



EtherCAT and CANopen Reference Manual

CDHD2 Servo Drive

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Contact Information

Servotronix Motion Control Ltd.
21C Yagia Kapayim Street
Petach Tikva 49130, Israel
Tel: +972 (3) 927 3800
Fax: +972 (3) 922 8075
Website: www.servotronix.com

Technical Support

If you need assistance with the installation and configuration of the product, contact Servotronix Technical Support: tech.support@servotronix.com

Contents

1	Introduction	
1.1	About This Manual.....	17
1.2	Manual Format – Object Dictionary	17
2	Fieldbus Wiring and Setup	
2.1	Fieldbus Wiring – Examples.....	19
2.1.1	CDHD2 – EtherCAT Configuration – softMC 7 Controller – Example.....	19
2.1.2	CDHD2 – EtherCAT Configuration – Beckhoff Controller – Example	20
2.1.3	CDHD2 – CAN Configuration – softMC 7 Controller – Example	21
2.1.4	CDHD2 – CAN Configuration – Beckhoff Controller – Example.....	22
2.2	Node Address	22
2.2.1	Node Address in CANopen Network.....	22
2.2.2	Node Address in EtherCAT Network.....	23
2.3	Termination Resistor Switch.....	23
2.3.1	Termination Resistor Switch in CANopen Network	23
2.3.2	Termination Resistor Switch in EtherCAT Network	23
2.4	Command Interface Mode.....	23
2.4.1	Communication in CANopen Network.....	24
2.4.2	Communication in EtherCAT Network.....	24
2.5	CAN Bus Bit Rate.....	25
2.6	Interpolation Time (Cyclic Synchronous).....	25
3	Configuring softMC Controller for CDHD2 EtherCAT	
4	Configuring Beckhoff Controller for CDHD2 EtherCAT	
4.1	CDHD2 Hardware and Software Settings	27
4.2	Communication between Controller and PC.....	27
4.3	Communication between Controller and Drive.....	31
4.4	Generating Motion.....	33
4.4.1	Setup for Motion.....	33
4.4.2	Generating Motion in Cyclic Synchronous Position Mode	41
4.4.3	Generating Absolute and Relative Motion	43
4.4.4	Generating a Step Motion.....	44
5	Configuring Keba Controller for CDHD2 EtherCAT	
6	CANopen Operation	
6.1	Device Communication	47
6.2	Communication Objects	48
6.2.1	Service Data Communication.....	48
6.2.2	Process Data Communication.....	48
6.3	Device Control and State Machine.....	50
6.4	Indicating the Operating State.....	51
6.5	Changing the Operating State	53
6.6	Starting and Changing an Operating Mode	54
6.7	Profile Position Mode	55
6.8	Homing Mode.....	58
6.9	Profile Velocity Mode.....	61
6.10	Profile Torque Mode	64
6.11	Interpolated Position Mode	67

6.12	Cyclic Synchronous Position Mode	70
6.13	Cyclic Synchronous Velocity Mode.....	72
6.14	Cyclic Synchronous Torque Mode	74
6.15	Digital Output Operation	75
7	Units	
7.1	Units Overview.....	77
7.2	Position Units	77
7.2.1	Position Resolution - Examples	78
7.3	Velocity Units.....	79
7.4	Acceleration/Deceleration Units.....	79
7.5	Current Units	80
7.6	Torque Units	80
7.7	Rotary Motor Units – Examples.....	80
7.8	Linear Motor Units - Examples.....	83
8	Communication Objects	
1000h:	Device Type.....	86
1001h:	Error Register	87
1002h:	Manufacturer Status Register (CAN only)	88
1003h:	Predefined Error Field (CAN only)	88
1005h:	COB-ID SYNC (CAN only)	89
1006h:	Communication Cycle Period (CAN only)	90
1007h:	Synchronous Window Length.....	90
1008h:	Manufacturer Device Name (CAN only)	91
1009h:	Manufacturer Hardware Version (CAN only)	91
100Ah:	Manufacturer Software Version (CAN only)	92
100Ch:	Guard Time (CAN only)	92
100Dh:	Life Time Factor (CAN only)	93
1010h:	Store Parameter Field.....	94
1011h:	Restore Default Parameters (CAN only).....	95
1014h:	COB-ID EMCY (CAN only).....	96
1015h:	Inhibit Time Emergency (CAN only)	96
1016h:	Heartbeat Consumer Entries (CAN only).....	97
1017h:	Producer Heartbeat Time (CAN only)	99
1018h:	Identity Object	100
1019h:	Synchronous Counter Overflow Value (CAN only)	102
1029h:	Error Behavior (CAN only)	103
1200h:	Server SDO Parameter 1 (CAN only)	104
1201h:	Server SDO Parameter 2 (CAN only)	105
1400h:	Receive PDO Communication Parameter 1 (CAN only)	107
1401h:	Receive PDO Communication Parameter 2 (CAN only)	109
1402h:	Receive PDO Communication Parameter 3 (CAN only)	111
1403h:	Receive PDO Communication Parameter 4 (CAN only)	113
1600h:	Receive PDO Mapping Parameter 1	115
1601h:	Receive PDO Mapping Parameter 2.....	118
1602h:	Receive PDO Mapping Parameter 3.....	121
1603h:	Receive PDO Mapping Parameter 4.....	124
1800h:	Transmit PDO Communication Parameter 1.....	127
1801h:	Transmit PDO Communication Parameter 2.....	130
1802h:	Transmit PDO Communication Parameter 3.....	133
1803h:	Transmit PDO Communication Parameter 4.....	136
1A00h:	Transmit PDO Mapping Parameter 1	139

1A01h: Transmit PDO Mapping Parameter 2	142
1A02h: Transmit PDO Mapping Parameter 3	145
1A03h: Transmit PDO Mapping Parameter 4	148
1C00h: Sync Manager Communication Type (ECT only)	151
1C10h: Sync Manager 0 PDO Assignment (ECT only)	153
1C11h: Sync Manager 1 PDO Assignment (ECT only)	153
1C12h: Sync Manager 2 PDO Assignment (ECT only)	153
1C13h: Sync Manager 3 PDO Assignment (ECT only)	155

9 Manufacturer-Specific Objects

2002h: Configuration Command	157
2003h: Current BEMF Compensation Gain	157
2006h: Current KI Gain	158
2007h: Current KP Gain	158
200Ah: HD Anti-Vibration 2 Filter – Gain	159
200Bh: HD Anti-Vibration 1 Filter - Sharpness	159
200Ch: HD Anti-Vibration 1 Filter - Gain	160
200Eh: Automatic Homing Mode	160
200Fh: Fieldbus Unit Scaling	161
2010h: Velocity Loop Bandwidth for Pole Placement	161
2011h: Warning Bits	162
2013h: Voltage Command D Component	163
2014h: Voltage Command Q Component	164
2015h: Drive Name (CAN only)	164
2016h: Electrical Position	165
2017h: HD Derivative Gain	165
2018h: HD Integral Gain	166
2019h: HD Derivative-Integral Gain	166
201Ah: HD Proportional Gain	167
201Bh: HD Global Gain	167
201Ch: Position Acceleration Feedforward to Current	168
201Dh: Position Acceleration Feedforward	168
201Eh: Position Derivative Gain	169
201Fh: Position Proportional Adaptive Gain	169
2020h: Position Integral Gain	170
2021h: Position Integral Saturation Output	170
2022h: Position Proportional Gain	171
2023h: Position Velocity Feedforward	171
2024h: Motor Type	172
2025h: Velocity Feedforward Ratio	172
2026h: Velocity Integral Gain	173
2027h: Velocity Proportional Gain	173
2028h: Mechanical Angle	174
2029h: Motor Encoder Type	174
202Ah: Motor Encoder Index Position (CAN only)	175
202Bh: Motor and Feedback Direction	175
202Ch: Position Command Move Low Pass Filter	176
202Dh: Motor Feedback Mode	176
202Eh: Motor Foldback Status	177
202Fh: Motor Foldback Delay Time	177
2030h: Motor Foldback Disable	178
2031h: Motor Foldback Recovery Time	178

2032h: Motor Foldback Time Constant	179
2033h: Motor Foldback Current.....	179
2034h: Motor Foldback Fault Threshold.....	180
2035h: Motor Foldback Warning Threshold	180
2036h: Motor Peak Current	181
2037h: Rotor Inertia	181
2038h: Force Constant for Linear Motor	182
2039h: Torque Constant.....	182
203Ah: Motor Inductance.....	183
203Bh: Adaptive Gain at Continuous Motor Current	183
203Ch: Adaptive Gain at Peak Motor Current.....	184
203Dh: Mass of Linear Motor Without Load	184
203Eh: Motor Commutation Type	185
203Fh: Motor Name.....	185
2041h: Motor Setup.....	186
2042h: Motor Setup Status.....	186
2043h: Commutation Offset.....	187
2044h: Drive Temperature.....	188
2045h: Feedback Direction	189
2046h: Disabling Mode	190
2049h: Quick Stop Deceleration Time	190
204Ah: Active Disable Speed Threshold	191
204Bh: Active Disable Time.....	191
204Ch: Factory Restore.....	192
204Dh: Feedback Type	192
204Eh: Velocity Loop Output Filter Parameter 1	193
204Fh: Velocity Loop Output Filter Parameter 2	193
2050h: Velocity Loop Output Filter Mode	194
2051h: Foldback Status	194
2052h: Friction Compensation Negative Current	195
2053h: Friction Compensation Positive Current.....	195
2054h: Friction Compensation Negative Velocity Hysteresis.....	196
2055h: Friction Compensation Positive Velocity Hysteresis	196
2056h: Halls State	197
2057h: Invert Hall Signals	199
2058h: Hall Signals Type.....	201
205Ah: Harmonic Correction Feedback Parameter 1	201
205Bh: Harmonic Correction Feedback Parameter 2	203
205Dh: Harmonic Current ICMD Parameter 1.....	205
205Eh: Harmonic Current ICMD Parameter 2.....	207
2060h: HD Current Filter - Damping	209
2061h: HD Current Filter - Notch Filter Center	210
2062h: HD Current Filter - Notch Filter Bandwidth.....	210
2063h: Hold Position Command.....	211
2064h: Hardware Position External.....	211
2065h: Hardware Position (CAN only).....	212
2066h: Current D Axis	212
2067h: Current Q Axis.....	213
2068h: Current Feedforward Low Pass Filter	213
2069h: Drive Foldback Current Limit.....	214
206Ah: Drive Foldback Fault Threshold	214
206Bh: Drive Foldback Warning Threshold	215

206Ch: Gravity Compensation	215
206Fh: Encoder Index Position Feedback	216
2070h: Input Inversion	217
2071h: Dynamic Brake Current	218
2072h: Phase U Actual Current	219
2073h: Phase U Current Offset	219
2074h: Phase V Actual Current	220
2075h: Phase V Current Offset	220
2076h: Zero Procedure Current	221
2077h: Position Integral Saturation Input	221
2078h: Limit Switch Negative Status	222
2079h: Limit Switch Positive Status	222
207Ah: Load to Motor Inertia Ratio	223
207Bh: Drive Peak Current	223
207Ch: Drive Continuous Current	224
207Dh: Motor Pitch	224
207Eh: Motor Poles	225
207Fh: Motor Resistance	225
2080h: Motor Resolver Poles	226
2082h: Current KFF Gain	226
2083h: Torque Commutation Angle Advance at Motor Continuous Current	227
2084h: Torque Commutation Angle Advance at Motor Peak Current	227
2085h: Velocity Commutation Angle Advance at Motor Maximum Speed	228
2086h: Velocity Commutation Angle Advance at Motor Maximum Speed/2	228
2087h: HD Spring Filter	229
2088h: Position Backup	229
2089h: Position Backup Mode	230
208Ah: HD Maximum Adaptive Gain	230
208Bh: HD Current Filter - Second Notch Filter Bandwidth	231
208Ch: HD Current Filter - Second Notch Filter Center	231
208Dh: Emergency or Controlled Stop Current Limit	232
208Eh: Position Command	232
208Fh: HD Flexibility Compensation	233
2090h: Homing Status	233
2091h: HD Acceleration/Deceleration Spring Filter Gain	234
2095h: Position Offset	234
2096h: HD Anti-Vibration 1 Filter - Center Frequency	235
2097h: HD Anti-Vibration 2 Filter - Center Frequency	235
2099h: Current Level 1 for Digital Output Definition	236
209Ah: Current Level 2 for Digital Output Definition	236
209Bh: Output Inversion	237
209Ch: Output Mode	239
209Dh: Position Level 1 for Digital Output Definition	241
209Eh: Position Level 2 for Digital Output Definition	241
209Fh: Velocity Level 1 for Digital Output Definition	242
20A0h: Velocity Level 2 for Digital Output Definition	242
20A1h: Over-Voltage Threshold	243
20A2h: Software Enable Status	243
20A3h: Position Loop Position Error	244
20A4h: Phase Find Command	244
20A5h: Forced Electrical Position	245
20A6h: Phase Find Gain	245

20A7h: Phase Find Current.....	246
20A8h: Phase Find Mode.....	247
20A9h: Phase Find Status	248
20AAh: Phase Find Duration.....	248
20ABh: Position Loop Controller Mode.....	249
20ACh: Position Limiting Mode	249
20ADh: PRB Generator Frequency	250
20AEh: PRB Generator Mode	251
20AFh: PRB Generator Configuration	252
20B0h: Position Command Generator Target Error	254
20B1h: Position Command Generator Velocity	255
20B2h: PWM Frequency	255
20B3h: Gearing Mode	256
20B5h: In Position Indication	256
20B6h: Hardware Position External (DSP)	257
20B8h: Fault Relay Status.....	257
20B9h: Fault Relay Mode	258
20BAh: Remote Hardware Enable Status	258
20BBh: Resolver Amplitude Range	259
20BCh: Resolver Conversion Bandwidth.....	259
20BDh: Save/Load Status.....	260
20BEh: Sine/Cosine Calibration Command	260
20BFh: Sine/Cosine Calibration Mode.....	261
20C0h: Sine/Cosine Calibration Status.....	261
20C1h: Sine/Cosine Calibration Parameters (CAN only)	262
20C2h: Synchronization Mode	263
20C3h: Tracking Factor	264
20C4h: Motor Over-Temperature	264
20C5h: Motor Over-Temperature Clear Fault Level	265
20C6h: Motor Over-Temperature Mode	265
20C7h: Motor Temperature	266
20C8h: Motor Over-Temperature Time	266
20C9h: Motor Over-Temperature Fault Level.....	267
20CAh: Motor Over-Temperature Type.....	267
20CBh: Tamagawa Multi-Turn Reset.....	268
20CCh: Run Time (CAN only)	268
20CDh: Under-Voltage Mode	269
20CEh: Under-Voltage Recovery Mode	270
20CFh: Under-Voltage Threshold 64.....	270
20D0h: Under-Voltage Time	271
20D1h: Bus Voltage (DC)	271
20D3h: Velocity Error	272
20D4h: Velocity Loop Controller	272
20D5h: Velocity Design Conversion (CAN only).....	273
20D6h: Velocity Filter Mode	273
20D7h: Drive Version (CAN only)	274
20D8h: Velocity Loop Output Filter.....	274
20D9h: Velocity Loop Input Filter.....	278
20DAh: Advanced Pole Placement H Polynomial	281
20DBh: Advanced Pole Placement R Polynomial	286
20DCh: Wake No Shake Status (CAN only)	290
20DDh: Display Warnings (CAN only)	291

20DEh: External Encoder Resolution	291
20DFh: Zeroing Command	292
20E0h: Input Mode	293
20E1h: Rotary Address Switch	296
20E2h: Test Digital Display	296
20E3h: Encoder Simulation Mode	297
20E4h: Encoder Simulation Line Resolution	297
20E5h: Encoder Simulation Index Position	298
20E6h: Recording Done	298
20E7h: Get Recorded Data (CAN only)	299
20E8h: Trigger Recording (CAN only)	302
20E9h: Stop Recording (CAN only)	304
20EAh: Record Command (CAN only)	305
20EBh: Recording Status	308
20ECh: Ready to Record	309
20EEh: Maximum Velocity for Drive and Motor	309
20EFh: Dead Time Compensation Minimal Level	310
20F0h: Maximum Current for Drive and Motor	310
20F2h: Analog Input 1	311
20F3h: Analog Input 1 Deadband	311
20F4h: Analog Input 1 Current Scaling	312
20F5h: Analog Input 1 Low Pass Filter	312
20F6h: Analog Input 1 Offset	313
20F7h: Analog Input 1 Velocity Scaling	313
20F8h: Analog Input 1 Zeroing	314
20F9h: Analog Input 2	314
20FAh: Analog Input 2 Deadband	315
20FBh: Analog Input 2 Current Scaling	315
20FCh: Analog Input 2 Low Pass Filter	316
20FDh: Analog Input 2 Offset	316
20FFh: Analog Input 2 Zeroing	317
2100h: Analog Input 2 Mode	318
2103h: Homing Command	319
2104h: Current Level for Homing on Hard Stop	319
2106h: Current Loop Compatibility Mode	320
2108h: Position Command Moving Average Filter	320
2109h: Position Command Smoothing Mode	321
210Bh: HD Anti-Vibration - Load to Motor Inertia Ratio	321
210Ch: HD Anti-Vibration Filter - Divider	322
210Dh: HD Current Filter Low Pass Filter Rise Time	322
2113h: Drive Ready	323
2114h: Drive Status (CAN only)	323
2115h: Step Command	325
2116h: Position Motion Ended	328
2117h: Units Linear Acc/Dec	328
2118h: Units Linear Position	329
2119h: Units Linear Velocity	329
211Ah: Units Rotary Acc/Dec	330
211Bh: Units Rotary Position	330
211Ch: Units Rotary Velocity	331
211Dh: Velocity Filter Pole Frequency	331
211Eh: Gearing	332

2120h: Gearing Acceleration Threshold.....	332
2121h: Gearing Filter Acceleration Feedforward.....	333
2122h: Gearing Filter Mode.....	333
2123h: Gearing Filter Depth.....	334
2124h: Gearing Filter Velocity and Acceleration Depth.....	334
2125h: Gearing Filter Velocity Feedforward.....	335
2126h: Gearing Ratio Numerator.....	335
2127h: Gearing Input Interpolation.....	336
2128h: Gearing Following Limits Mode.....	336
2129h: Gearing Ratio Denominator.....	337
212Ah: Drive Info (CAN only).....	337
212Bh: Torque Window.....	338
212Ch: Block Controlword.....	339
212Dh: HD Anti-Vibration 2 Filter - Sharpness.....	339
2131h: Touch Probe Event Counter.....	340
2133h: Analog Output Value.....	340
2134h: Analog Output Command.....	341
2135h: Analog Output Current Scaling.....	341
2136h: Analog Output Voltage Limit.....	342
2137h: Analog Output Mode.....	343
2138h: Analog Output Velocity Scaling.....	344
2139h: Secondary Feedback Mode.....	344
213Ah: Secondary Feedback Type.....	345
213Dh: Motor to Load Scaling Numerator.....	345
213Eh: Motor to Load Scaling Denominator.....	346
213Fh: Secondary Feedback Offset.....	346
2140h: Secondary Feedback Position Actual Value.....	347
2141h: Secondary Feedback Load Velocity.....	347
2142h: Primary Position Actual Value.....	348
2143h: Motor Velocity.....	348
2144h: Secondary Feedback Position Error Max.....	349
2145h: Secondary Feedback Position Error Threshold.....	349
2147h: Touch Probe Sampled Data Rising.....	350
2148h: Touch Probe Sampled Data Falling.....	352
2149h: Touch Probe Variables.....	354
214Ah: Software Position Limit Switch Hysteresis Value.....	354
214Bh: Touch Probe 1 Stable Input Level Duration.....	355
214Ch: sensAR Encoder Info (CAN only).....	355
214Eh: Position Modulo Mode.....	357
214Fh: Position Modulo Range.....	357
2150h: Counts Per Revolution.....	358
2158h: Force Digital Output State on Fault.....	359
2159h: Heartbeat Tolerance.....	360
215Ah: Sankyo Multi-Turn Reset.....	361
215Bh: Voltage State.....	361
215Ch: Voltage Non-Volatile State.....	362
2161h: Secondary Feedback Position.....	362
2162h: Secondary Feedback Offset - User Units.....	363
2168h: Secondary Feedback Position Error.....	363
216Bh: Touch Probe 2 Stable Input Level Duration.....	364
216Ch: CANopen Manufacturer Specific SDO Abort Code (CAN only).....	364
216Dh: Analog Input 2 Voltage in User Units.....	365

216Eh: Analog Input 2 Value Conversion - Denominator	366
216Fh: Analog Input 2 Value Conversion - Numerator	367
2170h: Analog Input 2 Value Conversion - Offset	367
2173h: Motor Pitch High Resolution	368
2176h: BiSS-C Protocol Properties	368
2179h: Halls-Only Commutation Mode	370
217Ah: Debug Position Command	371
217Bh: Zeroing MPHASE Value	371
217Ch: Reference Offset Value	372
217Dh: Hardware Version	372
2182h: Hardware Position External (FPGA)	374
2183h: Touch Probe 2 Event Counter	374
2184h: Touch Probe 2 Sampled Data Rising (CAN only)	375
2185h: Touch Probe 2 Sampled Data Falling	377
2186h: Multi-turn Encoder Reset (CAN only)	379
2187h: Ignore Absolute Encoder Battery Fault (CAN only)	379
2188h: Advanced Pole Placement D Polynomial	380
2189h: Advanced Pole Placement Global Gain	383
218Ah: PRB Current Command	384
218Bh: PRB Hold Mode	384
218Dh: Delayed Position Error	385
218Eh: Delay for Delayed Position Error	386
218Fh: KPP Change Mode	386
2191h: PCOM 1 Module Configuration	387
2192h: PCOM 2 Module Configuration	387
2193h: PCOM 1 Statusword	388
2194h: PCOM 2 Statusword	388
2195h: PCOM 1 Direction	389
2196h: PCOM 2 Direction	389
2197h: PCOM 1 Table Length	390
2198h: PCOM 2 Table Length	390
2199h: PCOM 1 Output Pulse Width	391
219Ah: PCOM 2 Output Pulse Width	391
219Bh: PCOM 1 Periodic Start	392
219Ch: PCOM 2 Periodic Start	392
219Dh: PCOM 1 Periodic End	393
219Eh: PCOM 2 Periodic End	393
219Fh: PCOM 1 Periodic Interval	394
21A0h: PCOM 2 Periodic Interval	394
21A1h: PCOM 1 Table Entry	395
21A2h: PCOM 2 Table Entry	397
21A3h: Differential Port Mode	399
21A4h: Secondary Feedback Direction	400
21A5h: Secondary Feedback Type AqB Encoder	401
21A6h: Secondary Feedback Resolution	401
21A8h: Motor Acceleration	402
21A9h: Secondary Feedback Acceleration	402
21AAh: Motor Deceleration	403
21ABh: Secondary Feedback Deceleration	403
21ACh: User Parameter	404
21ADh: Parameters Over FOE Results	404
2200h: Gantry Settings	406

2201h: Gantry Position Feedback.....	410
2202h: Gantry Velocity Feedback.....	411
2203h: Gantry Position Controllers Current Commands.....	413
2204h: Gantry Indicators.....	414
2205h: PCOM 1 Time Offset.....	416
2206h: PCOM 2 Time Offset.....	418
220Ah: Gearing Filter Depth.....	421
220Ch: Commutation Error Counter	421
220Dh: Commutation Error Threshold	422
220Eh: Commutation Velocity Deviation.....	422
220Fh: Commutation Index Deviation.....	423
2210h: Active Axis.....	423
2211h: Velocity Loop Second Filter Mode.....	424
2212h: Velocity Loop Second Filter Parameter 1	424
2213h: Velocity Loop Second Filter Parameter 2	425
2214h: Velocity Loop Second Filter User-Defined.....	425
2216h: HD Current Filter – First Notch Filter Mode	429
2217h: HD Current Filter – Second Notch Filter Mode.....	429
2218h: Error Correction Start Offset.....	430
2219h: Error Correction Active Entries	430
221Ah: Error Correction Start Position	431
221Bh: Error Correction Interval.....	432
221Ch: Error Correction Active Index.....	433
221Dh: Error Correction Set Index Value.....	433
221Eh: Error Correction Reset Parameters.....	435
221Fh: Error Correction Enable	435
2220h: Error Correction State	436
2221h: Error Correction PFB Raw.....	436
2222h: Error Correction Failed Index	437
2223h: Error Correction Units	437
2227h: EtherCAT Command Delay.....	438

10 Standard Servo Drive Objects

603Fh: Error Code.....	439
6040h: Controlword	440
6041h: Statusword.....	441
605Bh: Shutdown Option Code	442
605Ch: Disable Operation Option Code.....	443
605Dh: Halt Option Code	444
605Eh: Fault Response Options.....	445
6060h: Modes of Operation	446
6061h: Modes of Operation Display	447
6062h: Position Demand Value.....	448
6063h: Position Actual Internal Value.....	448
6064h: Position Actual Value	449
6065h: Following Error Window.....	450
6066h: Following Error Time Out.....	451
6067h: Position Window	452
6068h: Position Window Time.....	453
606Bh: Velocity Demand Value	453
606Ch: Velocity Actual Value	454
606Dh: Velocity Window.....	454

606Eh: Velocity Window Time	455
606Fh: Velocity Threshold	455
6070h: Velocity Threshold Time	456
6071h: Target Torque	456
6073h: Maximum Current	457
6074h: Torque Demand Value	458
6075h: Motor Rated Current	458
6076h: Motor Rated Torque	459
6077h: Torque Actual Value	459
6078h: Current Actual Value	460
6079h: DC Link Circuit Voltage	460
607Ah: Target Position	461
607Ch: Home Offset	462
607Dh: Software Position Limit	463
607Eh: Polarity	464
607Fh: Maximum Profile Velocity	465
6080h: Motor Maximum Speed	465
6081h: Profile Velocity in Profile Position Mode	466
6083h: Profile Acceleration	466
6084h: Profile Deceleration	467
6085h: Quick Stop Deceleration	468
6087h: Torque Slope	468
608Fh: Position Encoder Resolution	469
6091h: Fieldbus Gearing Ratio	470
6092h: Feed Constant	472
6098h: Homing Method	473
6099h: Homing Speeds	474
609Ah: Homing Acceleration	475
60B0h: Position Offset	476
60B1h: Velocity Offset	477
60B2h: Torque Offset	478
60B8h: Touch Probe Function	479
60B9h: Touch Probe Status	481
60BAh: Touch Probe 1 Position Positive Value	482
60BBh: Touch Probe 1 Position Negative Value	482
60BCh: Touch Probe 2 Position Positive Value	483
60BDh: Touch Probe 2 Position Negative Value	483
60C0h: Interpolation Submode	484
60C1h: Interpolation Data Record	485
60C2h: Fieldbus Interpolation Time	488
60C4h: Interpolation Data Configuration	490
60C5h: Maximum Acceleration	493
60C6h: Maximum Deceleration	493
60D0h: Touch Probe Source (CAN only)	494
60D5h: Touch Probe 1 Positive Edge Counter	495
60D6h: Touch Probe 1 Negative Edge Counter	496
60D7h: Touch Probe 2 Positive Edge Counter	496
60D8h: Touch Probe 2 Negative Edge Counter	497
60F2h: Positioning Option Code	498
60F4h: Following Error Actual Value	499
60FCh: Position Demand Internal Value	499
60FDh: Digital Inputs	499

60FEh: Digital Outputs.....	501
60FFh: Target Velocity	503
6502h: Supported Drive Modes.....	504
11 CANopen and EtherCAT Error Codes	
11.1 Warning Codes	505
11.2 Error Codes.....	505
11.3 Emergency Error (Fault) Codes.....	506

1 Introduction

1.1 About This Manual

Drive functionality is configured using various commands and variables, which are communicated over the serial port or over a fieldbus.

This manual describes the implementation of CANopen and CANopen over EtherCAT (CoE) communication in the CDHD2 servo drives.

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 Manual Format – Object Dictionary

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

nnnnh – Object Name

Object Description

Index	<i>nnnn</i>
Description	VarCom equivalent , where applicable. Description of the object.
Object Code	Variable | Array | Record
Data Type	INTEGER8 | INTEGER16 | INTEGER32 UNSIGNED8 | UNSIGNED16 | UNSIGNED32 REAL32 | VISIBLE_STRING

Entry Description for Variable and Record Objects

Access	Read/Write	Read and write access
	Read Only	Read only
	Constant	Read only access, value is constant
PDO Mapping	Yes | No	
Default Value	The object's default value.	
Lower Limit	The object's minimum value.	
Upper Limit	The object's maximum value.	
Units	When the object value implies units of measure, these units are specified.	

Entry Description for Array Objects

Sub-Index	<i>nnn</i>
Description	Description of the sub-index
Entry Category	Optional | Mandatory
Data Type	Integer8 | Integer16 | Integer32 Unsigned8 | Unsigned16 Unsigned32 | Real32 | Visible_String
Access	Read/Write Read and write access Read Only Read only Constant Read only access, value is constant
PDO Mapping	Yes | No
Default Value	The object's default value.
Lower Limit	The object's minimum value.
Upper Limit	The object's maximum value.
Unit	When the object value implies units of measure, these units are specified.

2 Fieldbus Wiring and Setup

2.1 Fieldbus Wiring – Examples

2.1.1 CDHD2 – EtherCAT Configuration – softMC 7 Controller – Example

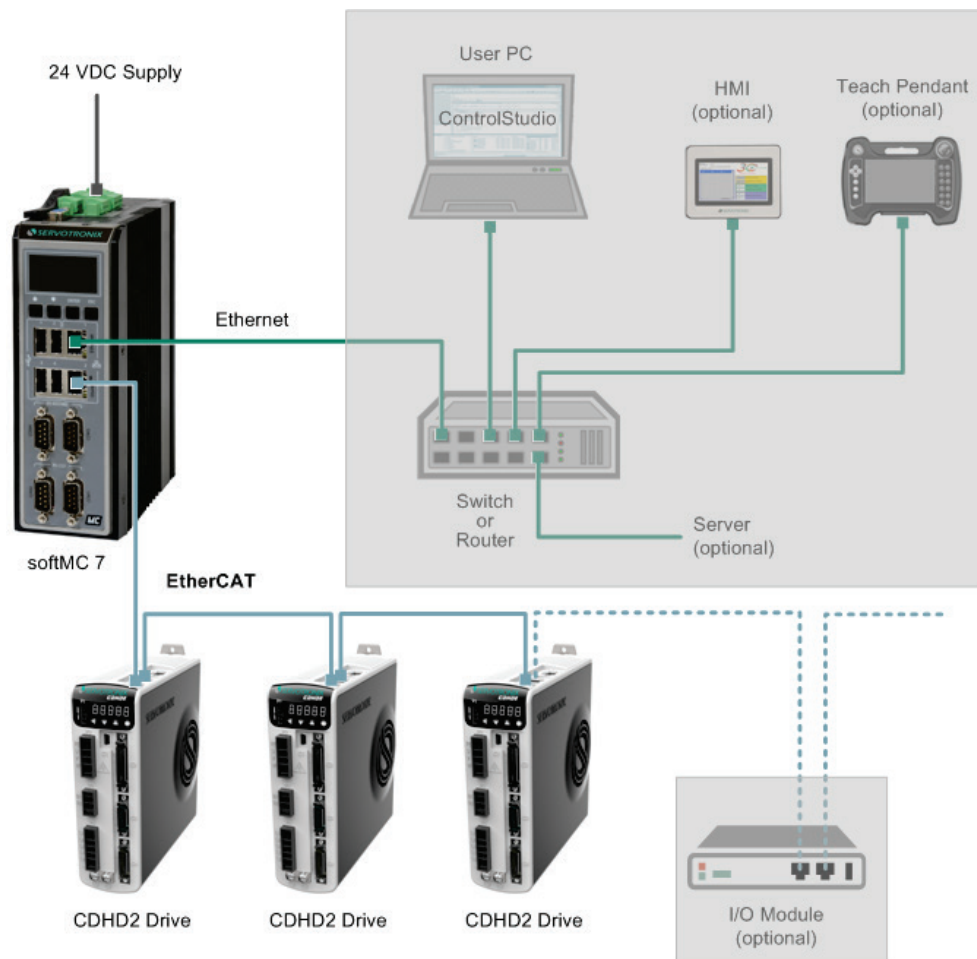


Figure 2-1. CDHD2 – EtherCAT Configuration – softMC 7 Controller – Example

2.1.2 CDHD2 – EtherCAT Configuration – Beckhoff Controller – Example

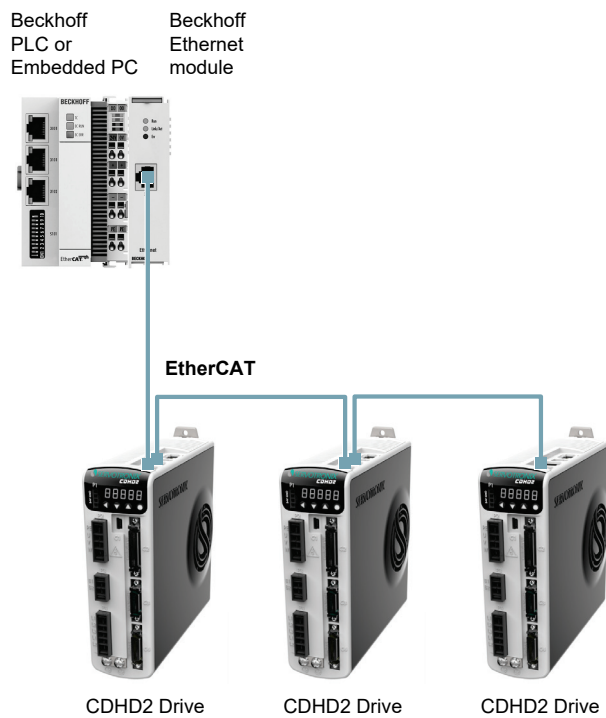


Figure 2-2. CDHD2 – EtherCAT Configuration – Beckhoff Controller – Example

2.1.3 CDHD2 – CAN Configuration – softMC 7 Controller – Example

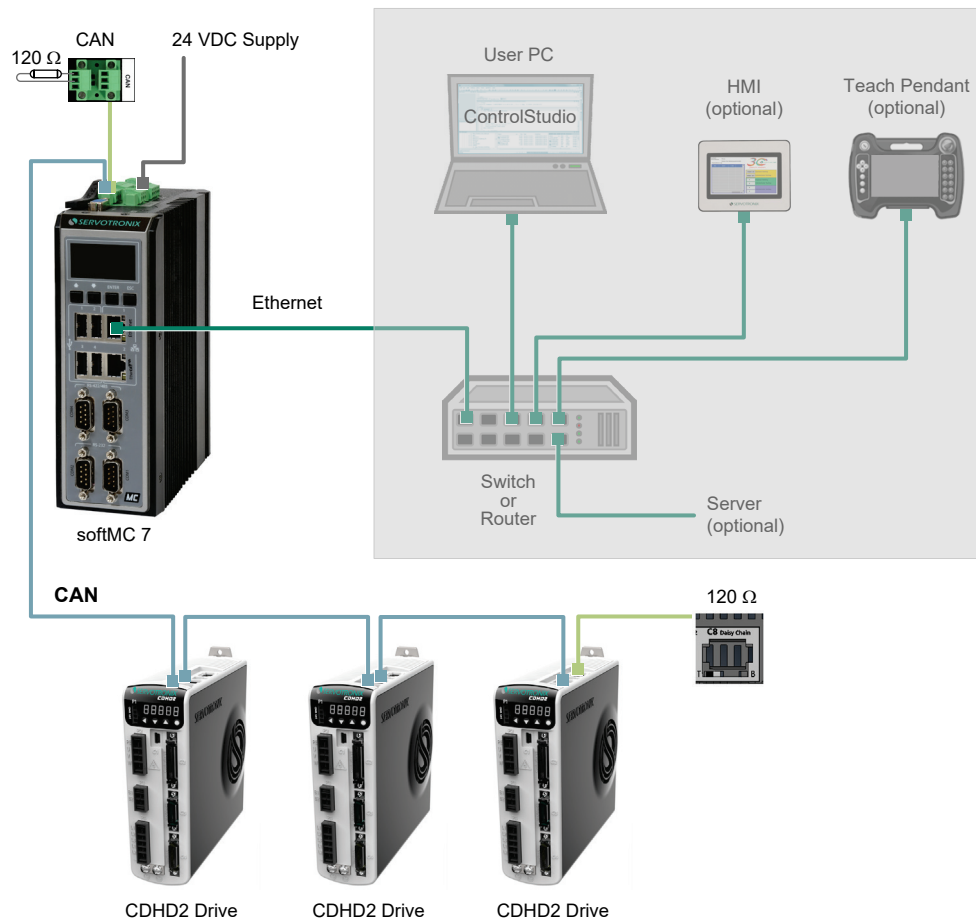


Figure 2-3. CDHD2 – CAN Configuration – softMC 7 Controller – Example

2.1.4 CDHD2 – CAN Configuration – Beckhoff Controller – Example

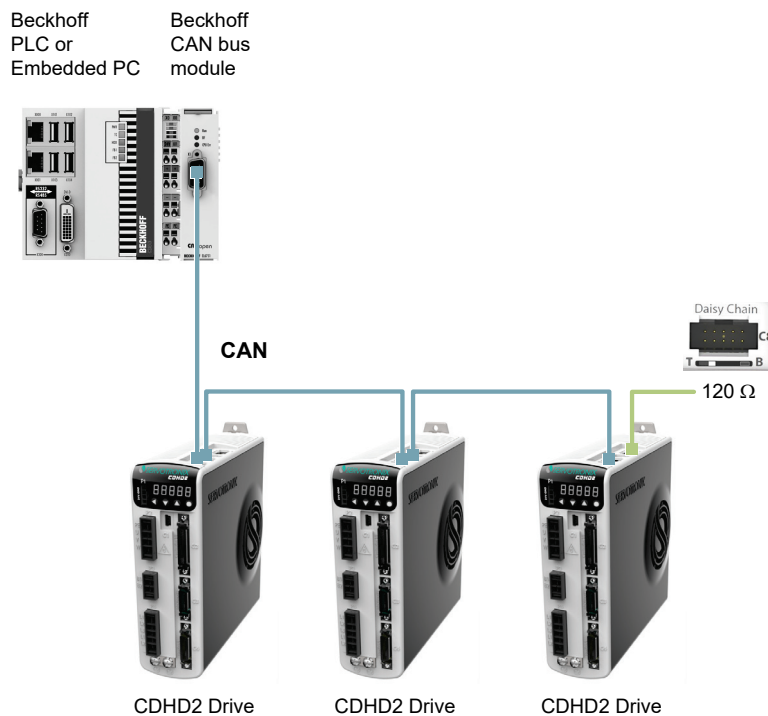


Figure 2-4. CDHD2 – CAN Configuration – Beckhoff Controller – Example

2.2 Node Address

2.2.1 Node Address in CANopen Network

Within a CANopen network, a unique node address (identification number) must be allocated to each individual CANopen device.

If only one drive is connected to the host computer, the drive address is set to 0 by default and does not need to be defined.

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 CANopen network cannot have the same address.

If the drive has a rotary address switch on the front panel, use it to set the drive communication address.

If the drive does not have a rotary address switch, set the drive address using operator panel parameter **P000**. Alternately use VarCom variable ADDR. Then enter SAVE and power-cycle the drive.

Note | The new address will take effect only after SAVE and power-cycle of the drive.

2.2.2 Node Address in EtherCAT Network

Within an EtherCAT network, a physical node address (identification number) does not have to be specifically allocated to a device; the EtherCAT controller will assign the address.

Two or more drives connected in the EtherCAT network can be set at the same physical address; the EtherCAT controller will automatically set the slave IDs.

2.3 Termination Resistor Switch

2.3.1 Termination Resistor Switch in CANopen Network

The CDHD2 has a Termination Resistor switch located on the top of the drive next to the daisy chain connector (C8).



Figure 2-5. Terminator Resistor Switch (T) on Interface 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.

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.

2.3.2 Termination Resistor Switch in EtherCAT Network

The terminator resistor switch is not required for EtherCAT drives.

2.4 Command Interface Mode

Certain parameters, such as the command interface mode, are factory-defined in the drive's firmware, and can only be modified by means of the ServoStudio software. Note that ServoStudio requires a serial (USB or RS232) connection between the host computer and the drive.

The drive is factory-configured for the fieldbus (CANopen/Ethernet) command interface, which is defined by the drive parameter `COMMODE=1`.

If necessary, you can enable the CANopen/EtherCAT command interface mode through the ServoStudio **Terminal** screen. Enter the command **COMMODE 1** and then issue the serial command **SAVE**.

Alternately, you can select the **Interface Mode** in the ServoStudio **Drive Information** screen.

EtherCAT/CANopen	SERVO ON (ACTIVE) and motion commands are transmitted via an EtherCAT/CANopen interface. Not applicable for CDHD2 AP models.	COMMODE 1
Serial/Pulse/Analog	SERVO ON (ACTIVE) and motion commands are transmitted via a serial, pulse or analog interface.	COMMODE 0

2.4.1 Communication in CANopen Network

When using **CANopen** communication, be sure the required **EDS file** is installed in the PLC controller or host computer. You can download the file from the Servotronics website or contact Technical Support.

Using any RJ45 cables:

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

Interfaces C5 and C6 (on **AF** model) share a LED that indicates the fieldbus status when communicating on a CANopen network.

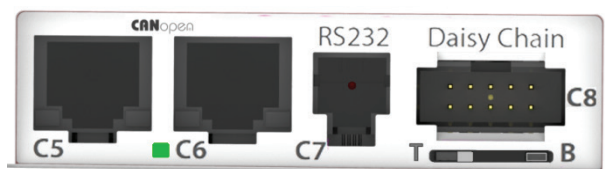


Figure 2-6. Top Panel Interfaces and LEDs on CANopen models

Green	Steadily lit – Operational (OP) state
	Fast flashing – Pre-Operational (PREOP) state
	Slow flashing – Stopped state
Red	Flashing – Error
Not Lit	Drive is not set to EtherCAT/CANopen command interface mode. (Refer to Command Interface Mode.)

2.4.2 Communication in EtherCAT Network

When using **EtherCAT** communication, be sure the required **XML file** is installed in the PLC controller or host computer. You can download the file from the Servotronics website or contact Technical Support.

Using any RJ45 cables:

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

Connectors C5 and C6 function as transmitter (Tx) and receiver (Rx), respectively.

Interfaces C5 and C6 (on **EB** and **EC** models) each have two LEDs that indicate the fieldbus status when communicating on an EtherCAT network:

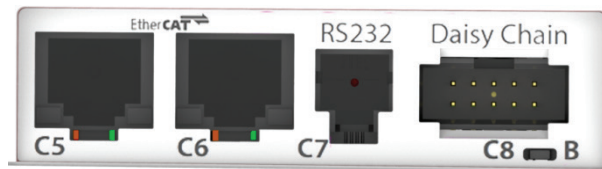


Figure 2-7. LEDs on Interfaces C5 and C6

Green	Flashing – Communication activity
	Not lit – No communication activity
Orange	Steadily lit – Operational (OP) state
	Slow flashing – Safe-Operation (SAFEOP) state
	Fast flashing – Pre-Operational (PREOP) state
	Very fast flashing – Bootstrap (BOOT) state
	Not lit – Initial (INIT) state

2.5 CAN Bus Bit Rate

The drive is factory-configured for a communication bus rate of 500 kbps, which is defined by the drive parameter CANBITRATE=3.

If necessary, you can manually set the value of CANBITRATE through the ServoStudio **Terminal** screen. After setting the CANBITRATE value, you must issue the serial command **SAVE**, and then power cycle the drive.

CANBITRATE can be set to one of the following values:

- 1 for 125 kbps
- 2 for 250 kbps
- 3 for 500 kbps (default)
- 4 for 1000 kbps (1 megabit)

2.6 Interpolation Time (Cyclic Synchronous)

The drive parameters FBITPRD and FBITIDX define, respectively, the interpolation time period and time index used for calculating fieldbus cyclic sync time in Cyclic Synchronous modes of operation.

The following equation defines the relationship of these parameters:

$$\text{FBITPRD} \times 10^{\text{FBITIDX}} = \text{Fieldbus cyclic synchronous time, in seconds.}$$

It is possible to set these parameters through object 60C2h sub-indices 1 and 2.

During INIT state, the host controller must set the values of the indexes to the equivalent cycle time as the controller.

If necessary, you can manually set the value of FBITPRD and FBITIDX through the ServoStudio **Terminal** screen. After setting FBITPRD and FBITIDX, you must issue the serial command **SAVE**.

3 **Configuring softMC Controller for CDHD2 EtherCAT**

Information on configuring the softMC controller for use with CDHD2 can be found in the softMC documentation wiki:

The articles should be accessed and read in the following order:

1. http://softmc.servotronix.com/wiki/Category:EtherCAT:EC_SETUP
2. http://softmc.servotronix.com/wiki/EtherCAT:EC_INSTALL_STX_CDHD

To login to the softMC wiki:

- Username: softMC
- Password: documentation

For additional assistance with the installation and configuration, contact Servotronix Technical Support.

4 Configuring Beckhoff Controller for CDHD2 EtherCAT

This chapter explains how to configure the Beckhoff controller for communication and operation with the CDHD2 EC models.

The application system consists of the following elements:

- CDHD2 EC Ethernet servo drive, servo motor, and ServoStudio software.
- Beckhoff controller with EtherCAT communication module, and TwinCAT software.

Notes

- Beckhoff controller refers to TwinCAT NC PTP (point-to-point axis positioning software).
- TwinCAT NC PTP includes axis positioning software (set value generation, position control), an integrated software PLC with NC interface, operating program for commissioning and an I/O connection to the axes through various fieldbuses. TwinCAT NC PTP replaces conventional positioning modules and NC controllers. The controllers that are simulated by the PC cyclically exchange data with drives and measuring systems via the fieldbus.
- Beckhoff controllers are programmed in accordance with the IEC 61131-3 programming standard.

4.1 CDHD2 Hardware and Software Settings

Make sure all hardware settings are in accordance with the instructions in the following sections.

- Fieldbus Wiring
- Node Address
- Termination Resistor Switch
- Command Interface Mode
- CAN Bus Bit Rate
- Interpolation Time

Before activating the TwinCAT System Manager, make sure the correct *.xml file (according to the firmware version) resides at C:\TwinCAT\Io\EtherCAT.

4.2 Communication between Controller and PC

Using TwinCAT software, establish communication between the controller and the PC by performing the following steps.

1. Activate TwinCAT software.

2. In the navigation pane, select **SYSTEM – Configuration**.
Then, in the **Version (Local)** tab, click **Choose Target**.

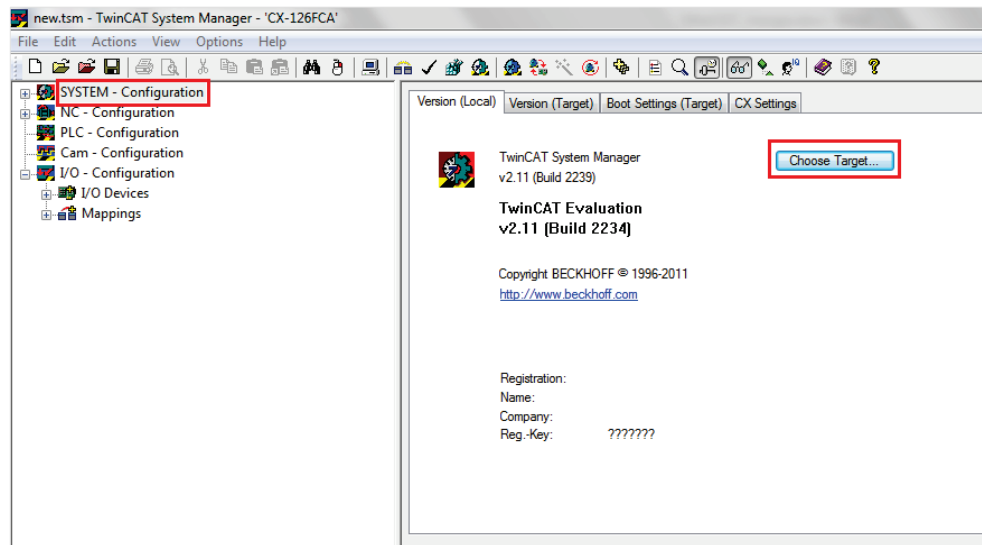


Figure 4-1.

3. Click **Search (Ethernet)** to search for the controller in the network.

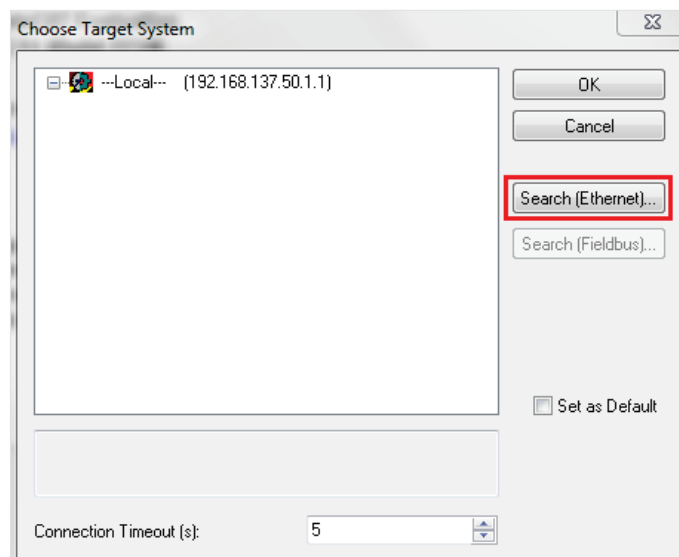


Figure 4-2.

4. Enable the option **IP Address**, and click **Broadcast Search**.
Wait for the controller name (in the format CX-xxx) to appear.

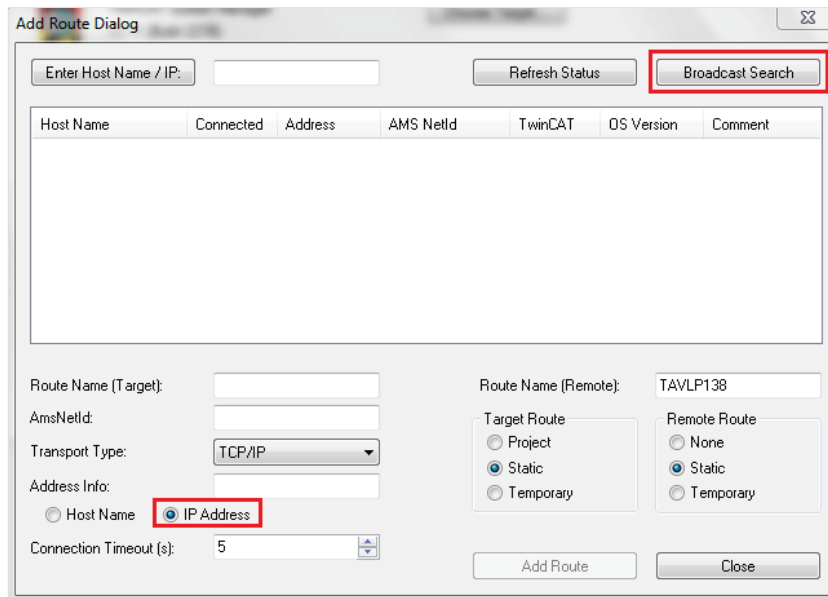


Figure 4-3.

5. After the controller appears, the option **Add Route** is displayed.
Click Add Route
6. In the Logon dialog box, enter the following:
User Name: **Administrator**
Password: 1
Click OK.

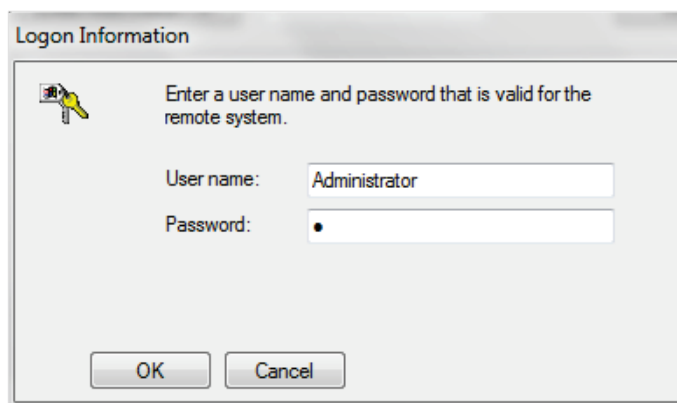


Figure 4-4.

7. In the Add Route dialog box, be sure an X appears next to the controller name. This means the controller is properly connected to the PC.
Close this dialog box.

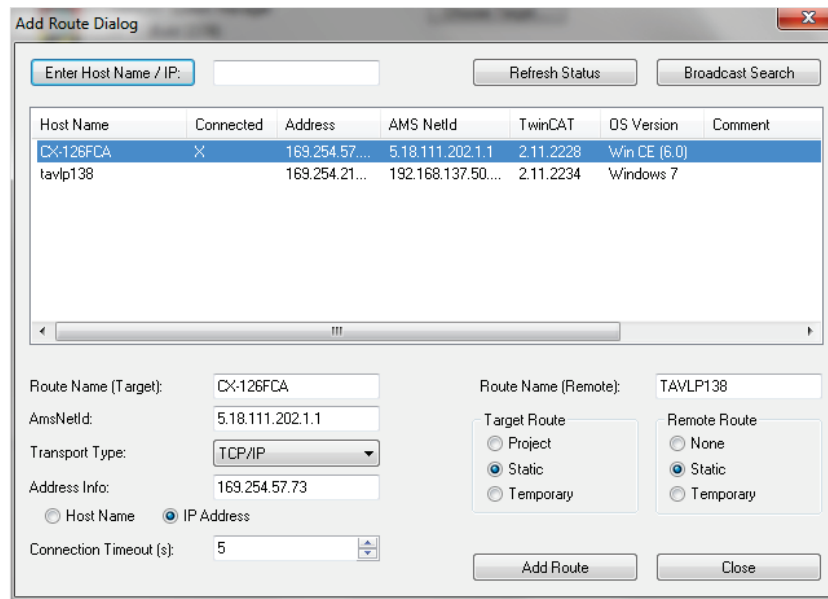


Figure 4-5.

8. In the Choose Target System dialog box, click on the controller, and click **OK**.

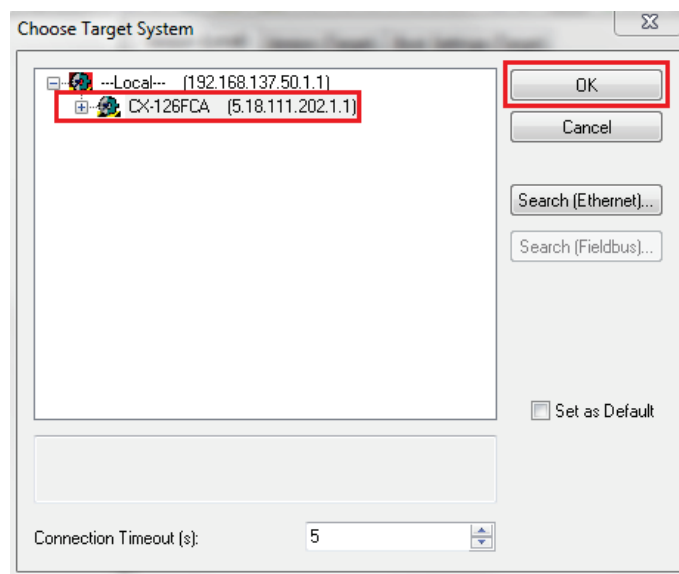


Figure 4-6.

9. Open the TwinCAT System Manager, and make sure it is in **Config Mode**.



Figure 4-7.

4.3 Communication between Controller and Drive

Using TwinCAT software, establish communication between the controller and the drive by performing the following steps.

1. In the navigation pane, expand **I/O–Configuration**, and then right-click on **I/O Devices**.
2. Select **Scan Devices**.
At the prompt, click **OK**.

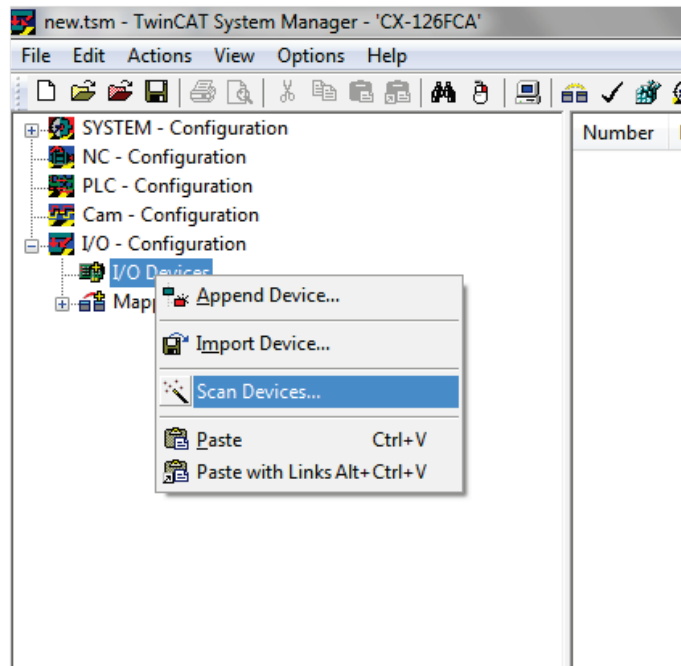


Figure 4-8.

3. After the scanning, detected devices are displayed.
CDHD2 is identified as **Device 1 (EtherCAT)**.

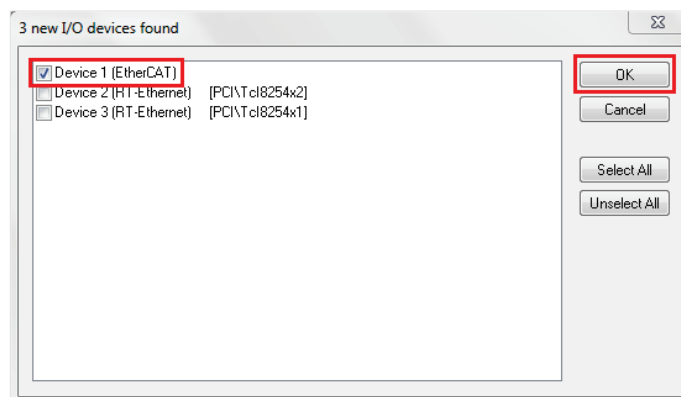


Figure 4-9.

4. Enable the option **Device 1 (EtherCAT)**, and click **OK**.
5. At the prompt to scan for boxes (slaves), click **Yes**.

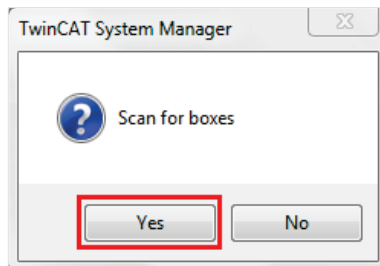


Figure 4-10.

6. At the prompt to append the linked axis to the NC configuration, click **Yes**.

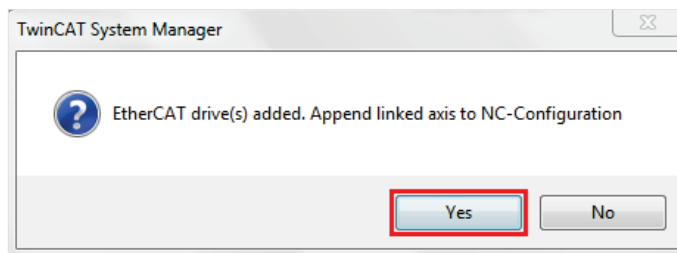


Figure 4-11.

7. At the prompt to activate FreeRun, click **No**.

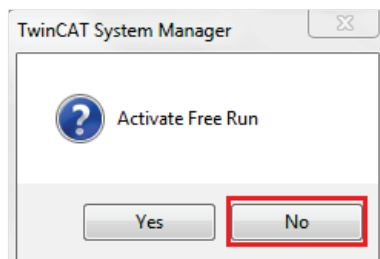


Figure 4-12.

8. At the end of this procedure, **Device 1 (EtherCAT)** is displayed in the navigation pane, with all components (TPDO and RPDO) listed and automatically linked to **NC-Configuration>Axis 1**.

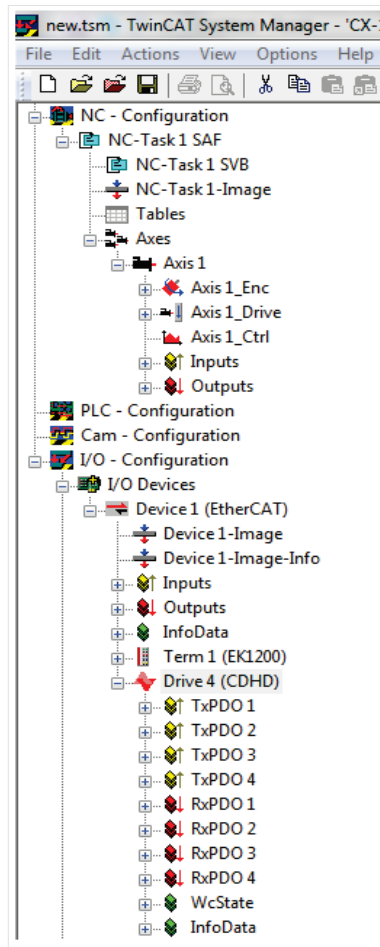


Figure 4-13.

4.4 Generating Motion

4.4.1 Setup for Motion

1. Open the TwinCAT System Manager, and make sure it is in **Config Mode**.



Figure 4-14.

2. In the navigation pane, expand **SYSTEM-Configuration**, and select **Real Time Settings**.
 - In the **Settings** tab, select Base Time = 1 ms.

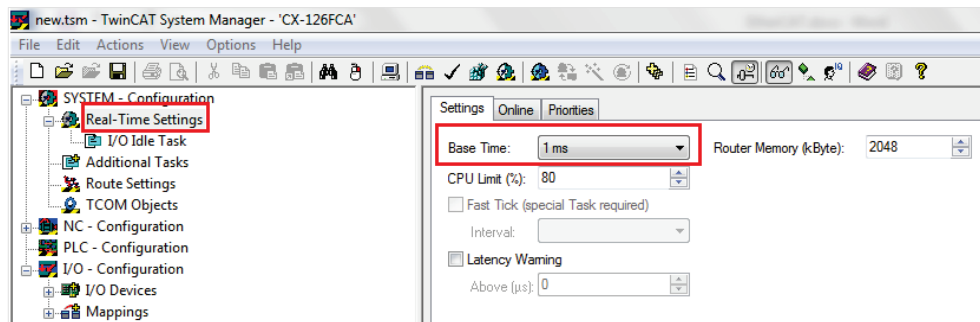


Figure 4-15.

- In the Priorities tab, enable Automatic Priority Management.

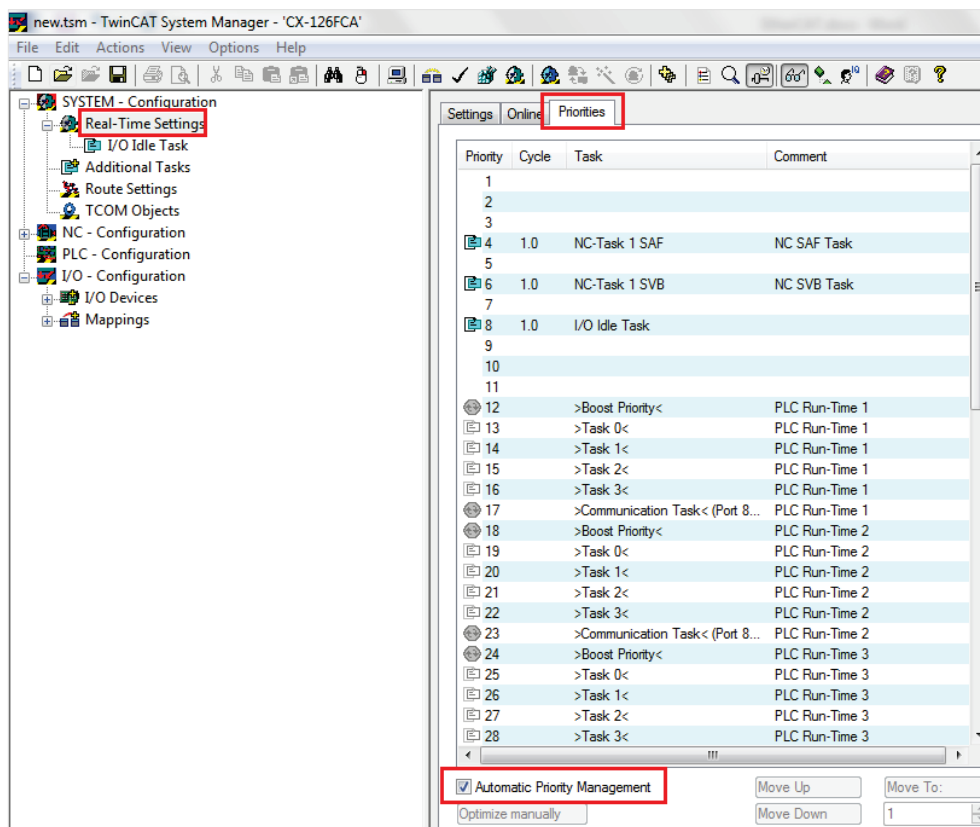


Figure 4-16.

- Expand **SYSTEM–Configuration**, and select **Real Time Settings > I/O Idle Task**.
In the **Task** tab, select **Cycle ticks = 1 ms**.

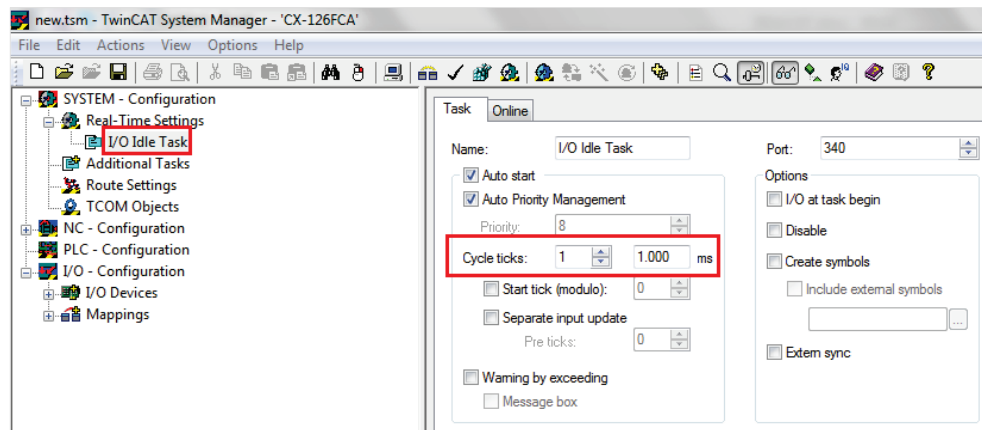


Figure 4-17.

4. In the navigation pane, expand **NC-Configuration**, and select **NC-Task1SAF**.
 - In the **Task** tab, select Cycle ticks = 1 ms.

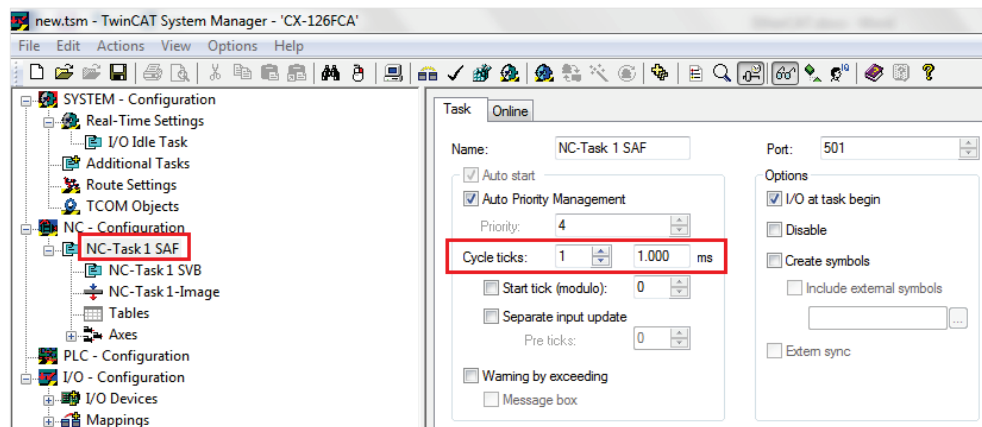


Figure 4-18.

5. Expand **NCT-Task1SAF**, and select **NC-Task1SVB**.
 - In the **Task** tab, select Cycle ticks = 1 ms.
 - Be sure the priority of NC-Task1 SVB has a higher value than the priority of NC-Task1 SAF.

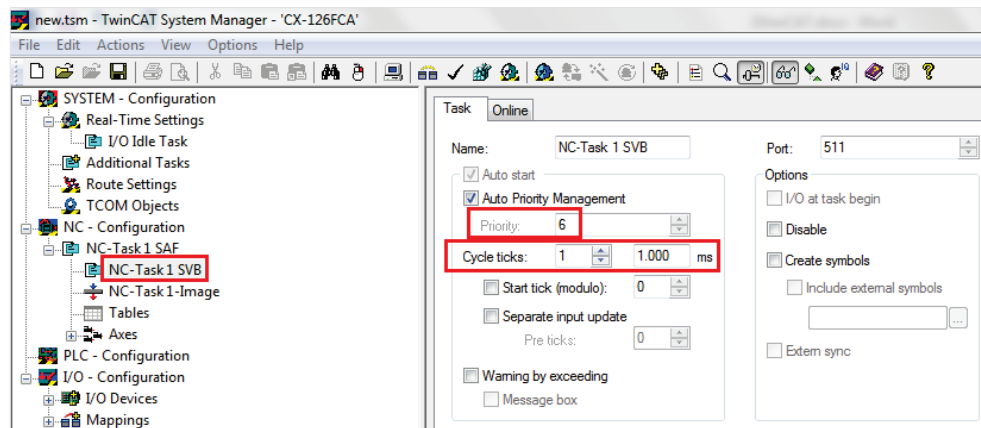


Figure 4-19.

6. Expand NC-Configuration > Axes > Axis 1 > Axis 1_Enc.

In the **Parameter** tab, do the following:

- Encoder Evaluation > Scaling Factor = 1.
Click Download.

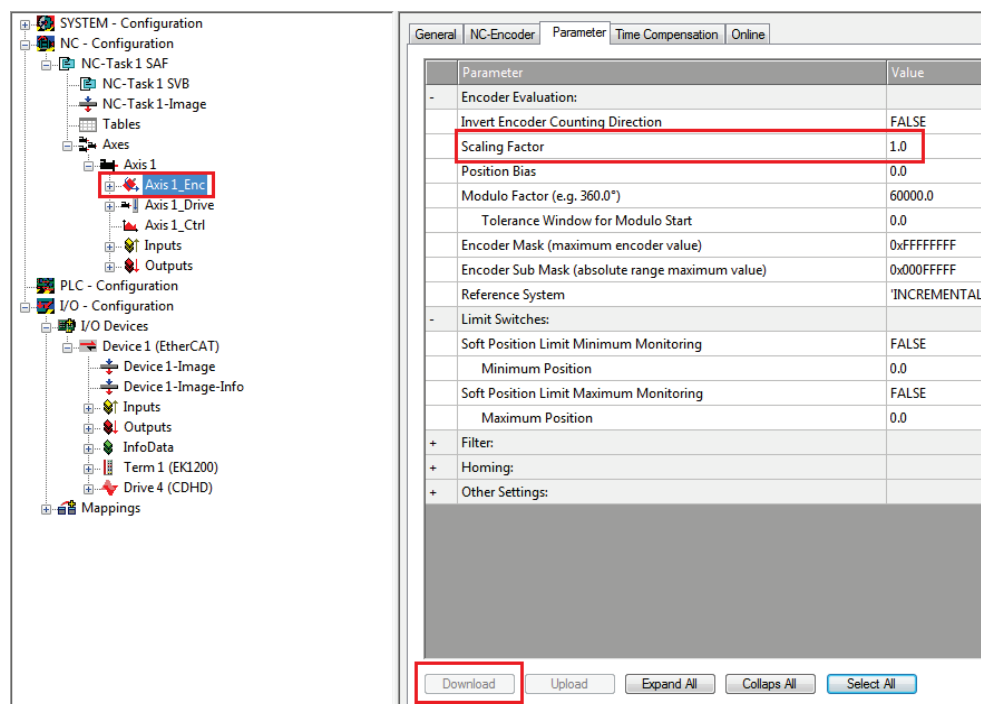


Figure 4-20.

- Encoder Evaluation > Modulo Factor = PNUM value.
Click Download.

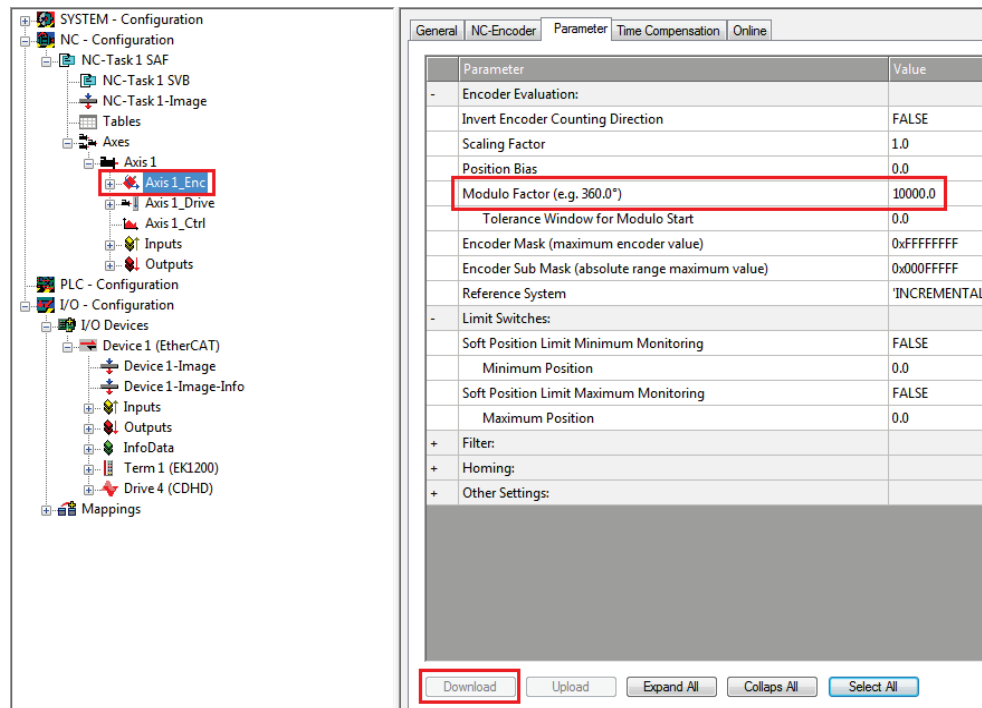


Figure 4-21.

7. Expand **NC-Configuration > Axes > Axis 1 > Axis 1_Ctrl**.

In the **Parameter** tab, do the following:

- **Monitoring > Position Lag Monitoring = FALSE**

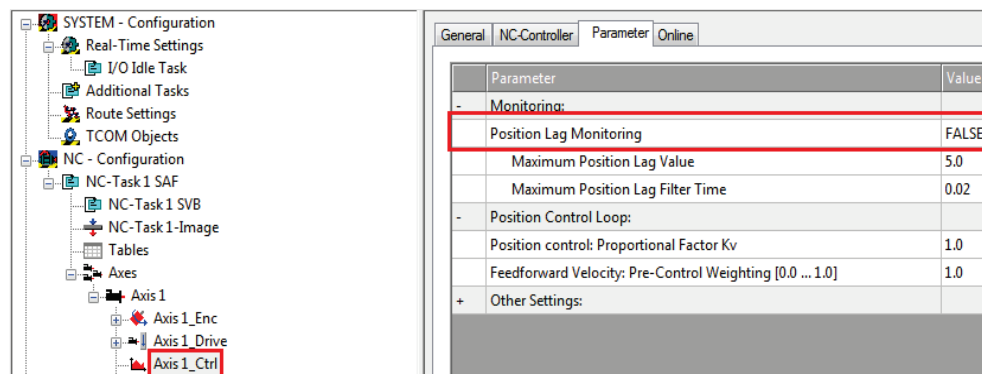


Figure 4-22.

8. Expand **IO-Configuration > I/O Devices > Device (EtherCAT)**, and select the drive indicated by the red icon.

- In the **DC** tab, select Operation Mode = **DC-Synchronous**

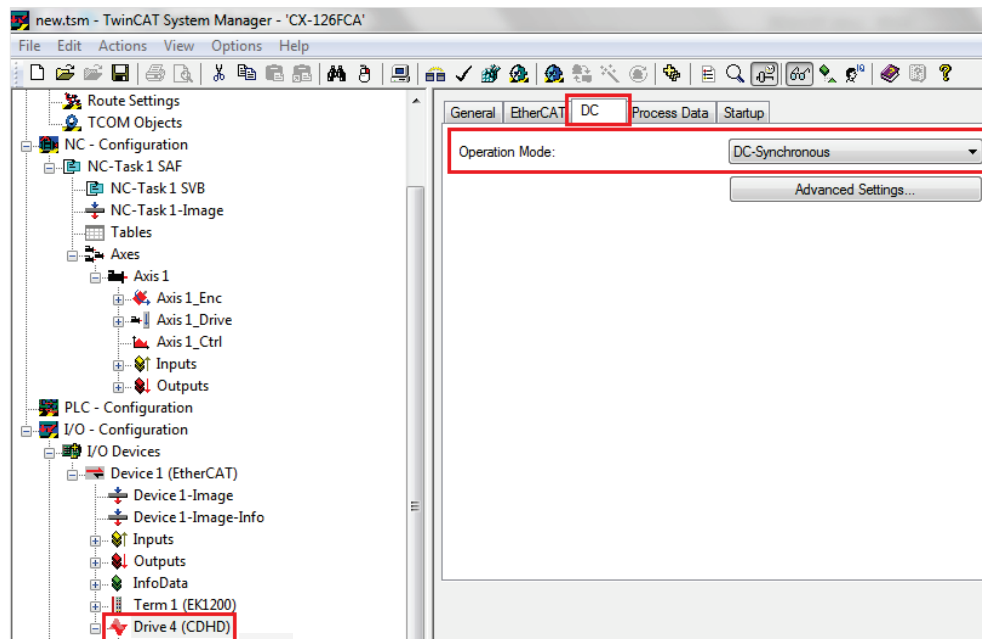


Figure 4-23.

9. Press the **Run Mode** button in the toolbar.



Figure 4-24.

Additional tabs are now available.

10. Go to the **CoE Online** tab.

The CoE Online tab shows only the SDO objects (CDHD2 EtherCAT parameters) that the drive manages.

Be sure the values of the objects 6060h and 60C2h are as follows:

- Object 6060h = 8

The drive is set to Cyclic Synchronous Position mode, OPMODE 8, through protocol object 6060h.

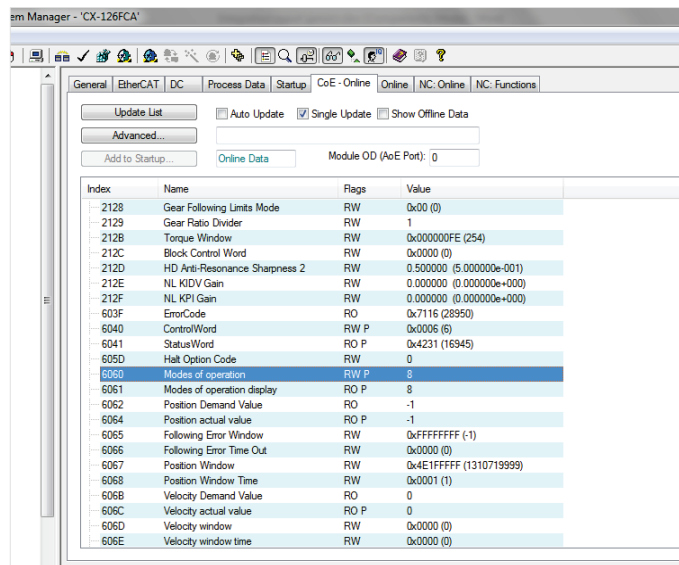


Figure 4-25.

- Object 60C2h:
Sub-index 01 (60C2:01) = 1
Sub-index 02 (60C2:02) = -3

The interpolation time for the Cyclic Synchronous operation modes is set through object 60C2h (sub-index 01 and sub-index 02).

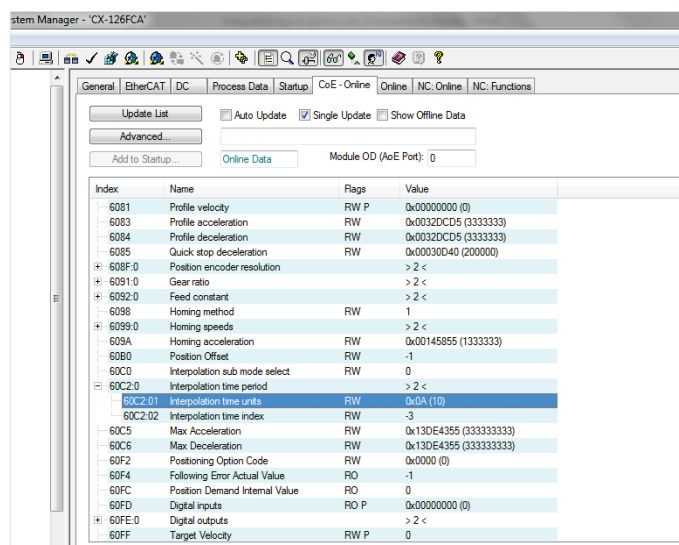


Figure 4-26.

Note The interpolation time must be configured with the same value of cycle ticks as configured in I/O Idle Task, in NC-Task 1 SAF, and in NC-Task 1 SVB.

11. Now activate **Run Mode** by pressing the following two buttons in the toolbar:

- Generate Mappings
- Check Configuration



Figure 4-27.

In Run mode, motion can be generated. The NC PTP communicates with the drive and receives all the values of the variables contained in each of the PDO objects (which were automatically mapped by the controller).

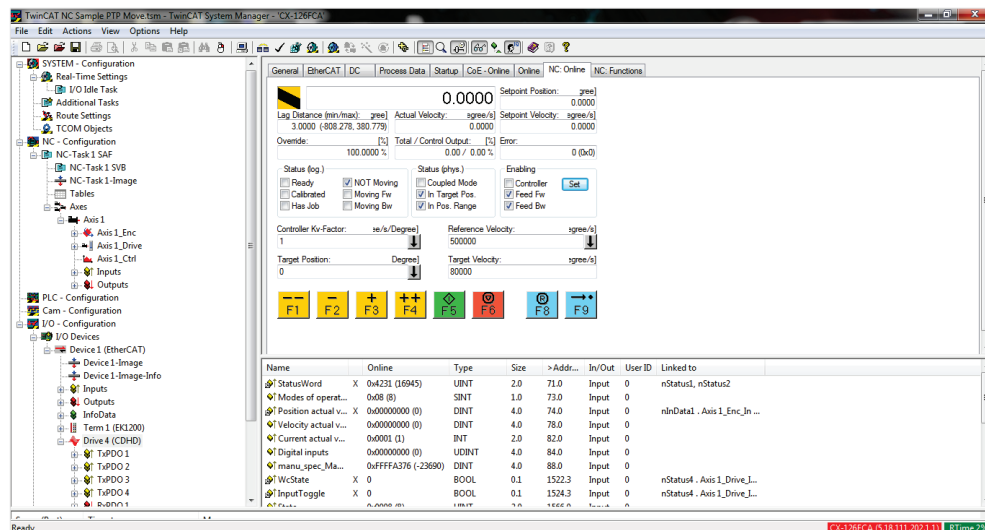


Figure 4-28.

12. In the NC-Online tab, test communication with the drive:

Take hold of the motor shaft, and turn it manually; check whether the position feedback value changes.

Refer to the following figure, which shows the various functions.

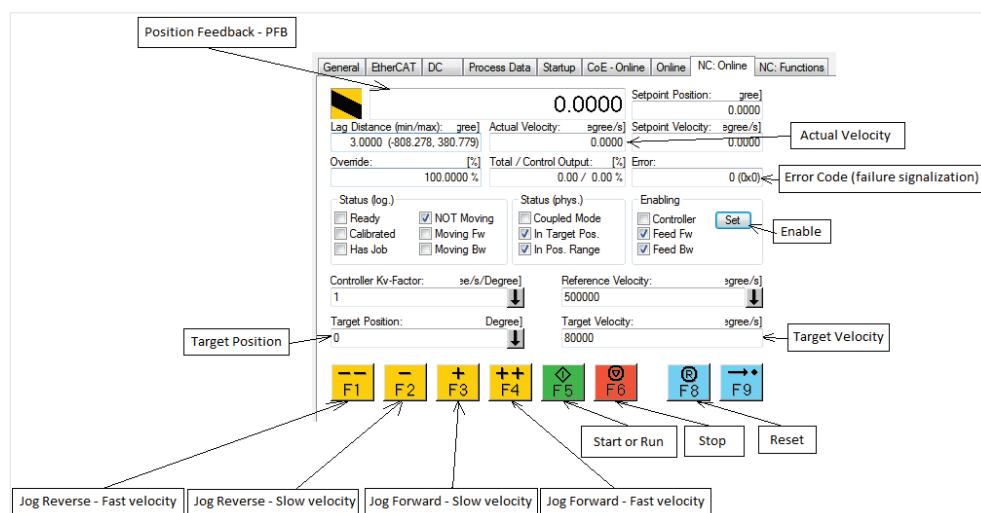


Figure 4-29.

4.4.2 Generating Motion in Cyclic Synchronous Position Mode

The following steps demonstrate how to generate a motion in Cyclic Synchronous Position mode. In the **NC-Online** tab, you will send a target position with a velocity to the drive. The controller will execute a motion profile.

1. Enable the drive:
 - a. NC-Online Screen > **Enabling** > **Set**
 - b. Enable the options: **Controller**, **Feed Fw** and **Feed Bw**, or select **All**
 - c. **OK**

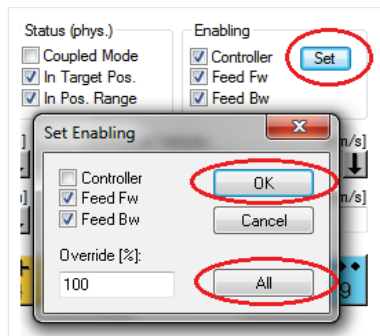


Figure 4-30.

Note To disable the drive:
NC-Online Screen > **Enabling** > Clear the option **Controller** > **OK**

2. Use the motion buttons – F1, F2, F3 and F4 to generate the following motion profiles.
Configure the velocity in the controller using **NC-Configuration** > **NC-Task1 SAF** > **Axes** > **Axis1** > **Parameters** > **Manual Velocity** (Slow and Fast), as shown in the following figure.

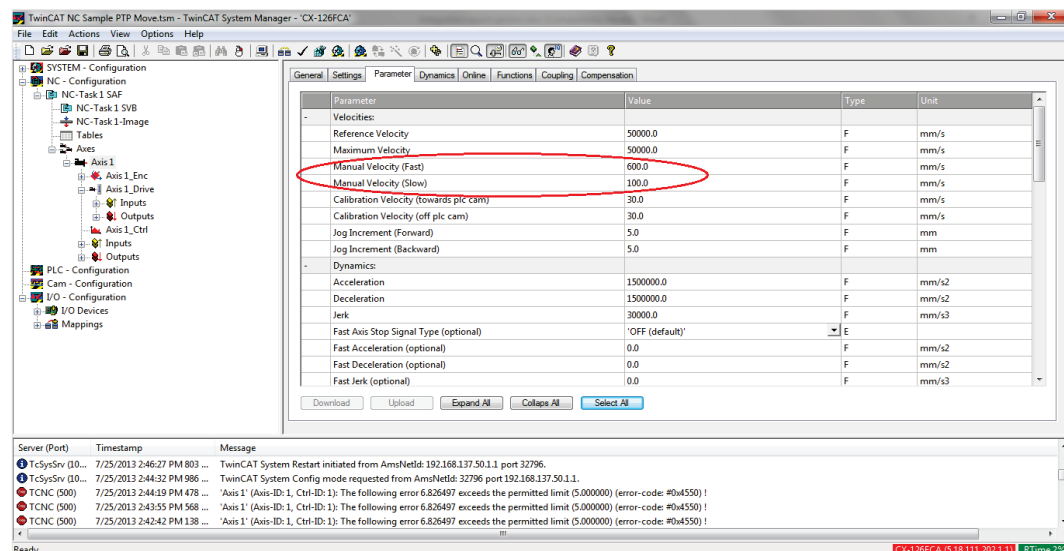


Figure 4-31.

- F1: Sends a jog command in the negative direction (CCW) with a fast velocity.
 - F2: Sends a jog command in the negative direction (CCW) with slow velocity.
 - F3: Sends a jog command in the positive direction (CW) with slow velocity.
 - F4: Sends a jog command in the positive direction (CW) with fast velocity.
3. Set values for **Target Position** and **Target Velocity** as shown in the following figure.

The screenshot shows the Beckhoff motion control software interface with the following data:

Parameter	Value	Unit
Current Position	49999.0000	mm
Setpoint Position	50000.0000	mm
Lag Distance (min/max)	1.0000 (-192.669, 436.048)	mm
Actual Velocity	0.0000	mm/s
Setpoint Velocity	0.0000	mm/s
Override	100.0000 %	%
Total / Control Output	0.00 / 0.00 %	%
Error	0 (0x0)	
Controller Kv-Factor	1	mm/s/mm
Reference Velocity	50000	mm/s
Target Position	50000	mm
Target Velocity	30000	mm/s

Status (log.):

- ☒ Ready
- ☒ NOT Moving
- ☐ Calibrated
- ☐ Moving Fw
- ☐ Has Job
- ☐ Moving Bw

Status (phys.):

- ☐ Coupled Mode
- ☒ In Target Pos.
- ☒ In Pos. Range

Enabling:

- ☒ Controller
- ☒ Feed Fw
- ☒ Feed Bw

Buttons at the bottom: F1 (yellow), F2 (yellow), F3 (yellow), F4 (yellow), F5 (green), F6 (red), F8 (blue), F9 (blue).

Figure 4-32.

4. Press F5 (green button) to start the motion profile in Synchronous Position mode.
- Press F6 (red button) to stop the motion.
 - Press F8 (blue button) to clear any faults.

The graph in the following figure reflects the motion performed:

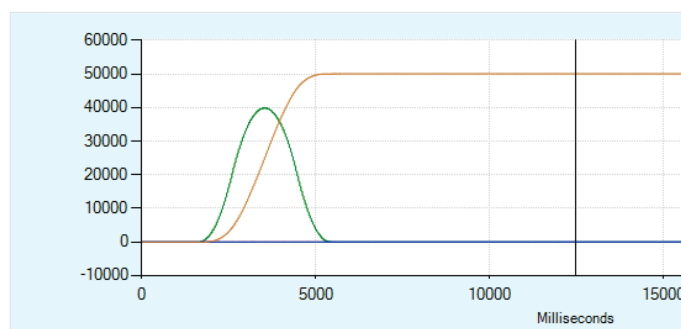


Figure 4-33.

- Brown line = Position feedback – PFB
- Green line = Point to point generator velocity command – PTPVCMD
- Blue line = Position error – PE

- X axis = milliseconds, Y axis = counts

4.4.3 Generating Absolute and Relative Motion

To generate absolute or relative motion in Position Profile mode, refer to the following two figures, and do the following:

1. Go to the **Functions** tab.
2. Configure the target position, the target velocity, the acceleration and deceleration, and the jerk of the motion.

The screenshot shows the 'Functions' tab of the Beckhoff Position Profile mode configuration window. The window has a tabbed interface with 'General', 'Settings', 'Parameter', 'Dynamics', 'Online', 'Functions', 'Coupling', and 'Compensation'. The 'Functions' tab is active, displaying a large digital readout (DRO) showing '28571.0000' and a 'Setpoint Position' of '28492.5000'. Below the DRO, the 'Extended Start' section contains fields for 'Start Mode' (set to 'Absolute'), 'Target Position' (0 [Degree]), 'Target Velocity' (5000 [Degree/s]), 'Acceleration' (1000 [Degree/s²]), 'Deceleration' (5000 [Degree/s²]), and 'Jerk' (8000 [Degree/s³]). A 'Last Time' field shows '33.78000 [s]'. The 'Raw Drive Output' section has 'Output Mode' (Percent) and 'Output Value' (10 [%]). The 'Set Actual Position' and 'Set Target Position' sections both have 'Absolute' selected and a value of '0'.

Figure 4-34.

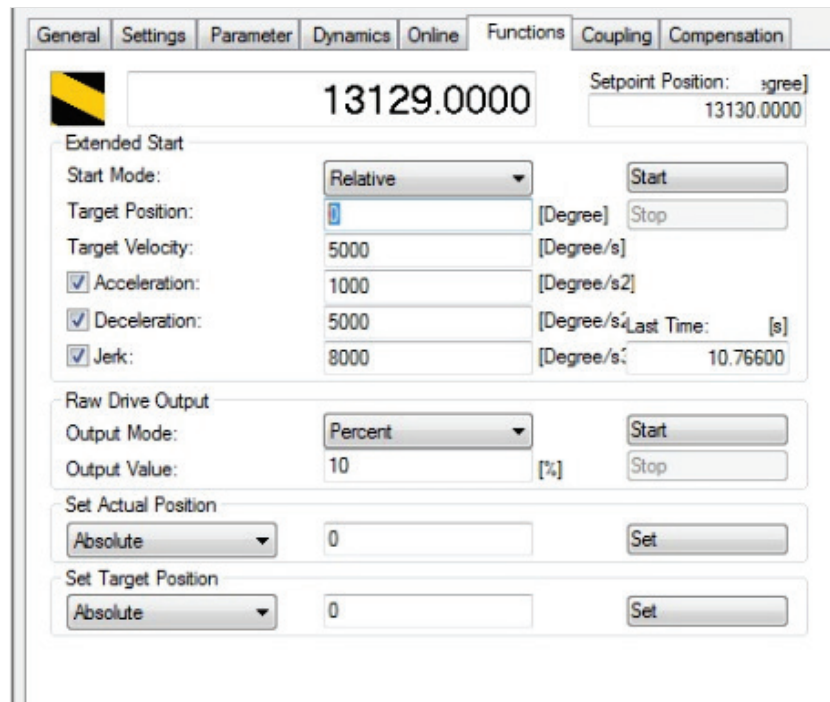


Figure 4-35.

4.4.4 Generating a Step Motion

To generate a step sequence in the Velocity profile, refer to the following two figures, and do the following:

1. Go to the **Functions** tab.
2. Configure the target velocity, and a time (duration) for the step.

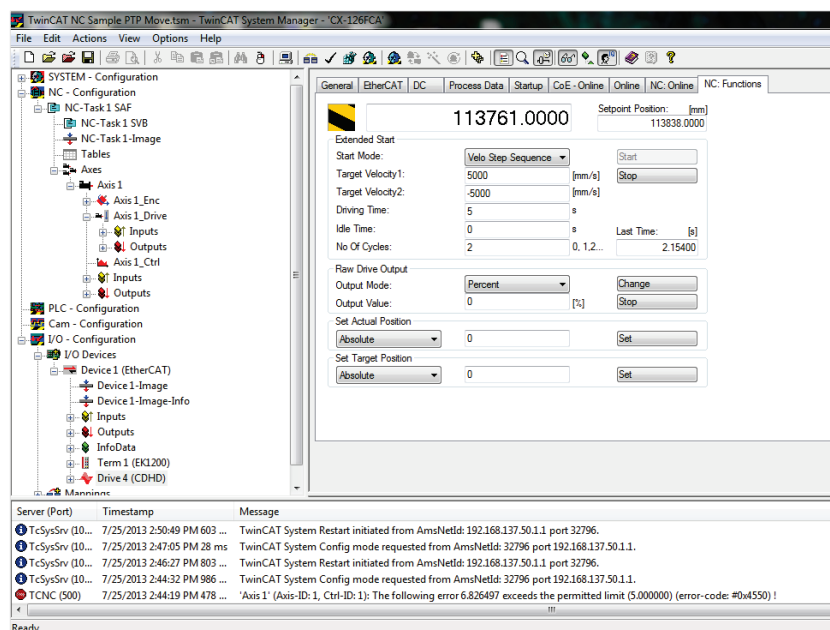


Figure 4-36.

The graph in the following figure reflects the motion performed:

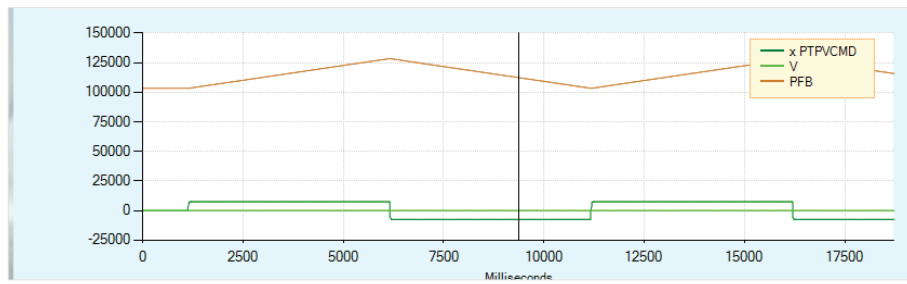


Figure 4-37.

- Brown line = Position feedback – PFB
- Dark green line = Point to point generator velocity command – PTPVCMD
- Light green line = Velocity – V
- X axis = milliseconds, Y axis = counts

5 Configuring Keba Controller for CDHD2 EtherCAT

To configure the Keba motion controller for use with CDHD2 EtherCAT drive, a customized set of files need to be installed on the PC.

To obtain these files, and for assistance with the installation and configuration, contact Servotronix Technical Support.

- **CustomDrivesIO**

Extract all the files to the folder:

C:\Kemro\KeStudioV2.3\Targets\KeMotion_CP24xCP25x_02.60\io\
CustomDrives\Flexy2.0_EtherCatDrive

- **McCustomDriveLibrary**

Extract the file to the library folder, and overwrite the existing file:

C:\Kemro\KeStudio V2.3\Targets\KeMotion_CP24xCP25x_02.60\lib

Note | The folder *KeMotion_CP24xCP25x_02.60* may be named differently, depending on the software installation.

Once these files have been put in place, the PLC configuration can be performed.

When prompted for the drive type, select CDHD2.

6 CANopen Operation

6.1 Device Communication

The CDHD2 communication interface conforms to the following standards:

- CiA 301: CANopen Application Layer and Communication Profile
- IEC 61800-7-1: Interface Definition; (previously CiA 402-1: General Definitions)
- IEC 61800-7-201: Profile Type 1 (CiA 402); (previously CiA 402-2: Operation Modes and Application Data)
- IEC 61800-7-301: Mapping of Profile Type 1; (previously CiA 402-3: PDO Mapping)

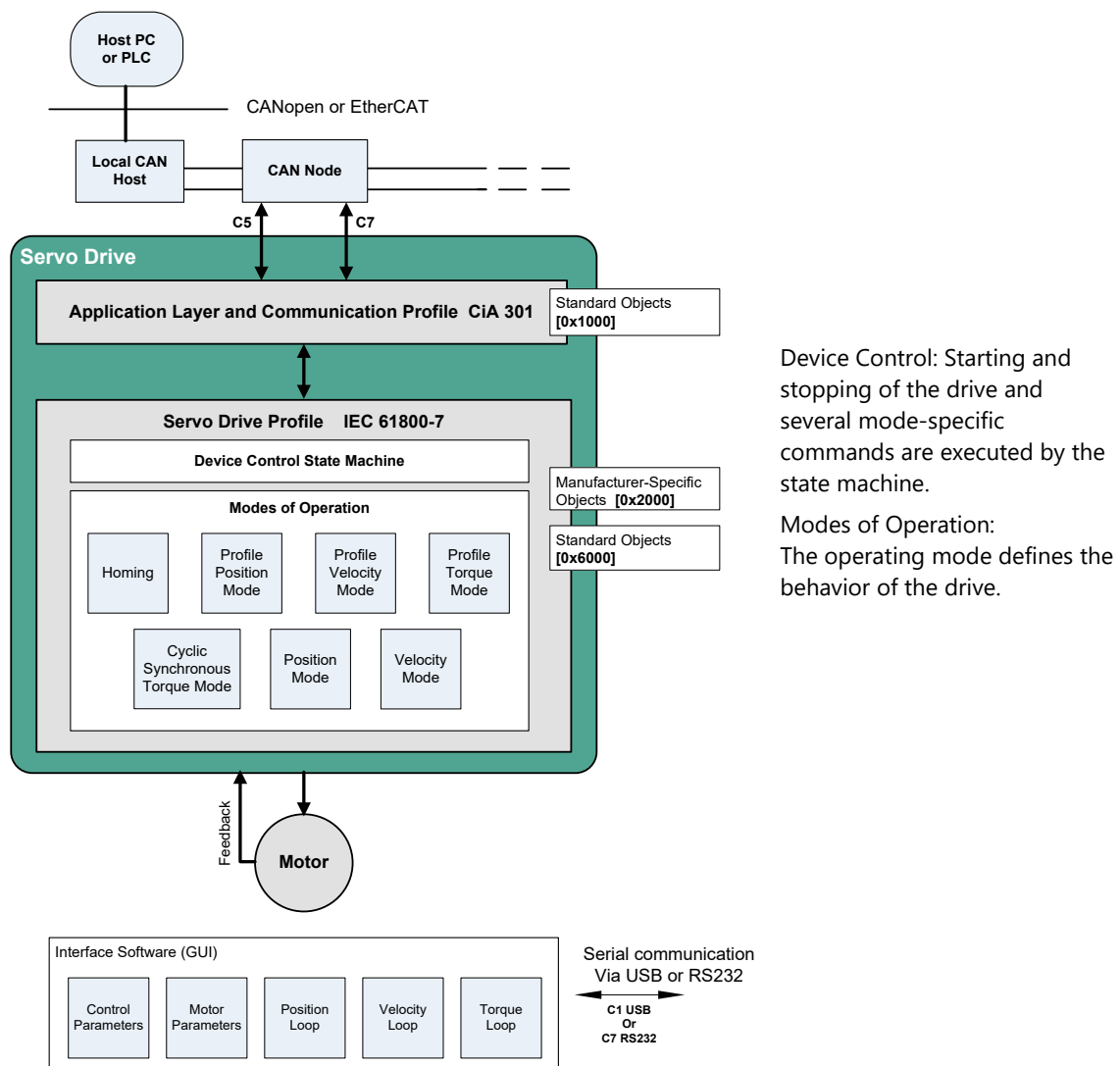


Figure 6-1. Communication Architecture

6.2 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.

6.2.1 Service Data Communication

Service data objects (SDOs) provide 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).

6.2.2 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. CDHD2 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. CDHD2 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.

The CDHD2 has a limit of 20 transmit PDO (TPDO) and receive PDO (RPDO). If more than 20 TPDOs and RPDOs are used, the drive might not have enough computing resources, which would result in a realtime overload fault.

By default 4 TPDOs and 4 RPDOs are implemented in the CDHD2:

TPDO1

- Statusword (6041h), 16 bits
- Modes of operation display (6061h)
- Torque actual value (6077h), 16 bits

TPDO2

- Position actual value (6064h), 32 bits

TPDO3

- Torque demand command (6074h), 16 bits
- Analog input 1 (20F2h), 16 bits

TPDO4

- Digital inputs (60FDh), 32 bits
- Position external command (20b6h), 32 bits
- Following error actual value (60F4h), 32 bits

RPDO1

- Control word (6040h), 16 bits
- Mode of operation (6060h), 8 bits

RPDO2

- Target position (607Ah), 32 bits
- Profile velocity (6081h), 32 bits

RPDO3

- Target velocity (60FFh), 32 bits

RPDO4

- Target torque (6071h), 16 bits
- Digital outputs (60FEh), 32 bits
- Torque offset (60B2h), 16 bits

6.3 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 shows how the power drive system operates remotely via the network, or locally.

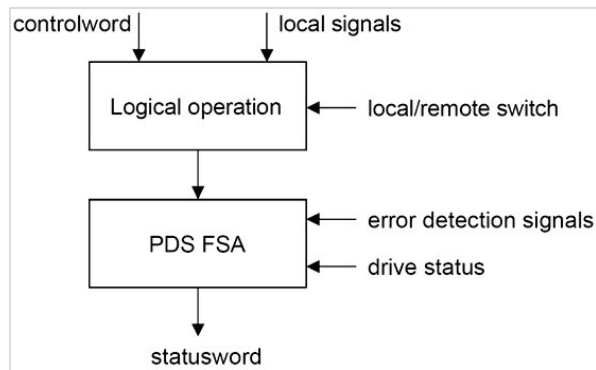


Figure 6-2. Remote and Local Control

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.

6.4 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 6-3 illustrates the PDS FSA behavior. It takes into consideration the control of the power electronics, in accordance with user commands and internal drive faults.

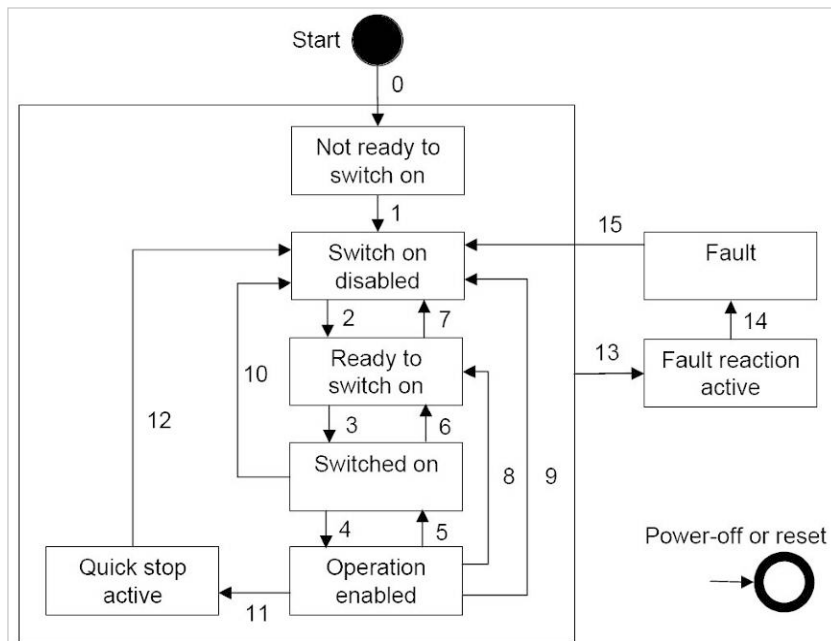


Figure 6-3. Power Drive System State Diagram

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 status word 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.

6.5 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 Operate	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.

6.6 Starting and Changing an Operating Mode

The Mode of Operation parameter (6060h) is used to set the desired operating mode.

Parameter Name	Description	Data Type R/W
Mode of operation	Operating mode	Integer8 Read/Write
	1 Profile Position	
	3 Profile Velocity	
	4 Profile Torque	
	6 Homing	
	7 Interpolated Position	
	8 Cyclic Synchronous Position	
	9 Cyclic Synchronous Velocity	
	10 Cyclic Synchronous Torque	
	Changed settings become active immediately.	

The 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	Integer8 Read/Write
	1 Profile Position	
	3 Profile Velocity	
	4 Profile Torque	
	6 Homing	
	7 Interpolated Position	
	8 Cyclic Synchronous Position	
	9 Cyclic Synchronous Velocity	
	10 Cyclic Synchronous Torque	
	Changed settings become active immediately.	

6.7 Profile Position Mode

Description

In the Profile Position operating mode, the motor executes a movement according to a target position, acceleration and velocity values sent from the master controller.

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 activate the operating mode and enable 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	-

Index	Sub-index	Object	PDO	Data Type	Takes Effect
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	-

Profile Position – Example

Setting the Operating Mode

The operating mode is set in the Mode of Operation parameter (6060h). Writing the parameter value activates the operating mode.

Generating Movement

Use the Controlword according to the CANopen state machine to enable the drive and execute the movement.

Controlword

Bits 4–6 and bit 8 in the Controlword (6040h) start a movement.

Bit 5: Change Set Point 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.*

Parameter Value	Meaning
Bit 6 = Absolute / relative	0: Absolute movement 1: Relative movement
Bit 8 = Halt	Stop movement with Halt

Statusword

Information on the current movement is available via bits 10 and 12–15 in the 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 00
» Enable power stage with R_PDO1 201 / 00 00 00 00 00 00 00 201 / 06 00 00 00 00 00 00 201 / 0F 00 00 00 00 00 00
« T_PDO1 (operating state: 6 Operation Enabled) 181 / 37 42 00 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

6.8 Homing Mode

Description

In the Homing operating mode, the motor executes a movement until it reaches the home position, also called reference point or zero 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 activate the operating mode and enable movement.
- 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

Homing – Example

Setting the Operating Mode

The operating mode is set in the Mode of Operation parameter (6060h). Writing the parameter value activates the operating mode.

Generating Movement

Use the Controlword according to the CANopen state machine to enable the drive and execute the movement.

Controlword

Bits 4 in the 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

Statusword

Information on the current movement is available via bits 10 and 12–15 in the 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

Work Step	
COB ID / Data	
»	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

6.9 Profile Velocity Mode

Description

In the Profile Velocity operating mode, the motor executes a movement according to a target velocity and acceleration values sent from the master controller.

Procedure

- Set [Mode of operation (6060h)] to operating mode Profile Velocity (3).
- Set [Controlword (6040h)] to activate the operating mode and enable movement.
- 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

Profile Velocity – Example

Setting the Operating Mode

The operating mode is set in the Mode of Operation parameter (6060h). Writing the parameter value activates the operating mode.

Generating Movement

Use the Controlword according to the CANopen state machine to enable the drive and execute the movement.

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 set point	Not relevant for this operating mode

Statusword

Information on the current movement is available via bits 10 and 12 in the 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

Work Step	
COB ID / Data	
»	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 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 00
«	T_PDO3 with Statusword 381 / 17 66 00 00 00 00 00
»	Clear Quick Stop with R_PDO3 401 / 0F 00 00 00 00 00 00
«	T_PDO3 with Statusword 381 / 37 46 00 00 00 00 00

6.10 Profile Torque Mode

Description

In the Profile Torque operating mode, the motor executes a movement according to a target torque value sent from the master controller.

Procedure

- Set [Mode of operation (6060)] to operating mode Profile Torque (4).
- Set [Controlword (6040h)] to activate the operating mode and enable movement.
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

Profile Torque – Example

Setting the Operating Mode

The operating mode is set in the Mode of Operation parameter (6060h). Writing the parameter value activates the operating mode.

Generating Movement

Use the Controlword according to the CANopen state machine to enable the drive and execute the movement.

Controlword

Bit 8 in the 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

Statusword

Information on the movement is available via bit 10 in the 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

Work Step	
COB ID / Data	
»	Clear Quick Stop with R_PDO1 201 / 0F 00
«	T_PDO1 with Statusword 181 / 37 46

6.11 Interpolated Position Mode

Description

The Interpolated Position operating mode is used to control multiple coordinated axes or a single axis with the need for time-interpolation of set-point data. The interpolated position mode normally uses time synchronization mechanisms for a time coordination of the related drive units.

This mode uses a buffer of position commands. The buffer size is always 1, thus it is not possible to give a list of target position commands in advance.

Procedure

- Set [Mode of operation (6060h)] to operating mode Interpolated Position (7).
- Set [Target position (60C1h)] to the target position (unit = pulse).
- Set [Controlword (6040h)] to activate the operating mode and enable 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).

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	R_PDO	Integer8	Immediately
6061h	0	Modes of operation display	T_PDO	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
6091h	1&2	Gear (Position factor)	No	Unsigned32	Immediately

Index	Sub-index	Object	PDO	Data Type	Takes Effect
6092h	1&2	Feedback constant (Units resolution factor)	No	Unsigned32	Immediately
60F2h	0	Position option code	No	Unsigned16	Next movement
60F4h	0	Following error actual value	T_PDO	Integer32	-
60FCh	0	Position demand internal value	No	Integer32	-

Interpolated Position Profile – Example

Setting the Operating Mode

The operating mode is set in the Mode of Operation parameter (6060h). Writing the parameter value activates the operating mode.

Generating Movement

Use the Controlword according to the CANopen state machine to enable the drive and execute the movement.

Controlword

Bit 4 in the Controlword (6040h) is used to start a movement.

Bit 4: New Target Value	Meaning
0 » 1	Starts a movement to a target position. Target values transmitted during a movement every tick times according to the synchronous time value. The movement is stopped at the desired target position.

Statusword

Information on the current movement is available via bits 10 and 12–15 in the 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	
OB ID / Data	
» Set opmode 7 interpolated position	
601 : sD : 2f 60 60 00 07 00 00 00	
« 581 : sD : 60 60 60 00 00 00 00 00	
» Check state is 8 sync position*	
601 : sD : 40 61 60 00 00 00 00 00	
« 581 : sD : 4f 61 60 00 07 00 00 00	
» Move to OP mode	
000 : sD : 01 00	
» Set to enable	
601 : sD : 2b 40 60 00 80 00 00 00	
581 : sD : 60 40 60 00 00 00 00 00	
601 : sD : 2b 40 60 00 06 00 00 00	
581 : sD : 60 40 60 00 00 00 00 00	
601 : sD : 2b 40 60 00 0f 00 00 00	
581 : sD : 60 40 60 00 00 00 00 00	
» Set target position via PDO	
769/301 : sD : 24 c7 2d 00 00 00 00 00	

6.12 Cyclic Synchronous Position Mode

Description

In the Cyclic Synchronous Position operating mode, the master controller provides a target position to the drive at each EtherCAT/CAN cycle, and the drive performs position control, velocity control and torque control.

Procedure

- Set [Mode of operation (6060h)] to operating mode Cyclic Synchronous Position Profile (8).
- Set [Target position (607Ah)] to the target position (unit = pulse).
- Set [Controlword (6040h)] to activate the operating mode and enable 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).

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	R_PDO	Integer8	Immediately
6061h	0	Modes of operation display	T_PDO	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
6091h	1&2	Gear (Position factor)	No	Unsigned32	Immediately
6092h	1&2	Feedback constant (Units resolution factor)	No	Unsigned32	Immediately
60F2h	0	Position option code	No	Unsigned16	Next movement

Index	Sub-index	Object	PDO	Data Type	Takes Effect
60F4h	0	Following error actual value	T_PDO	Integer32	-
60FCh	0	Position demand internal value	No	Integer32	-

Cyclic Synchronous Position Profile – Example

Setting the Operating Mode

The operating mode is set in the Mode of Operation parameter (6060h). Writing the parameter value activates the operating mode.

Generating Movement

Use the Controlword according to the CANopen state machine to enable the drive and execute the movement.

Controlword

Bit 8 in the 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

Statusword

Statusword changes according to the CANopen state machine.

Example Node Address 1

Work Step
COB ID / Data
» Set opmode 8 sync position 601 : sD : 2f 60 60 00 08 00 00 00
« 581 : sD : 60 60 60 00 00 00 00 00
» Check state is 8 sync position* 601 : sD : 40 61 60 00 00 00 00 00
« 581 : sD : 4f 61 60 00 08 00 00 00
» Move to OP mode 000 : sD : 01 00
» Set to enable 601 : sD : 2b 40 60 00 80 00 00 00 581 : sD : 60 40 60 00 00 00 00 00 601 : sD : 2b 40 60 00 06 00 00 00 581 : sD : 60 40 60 00 00 00 00 00 601 : sD : 2b 40 60 00 0f 00 00 00 581 : sD : 60 40 60 00 00 00 00 00

Work Step
COB ID / Data
» Set target position via PDO 769/301 : sD : 24 c7 2d 00 00 00 00 00

6.13 Cyclic Synchronous Velocity Mode

Description

In the Cyclic Synchronous Velocity operating mode, the master controller provides a target velocity to the drive at each EtherCAT/CAN cycle, and the drive performs velocity control and torque control.

Procedure

- Set [Mode of operation (6060h)] to operating mode Cyclic Synchronous Velocity Profile (9).
- 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.
- Set [Controlword (6040h)] to activate the operating mode and enable movement.
- Query [Statusword (6041h)] to get the current status of following error, set-point acknowledge and target reached.

Optional

Additional information on the operating mode cyclic synchronous velocity:

- 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 required in the velocity window to consider the velocity has 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	R_PDO	Integer8	Immediately
6061h	0	Modes of Operation Display	T_PDO	Integer8	-
606Bh	0	Velocity Demand Value	No	Integer32	-
606Ch	0	Velocity Actual Value	T_PDO	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	R_PDO	Integer32	Immediately

Cyclic Synchronous Velocity – Example

Setting the Operating Mode

The operating mode is set in the Mode of Operation parameter (6060h). Writing the parameter value activates the operating mode.

Generating Movement

Use the Controlword according to the CANopen state machine to enable the drive and execute the movement.

Controlword

Bit 8 in the 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

Statusword

Statusword changes according to the CANopen state machine.

Example Node Address 1

Work Step
COB ID / Data
» Set opmode 9 sync velocity 601 : sD : 2f 60 60 00 09 00 00 00
« 581 : sD : 60 60 60 00 00 00 00 00
» Check state is 9 sync velocity*
601 : sD : 40 61 60 00 00 00 00 00
« 581 : sD : 4f 61 60 00 09 00 00 00
» Move to OP mode 000 : sD : 01 00
» Set to enable 601 : sD : 2b 40 60 00 80 00 00 00 581 : sD : 60 40 60 00 00 00 00 00 601 : sD : 2b 40 60 00 06 00 00 00 581 : sD : 60 40 60 00 00 00 00 00 601 : sD : 2b 40 60 00 0f 00 00 00 581 : sD : 60 40 60 00 00 00 00 00
» Set target velocity via PDO 401 : sD : 64 00 00 00

6.14 Cyclic Synchronous Torque Mode

Description

In the Cyclic Synchronous Torque operating mode, the master controller provides a target torque to the drive at each EtherCAT/CAN cycle, and the drive performs torque control.

Procedure

- Set [Mode of operation (6060h)] to operating mode Cyclic Synchronous Torque (10).
- Set [Target torque (6071h)] to the target torque. If the power stage is enabled, the new target torque will become active immediately and the movement will start.
- Set [Controlword (6040h)] to activate the operating mode and enable movement.
- Query [Statusword (6041h)] to get the current status of following error, set-point acknowledge and target reached.

Optional

Additional information on the operating mode cyclic synchronous velocity:

- 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	R_PDO	Integer8	Immediately
6061h	0	Modes of Operation Display	T_PDO	Integer8	-
6071h	0	Target Torque	R_PDO	Integer16	Immediately
6074h	0	Torque demand value	T_PDO	Integer16	-
6075h	0	Motor rated current	No	Unsigned32	-
6087h	0	Torque slope	No	Unsigned32	

Cyclic Synchronous Torque – Example

Setting the Operating Mode

The operating mode is set in the Mode of Operation parameter (6060h).

Writing the parameter value activates the operating mode.

Generating Movement

Use the Controlword according to the CANopen state machine to enable the drive and execute the movement.

Controlword

Bit 8 in the 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

Statusword

Statusword changes according to the CANopen state machine.

Example Node Address 1

Work Step
COB ID / Data
» Set opmode 10 sync torque 601 : sD : 2f 60 60 00 0A 00 00 00
« 581 : sD : 60 60 60 00 00 00 00 00
» Check state is 10 sync torque*
601 : sD : 40 61 60 00 00 00 00 00
« 581 : sD : 4f 61 60 00 0A 00 00 00
» Move to OP mode 000 : sD : 01 00
» Set to enable 601 : sD : 2b 40 60 00 80 00 00 00 581 : sD : 60 40 60 00 00 00 00 00 601 : sD : 2b 40 60 00 06 00 00 00 581 : sD : 60 40 60 00 00 00 00 00 601 : sD : 2b 40 60 00 0f 00 00 00 581 : sD : 60 40 60 00 00 00 00 00
» Set target torque via PDO 501 : sD : 64 00 00 00

6.15 Digital Output Operation

The following procedure describes how to control a CDHD2 digital output.

1. Enable the digital outputs to be controlled manually:
 - Set object 60FEh sub-index 2 to FFFFFFFFh

This gives you permission to write to all digital outputs.

2. Define the mode of a specific output as idle to give you (and not drive logic) manual control of the output.

For example, define digital output 3 as idle:

- Set object 209Ch sub-index 1 to value 3
- Set object 209Ch sub-index 2 to value 0

3. Set the output state by writing to the object.

Digital input 3 is represented by bit 18 in object 60FE; therefore:

- Set object 60FE sub-index 1 to 40000h (218=262144).

7 Units

7.1 Units Overview

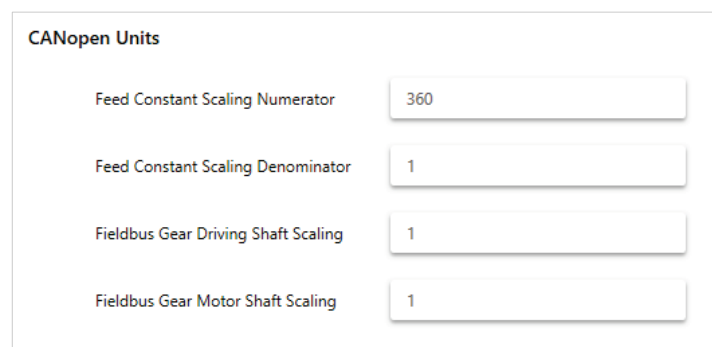
CiA and ETG standards provide two objects for setting the gear ratio and the feed constant conversion factors, each of which has two sub-indices.

These objects have four equivalent (VarCom) drive parameters, as shown in the following table.

CAN Object	VarCom | ServoStudio	Description
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 motor type.
6092h, sub-index 2	PDEN: Feed Constant (Unit Conversion) Denominator	
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.

You can modify the values by writing directly to the objects.

Alternately, you can use the **CANopen Units** pane in the ServoStudio **Motion Units** screen:



The screenshot shows a window titled "CANopen Units". Inside, there are four rows, each with a label and a text input field:

- Feed Constant Scaling Numerator: 360
- Feed Constant Scaling Denominator: 1
- Fieldbus Gear Driving Shaft Scaling: 1
- Fieldbus Gear Motor Shaft Scaling: 1

Figure 7-1. ServoStudio Motion Units | CANopen Units

7.2 Position Units

Position units are expressed by the following equation:

$$\frac{0x6091 \text{ sub-index } 1}{0x6091 \text{ sub-index } 2} \times \frac{0x6092 \text{ sub-index } 1}{0x6092 \text{ sub-index } 2} = 1 \text{ motor revolution}$$

For example:

$$6091h \text{ sub-index } 1 = 1048576$$

$$6091h \text{ sub-index } 2 = 1$$

$$6092h \text{ sub-index } 1 = 1$$

6092h sub-index 2 = 1

Therefore:

$$\frac{1048576}{1} \times \frac{1}{1} = 1048576$$

That is, 1048576 position units = 1 motor revolution.

7.2.1 Position Resolution - Examples

Position resolution should be as high as possible; it must certainly be no less than the encoder resolution.

When the drive is operating in Synchronous Position mode, the controller sends the drive one position command per cycle.

Low Resolution

CAN Object	Parameter	Value
6092h, sub-index 1	PNUM - Feed Constant (Unit Conversion) Numerator	360
6092h, sub-index 2	PDEN - Feed Constant (Unit Conversion) Denominator	1

Let's assume the controller intends to move the motor at a slow speed of 60 rpm; that is, 1 revolution per second, or **360 degrees per second**.

A typical EtherCAT cycle time is 1 ms; thus, the controller divides 360 degrees by 1000, and sends a command every 1 ms. Since EtherCAT supports integers only, and 0.36 (360/1000) is not an integer, the following will result:

Cycle	1	2	3	4	5	6	..	..	n
Profile generator in controller	0.36	0.72	1.08	1.44	1.8	2.16	..	..
EtherCAT position command	0	0	1	0	0	2	..	..	INT(n×0.36)
Position command in drive in units of 10000 counts/rev	0	0	27	0	0	55	..	..	INT(n×0.36)×10000/360

From the table, it can be seen that the command will be updated, on average, only once every three cycles. As a result, the motor will move 27 encoder counts in one cycle and be stopped for two cycles, producing significant acoustic noise. Should the speed be lowered, the noise will become even more severe.

High Resolution

CAN Object	Parameter	Value
6092h, sub-index 1	PNUM - Feed Constant (Unit Conversion) Numerator	1
6092h, sub-index 2	PDEN - Feed Constant (Unit Conversion) Denominator	1

Let's assume the controller intends to move the motor at a slow speed of 60 rpm; that is, 1 revolution per second, or **360000 counts per second**.

A typical EtherCAT cycle time is 1 ms; thus, the controller divides 360000 counts by 1000, and sends a command every 1 ms. Since 360000/1000 equals the integer 360, the following will result:

Cycle #	1	2	3	4	5	6	..	..	n
Profile generator in controller	360	720	1080	1440	1800	2160	..	..
EtherCAT position command	360	720	1080	1440	1800	2160	..	..	INT(n×360)
Position command in drive in units of 10000 counts/rev	10	20	30	40	50	60	..	..	INT(n×360)×10000/360000

From the table, it can be seen that the command will be consistently updated at each cycle. Speed will remain constant and there will be no acoustic noise.

Position commands sent over EtherCAT have the advantage of being highly accurate, thereby improving system performance.

7.3 Velocity Units

Velocity units are expressed by the following equation:

$$\frac{0x6091 \text{ sub-index } 1}{0x6091 \text{ sub-index } 2} \times \frac{0x6092 \text{ sub-index } 1}{0x6092 \text{ sub-index } 2} = 1 \text{ rps}$$

For example:

6091h sub-index 1 = 1048576

6091h sub-index 2 = 1

6092h sub-index 1 = 1

6092h sub-index 2 = 1

Therefore:

$$\frac{1048576}{1} \times \frac{1}{1} = 1048576$$

That is, 1048576 velocity units = 1 rps

7.4 Acceleration/Deceleration Units

Acceleration/deceleration units are expressed by the following equation:

$$\frac{0x6091 \text{ sub-index } 1}{0x6091 \text{ sub-index } 2} \times \frac{0x6092 \text{ sub-index } 1}{0x6092 \text{ sub-index } 2} = 1 \text{ rps/s}$$

For example:

6091h sub-index 1 = 1,048,576

6091h sub-index 2 = 1

6092h sub-index 1 = 1

6092h sub-index 2 = 1

Therefore:

$$\frac{1048576}{1} \times \frac{1}{1} = 10000$$

That is, 1,048,576 acc/dec units = **1 rps/s**

7.5 Current Units

Current units are derived from object 6075h (Motor Rated Current), which is defined in mA.

After setting a value for 6075h, all other current-related 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 40000 mA for object 6073h (Max Current), write 2000 for object 6073h.

The calculation is: $(2000 \div 1000) \times 20000 = 40000$ mA

7.6 Torque Units

Torque units are derived from object 6076h (Motor Rated Torque), which is defined in mNm.

After setting a value for 6076h, all other torque-related objects must receive values defined in 1/1000 (one thousandth) of 6076h.

For example: Assuming 6076h has a value of 500 mNm, then to set a value of 100 mNm for object 6074h (Torque Demand), write 200 for object 6074h.

The calculation is: $(200 \div 1000) \times 500 = 100$ mNm

7.7 Rotary Motor Units – Examples

Setting Units to Represent Revolutions

Position = rev

Velocity = rev/sec

Acceleration = rev/sec²

CAN Object	Parameter	Value
6092h, sub-index 1	PNUM - Feed Constant (Unit Conversion) Numerator	1
6092h, sub-index 2	PDEN - Feed Constant (Unit Conversion) Denominator	1
6091h, sub-index 1	FBGMS - Fieldbus Gear Ratio – Motor Shaft Scaling	1
6091h, sub-index 2	FBGDS - Fieldbus Gear Ratio – Drive Shaft Scaling	1

Operating Mode: Profile Position

1. Set Mode of Operation (6060h) to Profile Position mode (1).
2. Set the Target Position (607Ah) value (unit = **revolutions**).
If object 607Ah is 1, the motor shaft will rotate one revolution.
3. Set the Profile Velocity (6081h) value (unit = **revolutions** per second).
If object 6081h is 1, the motor shaft speed will be 1 rev/sec.

4. Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

1. Set Mode of Operation (6060h) to Profile Velocity mode (3).
2. Set Controlword (6040h) to start the operating mode.
3. 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 Units to Represent Degrees

Position = deg

Velocity = deg/sec

Acceleration = deg/sec²

CAN Object	Parameter	Value
6092h, sub-index 1	PNUM - Feed Constant (Unit Conversion) Numerator	360
6092h, sub-index 2	PDEN - Feed Constant (Unit Conversion) Denominator	1
6091h, sub-index 1	FBGMS - Fieldbus Gear Ratio – Motor Shaft Scaling	1
6091h, sub-index 2	FBGDS - Fieldbus Gear Ratio – Drive Shaft Scaling	1

Operating Mode: Profile Position

1. Set Mode of Operation (6060h) to Profile Position mode (1).
2. Set the Target Position (607Ah) value (unit = **degrees**).
If object 607Ah is **360**, the motor shaft will rotate one revolution.
3. Set the Profile Velocity (6081h) value (unit = **degrees** per second).
If object 6081h is **360**, the motor shaft speed will be 1 rev/sec.
4. Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

1. Set Mode of Operation (6060h) to Profile Velocity mode (3).
2. Set Controlword (6040h) to start the operating mode.
3. 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 Units to Represent Feedback Counts

Position = counts

Velocity = counts/sec

Acceleration = counts/sec²

CAN Object	Parameter	Value
6092h, sub-index 1	PNUM - Feed Constant (Unit Conversion) Numerator	<i>Motor_Resolution</i>
6092h, sub-index 2	PDEN - Feed Constant (Unit Conversion) Denominator	1
6091h, sub-index 1	FBGMS - Fieldbus Gear Ratio – Motor Shaft Scaling	1
6091h, sub-index 2	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 *Motor_Resolution* parameter (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 *Motor_Resolution* by 4.

Get the value of *Motor_Resolution*, multiple by 4, and then enter the number as the value of object 6092, sub-index 1.

Operating Mode: Profile Position

1. Set Mode of Operation (6060h) to Profile Position mode (1).
2. 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.
3. 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).
4. Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

1. Set Mode of Operation (6060h) to Profile Velocity mode (3).
2. Set Controlword (6040h) to start the operating mode.
3. 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.

7.8 Linear Motor Units - Examples

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 Units to Represent Motor Pitch

Position = pitch

Velocity = pitch/sec

Acceleration = pitch/sec²

CAN Object	Parameter	Value
6092h, sub-index 1	PNUM - Feed Constant (Unit Conversion) Numerator	1
6092h, sub-index 2	PDEN - Feed Constant (Unit Conversion) Denominator	1
6091h, sub-index 1	FBGMS - Fieldbus Gear Ratio – Motor Shaft Scaling	1
6091h, sub-index 2	FBGDS - Fieldbus Gear Ratio – Drive Shaft Scaling	1

Operating Mode: Profile Position

1. Set Mode of Operation (6060h) to Profile Position mode (1).
2. Set the Target Position (607Ah) value (unit = **motor pitch**).
If object 607Ah is 1, the motor shaft will move a distance of 1 pitch.
3. 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).
4. Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

1. Set Mode of Operation (6060h) to Profile Velocity mode (3).
2. Set Controlword (6040h) to start the operating mode.
3. 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 Units to Represent Millimeters

Position = mm

Velocity = mm/sec

Acceleration = mm/sec²

CAN Object	Parameter	Value
6092h, sub-index 1	PNUM - Feed Constant (Unit Conversion) Numerator	<i>Motor Pitch Distance [mm]</i>
6092h, sub-index 2	PDEN - Feed Constant (Unit Conversion) Denominator	1
6091h, sub-index 1	FBGMS - Fieldbus Gear Ratio – Motor Shaft Scaling	1
6091h, sub-index 2	FBGDS - Fieldbus Gear Ratio – Drive Shaft Scaling	1

This example assumes that the pitch value is 32.

Operating Mode: Profile Position

1. Set Mode of Operation (6060h) to Profile Position mode (1).
2. Set the Target position (607Ah) value (unit = **mm**).
If object 607Ah is 32, the motor will move a distance of 1 **mm**
3. Set the Profile Velocity (6081h) value (unit = **mm** per second).
If object 6081h is 32, the motor speed will be 1 **mm/sec**
4. Set Controlword (6040h) to start the operating mode.

Operating Mode: Profile Velocity

1. Set Mode of Operation (6060h) to Profile Velocity mode (3).
2. Set Controlword (6040h) to start the operating mode.
3. 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 Units to Represent Feedback Counts

Position = counts

Velocity = counts/sec

Acceleration = counts/sec²

CAN Object	Parameter	Value
6092h, sub-index 1	PNUM - Feed Constant (Unit Conversion) Numerator	<i>Motor_Resolution</i>
6092h, sub-index 2	PDEN - Feed Constant (Unit Conversion) Denominator	1
6091h, sub-index 1	FBGMS - Fieldbus Gear Ratio – Motor Shaft Scaling	1
6091h, sub-index 2	FBGDS - Fieldbus Gear Ratio – Drive Shaft Scaling	1

The *Motor_Resolution* parameter (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 *Motor_Resolution* by 4

Operating Mode: Profile Position

1. Set Mode of Operation (6060h) to Profile Position mode (1).
2. Set the Target Position (607Ah) value (unit = **counts**).
3. If object 607Ah is 1, the motor will move a distance of one count.
4. 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).
5. Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

1. Set Mode of Operation (6060h) to Profile Velocity mode (3).
2. Set Controlword (6040h) to start the operating mode.
3. 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 Communication Objects

The following communication objects have been implemented in the CDHD2 servo drives.
For more information, refer to the specific CAN documentation.

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

Entry Description

Access	Constant
PDO Mapping	No
Default Value	0x00420192
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1001h: Error Register

Object Description

Index	1001
Description	<p>The error register is a field of 8 bits, each for a certain error type.</p> <p>If an error occurs the bit will be set.</p> <p>The bits have the following meaning:</p> <p>bit 0: Generic error</p> <p>bit 1: Current</p> <p>bit 2: Voltage</p> <p>bit 3: Temperature</p> <p>bit 4: Communication error (overflow, error state)</p> <p>bit 5: Device profile specific</p> <p>bit 6: Reserved</p> <p>bit 7: Manufacturer specific</p>
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

1002h: Manufacturer Status Register (CAN only)**Object Description**

Index	1002
Description	A common status register for manufacturer specific purposes.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1003h: Predefined Error Field (CAN only)**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. Writing 0 to sub-index 0 deletes the entire error history.
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Errors
Entry Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFE
Unit	-

Sub-Index	001 – 002 – 003 – 004 – 005 006 – 007 – 008 – 009 – 010
Description	Standard Error Field
Entry Category	Mandatory
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1005h: COB-ID SYNC (CAN only)

Object Description

Index	1005
Description	Defines the COB ID of the synchronization object (SYNC). If bit 30 is set to high, the device generates a SYNC message to be used by the drive. The meaning of other bits is the same as for other communication objects.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000080
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

1006h: Communication Cycle Period (CAN only)**Object Description**

Index	1006
Description	Defines the communication cycle period. It is 0 if not used.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	μs

1007h: Synchronous Window Length**Object Description**

Index	1007
Description	Defines the length of the time window for synchronous messages. Value is 0 if not used.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	μs

1008h: Manufacturer Device Name (CAN only)**Object Description**

Index	1008
Description	Device name assigned by manufacturer.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Constant
PDO Mapping	No
Default Value	Hardware-dependent
Lower Limit	-
Upper Limit	-
Unit	-

1009h: Manufacturer Hardware Version (CAN only)**Object Description**

Index	1009
Description	Device version assigned by manufacturer.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Constant
PDO Mapping	No
Default Value	Hardware-dependent
Lower Limit	-
Upper Limit	-
Unit	-

100Ah: Manufacturer Software Version (CAN only)**Object Description**

Index	100A
Description	The version number of the manufacturers software.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Constant
PDO Mapping	No
Default Value	Hardware-dependent
Lower Limit	-
Upper Limit	-
Unit	-

100Ch: Guard Time (CAN only)**Object Description**

Index	100C
Description	The guard time, in milliseconds. Value is 0 if not used.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

100Dh: Life Time Factor (CAN only)**Object Description**

Index	100D
Description	The life time factor multiplied with the guard time gives the life time for the device. Value is 0 if not used.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

1010h: Store Parameter Field

Object Description

Index	1010
Description	VarCom - SAVE Controls the saving of parameters in non-volatile memory. Writing 65766173h (ASCII value of "save") to the sub-index saves the parameters. Several parameter groups are distinguished. Sub-index 1 - All parameters
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x01
Lower Limit	0x01
Upper Limit	0x01
Unit	-

Sub-Index	001
Description	Save All Parameters
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1011h: Restore Default Parameters (CAN only)

Object Description

Index	1011
Description	VarCom - LOAD Loads the default values of parameters. Writing 64616F6Ch (ASCII value of "load") to the sub-index restores the parameters. Several parameter groups are distinguished. Sub-index 1 - All parameters Sub-index 2 - Communication parameters Sub-index 3 - Application parameters Sub-index 4-127 - Manufacturer defined parameters
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0x7F
Unit	-
Sub-Index	001
Description	Restore All Default Parameters
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1014h: COB-ID EMCY (CAN only)**Object Description**

Index	1014
Description	Defines the COB ID of the Emergency object (EMCY).
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000080
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

1015h: Inhibit Time Emergency (CAN only)**Object Description**

Index	1015
Description	The inhibit time used for emergency message (Emergency Server). Defined in multiples of 100 ms.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

1016h: Heartbeat Consumer Entries (CAN only)

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. bits 31 - 24 of each sub-index must be 0. bits 23 - 16 contain the node ID. bits 15 - 0 contain the heartbeat time
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x01
Upper Limit	0x7F
Unit	-

Sub-Index	001
Description	Consumer Heartbeat Time 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x02FFFFFF
Unit	-

Sub-Index	002
Description	Consumer Heartbeat Time 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x02FFFFFF
Unit	-

Sub-Index	003
Description	Consumer Heartbeat Time 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x02FFFFFF
Unit	-

1017h: Producer Heartbeat Time (CAN only)**Object Description**

Index	1017
Description	Defines the cycle time of the heartbeat, which must be a multiple of 1 millisecond. It is 0 if not used. Defined in multiples of 1 ms.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

1018h: Identity Object

Object Description

Index	1018
Description	<p>Contains general information about the device.</p> <p>Sub-index 1 - Contains a unique value allocated each manufacturer.</p> <p>Sub-index 2 - Identifies the manufacturer specific product code (device version).</p> <p>Sub-index 3 - Contains the revision number.</p> <p> bit 31-16: major revision number</p> <p> bit 15-0: minor revision number.</p> <p>Sub-index 4 - Identifies a manufacturer specific serial number.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x04
Lower Limit	0x01
Upper Limit	0x04
Unit	-

Sub-Index	001
Description	Vendor ID
Entry Category	Mandatory
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x000002E1
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Product Code
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x000002AF = drive model AF 0x000002EC = drive model EC 0x000002EB = drive model EB
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Revision Number
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Serial Number
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1019h: Synchronous Counter Overflow Value (CAN only)**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

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xF0
Unit	-

1029h: Error Behavior (CAN only)**Object Description**

Index	1029
Description	<p>Sub-index 000 - contains the number of error classes.</p> <p>Sub-index 001 - contains the error class for a communication error.</p> <p>Sub-indices 001 to 254 - contain device profile or manufacturer specific error classes.</p> <p>Possible values of an error class:</p> <p>0 = Pre-operational</p> <p>1 = No state change</p> <p>2 = Stopped</p> <p>3 .. 127 = Reserved</p> <p>128 = Ignore CAN interface bus-off condition</p>
Object Code	Array
Data Type	UNSIGNED8

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x01
Lower Limit	0x01
Upper Limit	0xFE
Unit	-

Sub-Index	001
Description	Communication Error
Entry Category	Mandatory
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x7F
Unit	-

1200h: Server SDO Parameter 1 (CAN only)**Object Description**

Index	1200
Description	Contains the parameters for the SDOs for which the device is the server.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	COB-ID Client -> Server
Entry Category	Mandatory
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000600
Lower Limit	0x00000600
Upper Limit	0xBFFFFFFF
Unit	-

Sub-Index	002
Description	COB-ID Server -> Client
Entry Category	Mandatory
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000580
Lower Limit	0x00000580
Upper Limit	0xBFFFFFFF
Unit	-

1201h: Server SDO Parameter 2 (CAN only)

Object Description

Index	1201
Description	Contains the parameters for the SDOs for which the device is the server.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x02
Upper Limit	0x03
Unit	-

Sub-Index	001
Description	COB-ID Client -> Server
Entry Category	Mandatory
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x80000000
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	COB-ID Server -> Client
Entry Category	Mandatory
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x80000000
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Node ID of the SDO Client
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x7F
Unit	-

1400h: Receive PDO Communication Parameter 1 (CAN only)**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, in 100 microseconds. Sub-index 4 - Define an event time for asynchronous PDOs.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x2
Upper Limit	0x5
Unit	-

Sub-Index	001
Description	COB-ID
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000200
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Transmission Type
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0xFF
Lower Limit	0x0
Upper Limit	0xFF
Unit	-

Sub-Index	003
Description	Inhibit Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	100 µs

1401h: Receive PDO Communication Parameter 2 (CAN only)**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, in 100 microseconds. Sub-index 4 - Define an event time for asynchronous PDOs.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x02
Upper Limit	0x05
Unit	-

Sub-Index	001
Description	COB-ID
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000300
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Transmission Type
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	003
Description	Inhibit Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	100 μ s

1402h: Receive PDO Communication Parameter 3 (CAN only)**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, in 100 microseconds. Sub-index 4 - Define an event time for asynchronous PDOs.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x02
Upper Limit	0x05
Unit	-

Sub-Index	001
Description	COB-ID
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000400
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Transmission Type
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	003
Description	Inhibit Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	100 μ s

1403h: Receive PDO Communication Parameter 4 (CAN only)**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, in 100 microseconds. Sub-index 4 - Define an event time for asynchronous PDOs.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x02
Upper Limit	0x05
Unit	-

Sub-Index	001
Description	COB-ID
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000500
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Transmission Type
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	003
Description	Inhibit Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	100 μ s

1600h: Receive PDO Mapping Parameter 1

Object Description

Index	1600
Description	<p>Contains the mapping for the PDOs the device is able to receive.</p> <p>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.</p> <p>Sub-index 1 to [<i>number of entries</i>] - Contain information about the mapped application variables. These entries describe the PDO contents by their index (16 bit), sub-index (8 bit) and length (8 bit).</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Mapping Entry 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60400010
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Mapping Entry 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60600008
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Mapping Entry 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Mapping Entry 4
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	005
Description	Mapping Entry 5
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	006
Description	Mapping Entry 6
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1601h: Receive PDO Mapping Parameter 2

Object Description

Index	1601
Description	<p>Contains the mapping for the PDOs the device is able to receive.</p> <p>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.</p> <p>Sub-index 1 to [<i>number of entries</i>] - Contain information about the mapped application variables. These entries describe the PDO contents by their index (16 bit), sub-index (8 bit) and length (8 bit).</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Mapping Entry 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60400010
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Mapping Entry 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60600008
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Mapping Entry 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Mapping Entry 4
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	005
Description	Mapping Entry 5
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	006
Description	Mapping Entry 6
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1602h: Receive PDO Mapping Parameter 3

Object Description

Index	1602
Description	<p>Contains the mapping for the PDOs the device is able to receive.</p> <p>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.</p> <p>Sub-index 1 to [number of entries] - Contain information about the mapped application variables. These entries describe the PDO contents by their index (16 bit), sub-index (8 bit) and length (8 bit).</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Mapping Entry 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60FE0120
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Mapping Entry 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Mapping Entry 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Mapping Entry 4
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	005
Description	Mapping Entry 5
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	006
Description	Mapping Entry 6
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1603h: Receive PDO Mapping Parameter 4

Object Description

Index	1603
Description	<p>Contains the mapping for the PDOs the device is able to receive.</p> <p>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.</p> <p>Sub-index 1 to [number of entries] - Contain information about the mapped application variables. These entries describe the PDO contents by their index (16 bit), sub-index (8 bit) and length (8 bit).</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Mapping Entry 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60710010
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Mapping Entry 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60B20010
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Mapping Entry 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60600008
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Mapping Entry 4
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	005
Description	Mapping Entry 5
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	006
Description	Mapping Entry 6
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1800h: Transmit PDO Communication Parameter 1

Object Description

Index	1800
Description	<p>Contains the communication parameters of the current PDO the device is able to transmit.</p> <p>Sub-index 0 - Defines the number of PDO parameters implemented.</p> <p>Sub-index 1 - Describes the COB ID. If bit 31 is set, the PDO is disabled.</p> <p>Sub-index 2 - Defines the transmission type.</p> <p>Sub-index 3 - Defines the inhibit time.</p> <p>Sub-index 4 - Reserved</p> <p>Sub-index 5 - Defines the event time, in 100 microseconds</p> <p>Sub-index 6 - Defines the SYNC start value.</p> <p>Start value 0 = SYNC message has no data content.</p> <p>Start value 1 to 240 = SYNC message has 1 byte data.</p> <p>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.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x05
Lower Limit	0x02
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	COB-ID
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000180
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Transmission Type
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	003
Description	Inhibit Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	100 µs

Sub-Index	004
Description	Compatibility Entry
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	005
Description	Event Timer
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

1801h: Transmit PDO Communication Parameter 2

Object Description

Index	1801
Description	<p>Contains the communication parameters of the current PDO the device is able to transmit.</p> <p>Sub-index 0 - Defines the number of PDO parameters implemented.</p> <p>Sub-index 1 - Describes the COB ID. If bit 31 is set, the PDO is disabled.</p> <p>Sub-index 2 - Defines the transmission type.</p> <p>Sub-index 3 - Defines the inhibit time.</p> <p>Sub-index 4 - Reserved</p> <p>Sub-index 5 - Defines the event time, in 100 microseconds</p> <p>Sub-index 6 - Defines the SYNC start value.</p> <p>Start value 0 = SYNC message has no data content.</p> <p>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.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x05
Lower Limit	0x02
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	COB-ID
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000280
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Transmission Type
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	003
Description	Inhibit Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	100 µs

Sub-Index	004
Description	Compatibility Entry
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	005
Description	Event Timer
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

1802h: Transmit PDO Communication Parameter 3

Object Description

Index	1802
Description	<p>Contains the communication parameters of the current PDO the device is able to transmit.</p> <p>Sub-index 0 - Defines the number of PDO parameters implemented.</p> <p>Sub-index 1 - Describes the COB ID. If bit 31 is set, the PDO is disabled.</p> <p>Sub-index 2 - Defines the transmission type.</p> <p>Sub-index 3 - Defines the inhibit time.</p> <p>Sub-index 4 - Reserved</p> <p>Sub-index 5 - Defines the event time, in 100 microseconds</p> <p>Sub-index 6 - Defines the SYNC start value.</p> <p>Start value 0 = SYNC message has no data content.</p> <p>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.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x05
Lower Limit	0x02
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	COB-ID
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000380
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Transmission Type
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	003
Description	Inhibit Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	100 µs

Sub-Index	004
Description	Compatibility Entry
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	005
Description	Event Timer
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

1803h: Transmit PDO Communication Parameter 4

Object Description

Index	1803
Description	<p>Contains the communication parameters of the current PDO the device is able to transmit.</p> <p>Sub-index 0 - Defines the number of PDO parameters implemented.</p> <p>Sub-index 1 - Describes the COB ID. If bit 31 is set, the PDO is disabled.</p> <p>Sub-index 2 - Defines the transmission type.</p> <p>Sub-index 3 - Defines the inhibit time.</p> <p>Sub-index 4 - Reserved</p> <p>Sub-index 5 - Defines the event time, in 100 microseconds</p> <p>Sub-index 6 - Defines the SYNC start value.</p> <p>Start value 0 = SYNC message has no data content.</p> <p>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.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x05
Lower Limit	0x02
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	COB-ID
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000480
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Transmission Type
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	003
Description	Inhibit Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	100 µs

Sub-Index	004
Description	Compatibility Entry
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	005
Description	Event Timer
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

1A00h: Transmit PDO Mapping Parameter 1

Object Description

Index	1A00
Description	<p>Contains the mapping for the PDOs the device is able to transmit.</p> <p>The type of the PDO mapping parameter is at index 21h.</p> <p>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.</p> <p>Sub-indices 1 to [<i>number of entries</i>] - Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length.</p> <p>This parameter can be used to verify the overall mapping length. It is mandatory.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x00
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Mapping Entry 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	CAN: 0x60410010 ECT: 0x60FD0020
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Mapping Entry 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	CAN: 0x60610008 ECT: 0x60FD0020
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Mapping Entry 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	CAN: 0x60770010 ECT: 0x60F40020
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Mapping Entry 4
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	005
Description	Mapping Entry 5
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	006
Description	Mapping Entry 6
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1A01h: Transmit PDO Mapping Parameter 2

Object Description

Index	1A01
Description	<p>Contains the mapping for the PDOs the device is able to transmit.</p> <p>The type of the PDO mapping parameter is at index 21h.</p> <p>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.</p> <p>Sub-indices 1 to [<i>number of entries</i>] - Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length.</p> <p>This parameter can be used to verify the overall mapping length. It is mandatory.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Mapping Entry 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60640020
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Mapping Entry 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x606C0020
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Mapping Entry 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Mapping Entry 4
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	005
Description	Mapping Entry 5
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x0
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	006
Description	Mapping Entry 6
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x0
Upper Limit	0xFFFFFFFF
Unit	-

1A02h: Transmit PDO Mapping Parameter 3

Object Description

Index	1A02
Description	<p>Contains the mapping for the PDOs the device is able to transmit.</p> <p>The type of the PDO mapping parameter is at index 21h.</p> <p>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.</p> <p>Sub-indices 1 to [<i>number of entries</i>] - Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length.</p> <p>This parameter can be used to verify the overall mapping length. It is mandatory.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Mapping Entry 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x60740010
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Mapping Entry 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x20F20010
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Mapping Entry 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Mapping Entry 4
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	005
Description	Mapping Entry 5
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	006
Description	Mapping Entry 6
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1A03h: Transmit PDO Mapping Parameter 4

Object Description

Index	1A03
Description	<p>Contains the mapping for the PDOs the device is able to transmit.</p> <p>The type of the PDO mapping parameter is at index 21h.</p> <p>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.</p> <p>Sub-indices 1 to [<i>number of entries</i>] - Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length.</p> <p>This parameter can be used to verify the overall mapping length. It is mandatory.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	CAN: 0x03 ECT: 0x02
Lower Limit	0x00
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Mapping Entry 1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	CAN: 0x60FD0020 ECT: 0x60410010
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Mapping Entry 2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	CAN: 0x20B60020 ECT: 0x60770010
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Mapping Entry 3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	CAN: 0x60F40020 ECT: 0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Mapping Entry 4
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	005
Description	Mapping Entry 5
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	006
Description	Mapping Entry 6
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

1C00h: Sync Manager Communication Type (ECT only)**Description**

Index	1C00
Description	Up to 32 sync manager types can be described. The first four sync manager types are fixed, and the remainder can be configured to one of the four types. The default configuration is the following: 1 - Mailbox receive 2 - Mailbox send 3 - Process data output 4 - Process data input
Object Code	Array
Data Type	UNSIGNED8

Entry Description

Sub-Index	000
Description	Number of Entries
Access	Read Only
PDO Mapping	no
Default Value	0x04
Lower Limit	0x00
Upper Limit	0x20
Sub-Index	001
Description	Sub-Index 1
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	no
Default Value	0x01
Lower Limit	0x00
Upper Limit	0x04

Sub-Index	002
Description	Sub-Index 2
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	no
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x04

Sub-Index	003
Description	Sub-Index 3
Data Type	UNSIGNED8
Access	Read Only/Read Only/Read Only
PDO Mapping	no
Default Value	0x03
Lower Limit	0x00
Upper Limit	0x04

Sub-Index	004
Description	Sub-Index 4
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	no
Default Value	0x04
Lower Limit	0x00
Upper Limit	0x04

1C10h: Sync Manager 0 PDO Assignment (ECT only)**Description**

Index	1C10
Description	Used to to assign PDOs to the Sync Managers starting at Sync Manager 2.
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	no
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0000

1C11h: Sync Manager 1 PDO Assignment (ECT only)**Description**

Index	1C11
Description	Sync Manager 1 PDO Assignment
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	no
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0000

1C12h: Sync Manager 2 PDO Assignment (ECT only)**Description**

Index	1C12
Description	Sync Manager 2 PDO Assignment
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Assigned RxPDO
Access	Read/Write
PDO Mapping	no
Default Value	0x0004
Lower Limit	0x0000
Upper Limit	0x0004

Sub-Index	001
Description	Sub-Index 1
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	no
Default Value	0x1600
Lower Limit	0x1600
Upper Limit	0x17FF

Sub-Index	002
Description	Sub-Index 2
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	no
Default Value	0x1601
Lower Limit	0x1600
Upper Limit	0x17FF

Sub-Index	003
Description	Sub-Index 3
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	no
Default Value	0x1602
Lower Limit	0x1600
Upper Limit	0x17FF

Sub-Index	004
Description	Sub-Index 4
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	no
Default Value	0x1603
Lower Limit	0x1600
Upper Limit	0x17FF

1C13h: Sync Manager 3 PDO Assignment (ECT only)

Description

Index	1C13
Description	Sync Manager 3 PDO Assignment
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Assigned TxPDOs
Access	Read/Write
PDO Mapping	no
Default Value	0x0004
Lower Limit	0x0000
Upper Limit	0x00FF

Sub-Index	001
Description	Sub-Index 1
Data Type	UNSIGNED16
Access	Read/Write/Read/Write/Read/Write
PDO Mapping	no
Default Value	0x1A00
Lower Limit	0x1A00
Upper Limit	0x1BFF

Sub-Index	002
Description	Sub-Index 2
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	no
Default Value	0x1A01
Lower Limit	0x1A00
Upper Limit	0x1BFF

Sub-Index	003
Description	Sub-Index 3
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	no
Default Value	0x1A02
Lower Limit	0x1A00
Upper Limit	0x1BFF

Sub-Index	004
Description	Sub-Index 4
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	no
Default Value	0x1A03
Lower Limit	0x1A00
Upper Limit	0x1BFF

9 Manufacturer-Specific Objects

2002h: Configuration Command

Object Description

Index	VarCom - CONFIG Performs a configuration sequence of the drive according to its internal parameters. Write 01 to initiate the configuration command.
Description	Configuration Command
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

2003h: Current BEMF Compensation Gain

Object Description

Index	2003
Description	VarCom - KCBEMF The feedforward BEMF compensation ratio for the current control.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	2.0
Unit	-

2006h: Current KI Gain**Object Description**

Index	2006
Description	VarCom - KCI The current controller integrator (KI) gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	100.0
Unit	-

2007h: Current KP Gain**Object Description**

Index	2007
Description	VarCom - KCP The current controller proportional (KP) gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	100.0
Unit	-

200Ah: HD Anti-Vibration 2 Filter – Gain

Object Description

Index	200A
Description	VarCom - NLANTIVIBGAIN2 The HD position control loop anti-vibration module 3 filter - gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	1000.0
Unit	-

200Bh: HD Anti-Vibration 1 Filter - Sharpness

Object Description

Index	200B
Description	VarCom - NLANTIVIBSHARP The HD position control loop anti-vibration module 1 filter - sharpness
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.5
Lower Limit	0.00999999977648
Upper Limit	10.0
Unit	-

200Ch: HD Anti-Vibration 1 Filter - Gain

Object Description

Index	200C
Description	VarCom - NLANTIVIBGAIN The HD position control loop anti-vibration module 1 filter - gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	10000.0
Unit	Rad*10 ⁻³ /N

200Eh: Automatic Homing Mode

Object Description

Index	200E
Description	VarCom - AUTOHOME The type of automatic homing to be performed on power up. Possible values: 0 = No Homing 1 = Attempt once at power up. Fail once.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

200Fh: Fieldbus Unit Scaling

Object Description

Index	200F
Description	VarCom - FBSCALE Fieldbus unit scaling for internal counts. Defines the number of bits of a 32-bit position that are equivalent to a number of revolution
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x000C
Lower Limit	0x0000
Upper Limit	0x0014
Unit	-

2010h: Velocity Loop Bandwidth for Pole Placement

Object Description

Index	2010
Description	VarCom - BW The velocity control loop bandwidth for the pole placement controller.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x001E
Lower Limit	0x000A
Upper Limit	0x0258
Unit	Hz

2011h: Warning Bits

Object Description

Index	2011
Description	Lists warnings, by bits. Warnings are 64 bits, split into two 32-bit segments. Refer to the section Warning Messages in the User Manual.
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Low Bits
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	High Bits
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

2013h: Voltage Command D Component

Object Description

Index	2013
Description	VarCom - CLVD Shows the D output of the current controller.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

2014h: Voltage Command Q Component

Object Description

Index	2014
Description	VarCom - CLVQ Shows the Q output of the current controller.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

2015h: Drive Name (CAN only)

Object Description

Index	2015
Description	VarCom - DRIVENAME The name assigned to the drive unit.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

2016h: Electrical Position

Object Description

Index	2016
Description	VarCom - ELECTANGLE The electrical angle position in 16-bit resolution.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	65536/(elect cycle)

2017h: HD Derivative Gain

Object Description

Index	2017
Description	VarCom - KNLD The HD control equivalent of PID D. It is used in the HD control loop to reduce velocity error.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	2000.0
Unit	Hz

2018h: HD Integral Gain

Object Description

Index	2018
Description	VarCom - KNLI The HD control equivalent of PID I. It is used in the HD control loop to reduce standstill error.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	200.0
Unit	Hz

2019h: HD Derivative-Integral Gain

Object Description

Index	2019
Description	VarCom - KNLIV The HD control equivalent of PID D and I. It is used in the HD control loop to reduce both error and steady state error and to increases control stiffness.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	400.0
Unit	Hz

201Ah: HD Proportional Gain

Object Description

Index	201A
Description	VarCom - KNLP The HD control equivalent of PID P. It is used in the HD control loop to reduce position error.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	400.0
Unit	Hz

201Bh: HD Global Gain

Object Description

Index	201B
Description	VarCom - KNLUSERGAIN HD adaptive gain scaling factor.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.5
Lower Limit	0.1
Upper Limit	3.0
Unit	-

201Ch: Position Acceleration Feedforward to Current

Object Description

Index	201C
Description	VarCom - KPAFRC The position acceleration feedforward to current loop.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-1000.0
Upper Limit	1000.0
Unit	-

201Dh: Position Acceleration Feedforward

Object Description

Index	201D
Description	VarCom - KPAFRV The acceleration feedforward for the linear position controller.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-1000.0
Upper Limit	1000.0
Unit	-

201Eh: Position Derivative Gain

Object Description

Index	201E
Description	VarCom - KPD The position controller derivative (KD) gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	1000.0
Unit	-

201Fh: Position Proportional Adaptive Gain

Object Description

Index	201F
Description	VarCom - KPE The position proportional adaptive gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	4.0
Unit	-

2020h: Position Integral Gain

Object Description

Index	2020
Description	VarCom - KPI The position controller integral gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	1000.0
Unit	Hz

2021h: Position Integral Saturation Output

Object Description

Index	2021
Description	VarCom - KPISATOUT The position integral output saturation.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	CAN user velocity units

2022h: Position Proportional Gain

Object Description

Index	2022
Description	VarCom - KPP The proportional gain for the linear position controller.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	1200.0
Unit	-

2023h: Position Velocity Feedforward

Object Description

Index	2023
Description	VarCom - KPVFR The position control velocity feedforward.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-1000.0
Upper Limit	1000.0
Unit	-

2024h: Motor Type

Object Description

Index	2024
Description	VarCom - MOTORTYPE The type of motor.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x2
Unit	-

2025h: Velocity Feedforward Ratio

Object Description

Index	2025
Description	VarCom - KVFR The velocity feedforward ratio
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	1.0
Unit	-

2026h: Velocity Integral Gain

Object Description

Index	2026
Description	VarCom - KVI The velocity integral gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	200000.0
Unit	Hz

2027h: Velocity Proportional Gain

Object Description

Index	2027
Description	VarCom - KVP The velocity proportional gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	1000000.0
Unit	-

2028h: Mechanical Angle

Object Description

Index	2028
Description	VarCom - MECHANGLE The actual position of the motor within one revolution.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	65536/Cycle

2029h: Motor Encoder Type

Object Description

Index	2029
Description	VarCom - MENCTYPE The type of motor encoder.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x000B
Lower Limit	0x0000
Upper Limit	0x000B
Unit	-

202Ah: Motor Encoder Index Position (CAN only)

Object Description

Index	202A
Description	VarCom – MENCZPOS The encoder index position.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0078
Lower Limit	0x0000
Upper Limit	0x0167
Unit	electrical degree

202Bh: Motor and Feedback Direction

Object Description

Index	202B
Description	VarCom - MFBDIR The direction and polarity of the motor and feedback.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x07
Unit	-

202Ch: Position Command Move Low Pass Filter

Object Description

Index	202C
Description	VarCom - MOVESMOOTHLPFHZ The low pass filter for position command move.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x1388
Lower Limit	0x000A
Upper Limit	0x1388
Unit	-

202Dh: Motor Feedback Mode

Object Description

Index	202D
Description	VarCom - MFBMODE Enables/disables the resolution enhancement mechanism for incremental encoders.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0x01
Unit	-

202Eh: Motor Foldback Status

Object Description

Index	202E
Description	VarCom - MFOLD Indicates whether the motor foldback limit has dropped below the application current limits.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

202Fh: Motor Foldback Delay Time

Object Description

Index	202F
Description	VarCom - MFOLDD Motor foldback delay time. This is the amount of time the system current can exceed Motor Continuous Current (6075h) before the drive enters motor foldback state.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	5.0
Lower Limit	1.0
Upper Limit	2400.0
Unit	second

2030h: Motor Foldback Disable

Object Description

Index	2030
Description	VarCom - MFOLDDIS Enables/disables motor foldback protection
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

2031h: Motor Foldback Recovery Time

Object Description

Index	2031
Description	VarCom - MFOLDR The recovery time for motor foldback.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	70.0
Lower Limit	5.0
Upper Limit	3600.0
Unit	second

2032h: Motor Foldback Time Constant

Object Description

Index	2032
Description	VarCom - MFOLDT The time constant for motor foldback.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	5.0
Lower Limit	1.0
Upper Limit	1200.0
Unit	second

2033h: Motor Foldback Current

Object Description

Index	2033
Description	VarCom - MIFOLD The current limit derived from the motor foldback mechanism. Foldback condition occurs when Motor Foldback Current (2033h) goes below User Current Limit (6072h).
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	mA

2034h: Motor Foldback Fault Threshold

Object Description

Index	2034
Description	VarCom - MIFOLDFTHRESH The motor foldback fault threshold.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	mA

2035h: Motor Foldback Warning Threshold

Object Description

Index	2035
Description	VarCom - MIFOLDWTHRESH The motor foldback warning threshold.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	mA

2036h: Motor Peak Current

Object Description

Index	2036
Description	VarCom - MIPEAK The peak rated current of the motor.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	mA

2037h: Rotor Inertia

Object Description

Index	2037
Description	VarCom - MJ The rotor inertia of a rotary motor.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.02
Lower Limit	0.0
Upper Limit	2000000.0
Unit	kg-m ² ×10 ⁻³

2038h: Force Constant for Linear Motor

Object Description

Index	2038
Description	VarCom - MKF The motor force constant for linear motors.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.016
Lower Limit	0.001
Upper Limit	1000.0
Unit	-

2039h: Torque Constant

Object Description

Index	2039
Description	VarCom - MKT The motor torque constant for rotary motors.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.016
Lower Limit	0.001
Upper Limit	65.0
Unit	-

203Ah: Motor Inductance

Object Description

Index	203A
Description	VarCom - ML The motor minimum line-to-line inductance.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0010000000475
Upper Limit	1000.0
Unit	mHz

203Bh: Adaptive Gain at Continuous Motor Current

Object Description

Index	203B
Description	VarCom - MLGAINC The current loop adaptive gain value at continuous motor current.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.10000000149
Upper Limit	1.0
Unit	-

203Ch: Adaptive Gain at Peak Motor Current

Object Description

Index	203C
Description	VarCom - MLGAINP The current loop adaptive gain value at peak motor current.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.10000000149
Upper Limit	1.0
Unit	-

203Dh: Mass of Linear Motor Without Load

Object Description

Index	203D
Description	VarCom - MMASS The mass of the linear motor carriage without any additional payload. It is used as the base for estimating the total moving mass.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	10000.0
Unit	kg

203Eh: Motor Commutation Type

Object Description

Index	203E
Description	VarCom - MOTORCOMMTYPE The type of motor commutation - brushless or brush.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

203Fh: Motor Name

Object Description

Index	203F
Description	VarCom - MOTORNAME The name assigned to the motor.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

2041h: Motor Setup

Object Description

Index	2041
Description	VarCom - MOTORSETUP Runs an automatic procedure for setting commutation related variables. Write 1 to activate.
Object Code	Variable
Data Type	INTEGER8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

2042h: Motor Setup Status

Object Description

Index	2042
Description	VarCom - MOTORSETUPST Indicates the status of the automatic motor setup procedure (object 2041h).
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

2043h: Commutation Offset

Object Description

Index	2043
Description	VarCom - MPHASE The feedback phase relative to the standard commutation table. It is used to compensate for feedback offset.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0167
Unit	degree

2044h: Drive Temperature

Object Description

Index	2044
Description	VarCom - DRIVETEMP The drive temperature in Celsius degrees. Sub-index 1 - Control board temperature. Sub-index 2 - Power board temperature. Sub-index 3 - Power module temperature.
Object Code	Array
Data Type	INTEGER16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x0003
Lower Limit	0x0000
Upper Limit	0x0003
Unit	-
Sub-Index	001
Description	Control Temperature
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	Celcius degree

Sub-Index	002
Description	Power Temperature
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	Celcius degree

Sub-Index	003
Description	Power Module Temperature
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	Celcius degree

2045h: Feedback Direction

Object Description

Index	2045
Description	VarCom - DIR Feedback positive direction.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

2046h: Disabling Mode

Object Description

Index	2046
Description	VarCom - DISMODE Defines if and how Disabling mode is used for stopping the motor.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0005
Unit	-

2049h: Quick Stop Deceleration Time

Object Description

Index	2049
Description	VarCom - DECSTOPTIME The deceleration rate for an Active Disable or emergency stop.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x1964
Unit	ms

204Ah: Active Disable Speed Threshold

Object Description

Index	204A
Description	VarCom - DISSPEED The velocity threshold below which the motor is considered stopped and the Active Disable timer starts the countdown to disable.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

204Bh: Active Disable Time

Object Description

Index	204B
Description	VarCom - DISTIME The time to wait after motor speed goes below Active Disable Speed Threshold (0204Ah) before the drive is disabled by the Active Disable function.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x000A
Lower Limit	0x0000
Upper Limit	0x1964
Unit	ms

204Ch: Factory Restore

Object Description

Index	204C
Description	VarCom - FACTORYRESTORE Restores all configuration variables to factory default settings. Write 01 to initiate the factory restore.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

204Dh: Feedback Type

Object Description

Index	204D
Description	VarCom - FEEDBACKTYPE The type of motor feedback.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0002
Lower Limit	0x0000
Upper Limit	0x0015
Unit	-

204Eh: Velocity Loop Output Filter Parameter 1

Object Description

Index	204E
Description	VarCom - FILTHZ1 Velocity loop output filter first parameter.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00C8
Lower Limit	0x0001
Upper Limit	0x2710
Unit	Hz

204Fh: Velocity Loop Output Filter Parameter 2

Object Description

Index	204F
Description	VarCom - FILTHZ2 Velocity loop output filter second parameter.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00C8
Lower Limit	0x0001
Upper Limit	0x2710
Unit	Hz

2050h: Velocity Loop Output Filter Mode

Object Description

Index	2050
Description	VarCom - FILTMODE Defines the velocity loop output filter.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x07
Unit	-

2051h: Foldback Status

Object Description

Index	2051
Description	VarCom - FOLD Indicates whether the Drive Foldback Limit (2069h) has dropped below the User Current Limit (6073h)
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2052h: Friction Compensation Negative Current

Object Description

Index	2052
Description	VarCom - FRICINEG The current added to the current command when commanded velocity is negative. Limited by the Drive Peak Current (207Bh).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

2053h: Friction Compensation Positive Current

Object Description

Index	2053
Description	VarCom - FRICIPOS The current added to the current command when commanded velocity is positive. Limited by the Drive Peak Current (207Bh).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

2054h: Friction Compensation Negative Velocity Hysteresis

Object Description

Index	2054
Description	VarCom - FRICNVHYST The velocity hysteresis in the negative direction for the friction compensation mechanism.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

2055h: Friction Compensation Positive Velocity Hysteresis

Object Description

Index	2055
Description	VarCom - FRICPVHYST The velocity hysteresis in the positive direction for the friction compensation mechanism.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

2056h: Halls State**Object Description**

Index	2056
Description	VarCom - HALLS 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

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x00
Upper Limit	0x03
Unit	-
Sub-Index	001
Description	Hall U
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	No
Default Value	0x0
Lower Limit	0x0
Upper Limit	0x1
Unit	-

Sub-Index	002
Description	Hall V
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	No
Default Value	0x0
Lower Limit	0x0
Upper Limit	0x1
Unit	-

Sub-Index	003
Description	Hall W
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	No
Default Value	0x0
Lower Limit	0x0
Upper Limit	0x1
Unit	-

2057h: Invert Hall Signals

Object Description

Index	2057
Description	VarCom - HALLSINV 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

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x00
Upper Limit	0x03
Unit	-

Sub-Index	001
Description	Hall U
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

Sub-Index	002
Description	Hall V
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

Sub-Index	003
Description	Hall W
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

2058h: Hall Signals Type

Object Description

Index	2058
Description	VarCom - HALLSTYPE The source and method used for connecting Hall sensors to the drive - single-ended or differential.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0002
Unit	-

205Ah: Harmonic Correction Feedback Parameter 1

Object Description

Index	205A
Description	Harmonic feedback correction parameter 1. Write 01 to the Config sub-index to perform the parameter configuration.
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x04
Lower Limit	0x04
Upper Limit	0x04
Unit	-

Sub-Index	001
Description	Config
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Argument_1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x00000028
Unit	-

Sub-Index	003
Description	Argument_2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000167
Upper Limit	0x00000000
Unit	-

Sub-Index	004
Description	Argument_3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	CAN user position units

205Bh: Harmonic Correction Feedback Parameter 2

Object Description

Index	205B
Description	Harmonic feedback correction parameter 2. Write 01 to the Config sub-index to perform the parameter configuration.
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x04
Lower Limit	0x04
Upper Limit	0x04
Unit	-

Sub-Index	001
Description	Config
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Argument_1
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x00000028
Unit	-

Sub-Index	003
Description	Argument_2
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x00000167
Unit	-

Sub-Index	004
Description	Argument_3
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	CAN user position units

205Dh: Harmonic Current ICMD Parameter 1

Object Description

Index	205D
Description	Harmonic current ICMD parameter 1. Write 01 to the Config sub-index to perform the parameter configuration.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x04
Lower Limit	0x00
Upper Limit	0x04
Unit	-

Sub-Index	001
Description	Config
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	002
Description	Argument_1
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0028
Unit	-

Sub-Index	003
Description	Argument_2
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0167
Unit	-

Sub-Index	004
Description	Argument_3
Entry Category	Optional
Data Type	REAL32
Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	0.0
Unit	-

205Eh: Harmonic Current ICMD Parameter 2

Object Description

Index	205E
Description	Harmonic current ICMD parameter 2. Write 01 to the Config sub-index to perform the parameter configuration.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x04
Lower Limit	0x04
Upper Limit	0x04
Unit	-

Sub-Index	001
Description	Config
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	002
Description	Argument_1
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0028
Unit	-

Sub-Index	003
Description	Argument_2
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0167
Unit	-

Sub-Index	004
Description	Argument_3
Entry Category	Optional
Data Type	REAL32
Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	0.0
Unit	-

2060h: HD Current Filter - Damping

Object Description

Index	2060
Description	VarCom - NLFILTDAMPING Used in the HD control loop to maintain the bandwidth of the filter up to the cutoff frequency.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0064
Unit	percentage

2061h: HD Current Filter - Notch Filter Center

Object Description

Index	2061
Description	VarCom - NLNOTCHCENTER Used in the HD control loop to maintain the bandwidth of the filter up to the cutoff frequency.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0064
Lower Limit	0x0064
Upper Limit	0x2710
Unit	Hz

2062h: HD Current Filter - Notch Filter Bandwidth

Object Description

Index	2062
Description	VarCom - NLNOTCHBW Used in the HD control loop to define the width (sharpness) of a high frequency that is causing system vibrations.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x01F4
Unit	Hz

2063h: Hold Position Command

Object Description

Index	2063
Description	VarCom - HOLD Instructs motor whether to maintain its position. 0 = Do not hold position 1 = Hold position
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

2064h: Hardware Position External

Object Description

Index	2064
Description	VarCom - HWPEXT The position as measured by an external feedback device.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	counts

2065h: Hardware Position (CAN only)**Object Description**

Index	2065
Description	VarCom - HWPOS The position as measured by the feedback device.
Object Code	Variable
Data Type	UNSIGNED64

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000000000000000
Upper Limit	0xFFFFFFFFFFFFFFFF
Unit	-

2066h: Current D Axis**Object Description**

Index	2066
Description	VarCom - ID In vector control, indicates the value perpendicular to Current Q Axis.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

2067h: Current Q Axis**Object Description**

Index	2067
Description	VarCom - IQ In vector control, indicates the current for the torque. This value is perpendicular to Current D Axis.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

2068h: Current Feedforward Low Pass Filter**Object Description**

Index	2068
Description	VarCom - IFFLPFHZ The corner frequency of a first-order filter of the feedforward low pass filter.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0050
Lower Limit	0x000A
Upper Limit	0x03E8
Unit	Hz

2069h: Drive Foldback Current Limit

Object Description

Index	2069
Description	VarCom - IIFOLD The current limit derived from the foldback mechanism. Foldback condition occurs when Drive Foldback Current Limit (2069h) goes below User Current Limit (6073h).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

206Ah: Drive Foldback Fault Threshold

Object Description

Index	206A
Description	VarCom - IFOLDFTHRESH The current threshold for declaring a fault due to foldback.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	mA

206Bh: Drive Foldback Warning Threshold

Object Description

Index	206B
Description	VarCom - IFOLDWTHRESH The current threshold level for declaring a warning due to foldback. Warning is declared when 2069h drops below 206Ah.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	mA

206Ch: Gravity Compensation

Object Description

Index	206C
Description	VarCom - IGRAV Value added to the current loop command to compensate for gravity or similar constant interference.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

206Fh: Encoder Index Position Feedback

Object Description

Index	206F
Description	VarCom - INDEXPFB The position feedback captured at the first encoder index detection after power on.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

2070h: Input Inversion

Object Description

Index	2070
Description	VarCom - ININV The inversion state of each digital input. Write the index first. Write the value to the input sub-index to execute the input inversion. Reading the value indicates the inversion state of the input.
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Index
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0001
Upper Limit	0x000B
Unit	-

Sub-Index	002
Description	Value
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

2071h: Dynanic Brake Current

Object Description

Index	2071
Description	VarCom - ISTOP The maximum current allowed during the dynamic braking process. Limited by the Drive Peak Current (207Bh).
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x249F0
Unit	mA

2072h: Phase U Actual Current

Object Description

Index	2072
Description	VarCom - IU The actual current at phase U (of UVW).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

2073h: Phase U Current Offset

Object Description

Index	2073
Description	VarCom - IUOFFSET The current offset at phase U (of UVW).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

2074h: Phase V Actual Current**Object Description**

Index	2074
Description	VarCom - IV The actual current at phase V (of UVW).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

2075h: Phase V Current Offset**Object Description**

Index	2075
Description	VarCom - IVOFFSET The current offset at phase V (of UVW).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mA

2076h: Zero Procedure Current

Object Description

Index	2076
Description	VarCom - IZERO The current for the ZERO (20DFh) procedure.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	DIPEAK
Unit	mA

2077h: Position Integral Saturation Input

Object Description

Index	2077
Description	VarCom - KPISATIN The position integral input saturation.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	10000.0
Unit	-

2078h: Limit Switch Negative Status

Object Description

Index	2078
Description	VarCom - LIMSWITCHNEG The state of the hardware limit switch in the negative direction; defined by inputs.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

2079h: Limit Switch Positive Status

Object Description

Index	2079
Description	VarCom - LIMSWITCHPOS The state of the hardware limit switch in positive direction; defined by inputs.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

207Ah: Load to Motor Inertia Ratio

Object Description

Index	207A
Description	VarCom - LMJR The ratio of the load inertia to the motor inertia.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	600.0
Unit	-

207Bh: Drive Peak Current

Object Description

Index	207B
Description	VarCom - DIPEAK The rated peak current of the drive (sinusoidal peak). Hardware-defined.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	Hardware-dependent
Lower Limit	Hardware-dependent
Upper Limit	Hardware-dependent
Unit	mA

207Ch: Drive Continuous Current

Object Description

Index	207C
Description	VarCom - DICONT The continuous rated current for the drive (sinusoidal peak). Hardware defined.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	Hardware-dependent
Lower Limit	Hardware-dependent
Upper Limit	Hardware-dependent
Unit	mA

207Dh: Motor Pitch

Object Description

Index	207D
Description	VarCom - MPITCH The pitch of a linear motor
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000020
Lower Limit	0x00000001
Upper Limit	0x000186A0
Unit	mm

207Eh: Motor Poles

Object Description

Index	207E
Description	VarCom - MPOLES The number of individual poles (not pairs) in the motor.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0002
Lower Limit	0x0002
Upper Limit	0x0050
Unit	poles

207Fh: Motor Resistance

Object Description

Index	207F
Description	VarCom - MR The motor resistance.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	10.0
Unit	ohm

2080h: Motor Resolver Poles

Object Description

Index	2080
Description	VarCom - MRESPOLES The number of individual poles in the resolver feedback device.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0002
Lower Limit	0x0002
Upper Limit	0x0050
Unit	poles

2082h: Current KFF Gain

Object Description

Index	2082
Description	VarCom - KCFF The current controller feedforward gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	100.0
Unit	-

2083h: Torque Commutation Angle Advance at Motor Continuous Current**Object Description**

Index	2083
Description	Varcom - MTANGLC The value of the torque-related commutation angle advance at the motors continuous current rating.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x002D
Unit	degree

2084h: Torque Commutation Angle Advance at Motor Peak Current**Object Description**

Index	2084
Description	Varcom - MTANGLP The value of the torque-related commutation angle advance at the motors peak current.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x002D
Unit	degree

2085h: Velocity Commutation Angle Advance at Motor Maximum Speed**Object Description**

Index	2085
Description	Varcom - MVANGLF The value of the velocity-related commutation angle advance to be used when the motor is operating at motor maximum speed.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x005A
Unit	degree

2086h: Velocity Commutation Angle Advance at Motor Maximum Speed/2**Object Description**

Index	2086
Description	Varcom - MVANGLH The value of the velocity-related commutation angle advance to be used when the motor is operating at motor maximum speed/2.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x005A
Unit	degree

2087h: HD Spring Filter

Object Description

Index	2087
Description	VarCom - NLAFFLPFHZ Used with HD Flexibility Compensation (208Fh) to reduce the vibrations induced to the load by abrupt changes in acceleration (jerk), and reduce tracking error. Can also be used to minimize overshoot and settling time.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x1B58
Lower Limit	0x000A
Upper Limit	0x1B58
Unit	Hz

2088h: Position Backup

Object Description

Index	2088
Description	VarCom - PFBBACKUP Reads the position values from non-volatile memory that were saved by the Position Backup process.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

2089h: Position Backup Mode

Object Description

Index	2089
Description	VarCom - PFBACKUPMODE Enables and disables the position backup process.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

208Ah: HD Maximum Adaptive Gain

Object Description

Index	208A
Description	VarCom - NLMAXGAIN Autotuning automatically sets this gain according to the encoder resolution.This is the recommended value.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.6
Lower Limit	1.0
Upper Limit	5.0
Unit	-

208Bh: HD Current Filter - Second Notch Filter Bandwidth**Object Description**

Index	208B
Description	VarCom - NLNOTCH2BW Used in the HD control loop to define the width (sharpness) of a high frequency that is causing system vibrations.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x01F4
Unit	Hz

208Ch: HD Current Filter - Second Notch Filter Center**Object Description**

Index	208C
Description	VarCom - NLNOTCH2CENTER Used in the HD control loop to block an additional high frequency that is causing system vibrations.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0064
Lower Limit	0x0064
Upper Limit	0x2710
Unit	Hz

208Dh: Emergency or Controlled Stop Current Limit

Object Description

Index	208D
Description	VarCom - ESTOPILIM The current limit during an emergency or controlled stop. Expressed as a factor of User Current Limit (6073h).
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0010000000475
Upper Limit	1.0
Unit	User position units

208Eh: Position Command

Object Description

Index	208E
Description	VarCom - PCMD The value of the position command.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

208Fh: HD Flexibility Compensation

Object Description

Index	208F
Description	VarCom - NLPEAFF Used with HD Spring Filter (2087h) to reduce the vibrations induced to the load by abrupt changes in acceleration (jerk), and reduce tracking error; can also be used to minimize overshoot and settling time.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	200000.0
Unit	Hz

2090h: Homing Status

Object Description

Index	2090
Description	VarCom - HOMESTATE Indicates the state of the homing process.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

2091h: HD Acceleration/Deceleration Spring Filter Gain

Object Description

Index	2091
Description	VarCom - NLPEDFFRATIO Determines the acceleration/deceleration spring filter gain.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	1.99899995327
Unit	-

2095h: Position Offset

Object Description

Index	2095
Description	VarCom - PBFOFFSET A feedback offset that is added to the internal cumulative position counter, to give the actual value of the position (6064h).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2096h: HD Anti-Vibration 1 Filter - Center Frequency**Object Description**

Index	2096
Description	VarCom - NLANTIVIBHZ The HD position control loop anti-vibration module 1 filter center frequency.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	400.000030518
Lower Limit	5.0
Upper Limit	400.0
Unit	Hz

2097h: HD Anti-Vibration 2 Filter - Center Frequency**Object Description**

Index	2097
Description	VarCom - NLANTIVIBHZ2 The HD position control loop anti-vibration module 2 filter center frequency.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	400.000030518
Lower Limit	5.0
Upper Limit	400.0
Unit	Hz

2099h: Current Level 1 for Digital Output Definition**Object Description**

Index	2099
Description	VarCom - OUTILVL1 The first current level used for a condition that controls a digital output.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x000249F0
Unit	mA

209Ah: Current Level 2 for Digital Output Definition**Object Description**

Index	209A
Description	VarCom - OUTILVL2 The second current level used for a condition that controls a digital output.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x000249F0
Unit	mA

209Bh: Output Inversion

Object Description

Index	209B
Description	VarCom - OUTINV The inversion state of each digital output. Write the index first. Then write the value to the output index execute the output inversion. Reading the value indicates the inversion state of the digital output.
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Index
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0001
Upper Limit	0x0007
Unit	-

Sub-Index	002
Description	Value
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

209Ch: Output Mode

Object Description

Index	209C
Description	<p>VarCom - OUTMODE</p> <p>Defines the condition that will activate the specified digital output.</p> <p>Write the output index first. Then write the function to the corresponding output index.</p> <p>0 = Idle</p> <p>1 = Active (enabled)</p> <p>2 = Brake release signal</p> <p>3 = Alarm for any fault</p> <p>4 = In position indication matching INPOS</p> <p>5 = Stopped indication (matching STOPPED=2)</p> <p>6 = Foldback indication (motor or drive) (fault or FOLD)</p> <p>7 = Average current exceeds OUTILVL1</p> <p>8 = Average current is above OUTILVL1 and below OUTILVL2</p> <p>9 = Velocity exceeds OUTVLVL1. Output will be activated when velocity exceeds the level set by OUTVLVL1.</p> <p>10 = Velocity is above OUTVLVL1 and below OUTVLVL2. Output will be activated when velocity is above the level set by OUTVLVL1 and below the level set by OUTVLVL2.</p> <p>11 = Position (PFB) is above OUTPLVL1. Output will be activated when position exceeds the level set by OUTPLVL1.</p> <p>12 = Position (PFB) is above OUTPLVL1 and below OUTPLVL2. Output will be activated when position is above the level set by OUTPLVL1 and below the level set by OUTPLVL2.</p> <p>13 = Encoder battery low voltage fault</p> <p>14 = Warning on</p> <p>15 = Faults or disabled</p> <p>16 = Encoder battery low voltage warning</p> <p>17 = Phase find succeeded</p> <p>18 = Over-current fault exists</p> <p>19 = Over-voltage fault exists</p> <p>20 = Under-voltage fault exists</p> <p>21 = Phase find required</p> <p>22 = Alarm for any fault except phase find failure</p> <p>23 = Homing complete</p> <p>24 = Encoder simulation index</p> <p>25 = Zero position after homing</p> <p>27 = PCOM module 1 output</p> <p>28 = PCOM module 2 output</p>
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x0002
Lower Limit	0x0002
Upper Limit	0x0002
Unit	-

Sub-Index	001
Description	Output Index
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	002
Description	Function Code
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

209Dh: Position Level 1 for Digital Output Definition**Object Description**

Index	209D
Description	VarCom - OUTPLVL1 The first position value for a condition that controls a digital output.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

209Eh: Position Level 2 for Digital Output Definition**Object Description**

Index	209E
Description	VarCom - OUTPLVL2 The second position value for a condition that controls a digital output.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

209Fh: Velocity Level 1 for Digital Output Definition

Object Description

Index	209F
Description	VarCom - OUTVLVL1 The first velocity value for a condition that controls a digital output.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

20A0h: Velocity Level 2 for Digital Output Definition

Object Description

Index	20A0
Description	VarCom - OUTVLVL2 The second velocity value for a condition that controls a digital output.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

20A1h: Over-Voltage Threshold

Object Description

Index	20A1
Description	VarCom - OVTHRESH The threshold level for detection of bus over-voltage.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	V

20A2h: Software Enable Status

Object Description

Index	20A2
Description	VarCom - SWEN Indicates the state of software enable.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

20A3h: Position Loop Position Error

Object Description

Index	20A3
Description	VarCom - PELOOP Position error value used by the position loop.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

20A4h: Phase Find Command

Object Description

Index	20A4
Description	VarCom - PHASEFIND Starts a procedure that initializes commutation for incremental encoder systems. Write 1 to initiate the phase find command.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

20A5h: Forced Electrical Position

Object Description

Index	20A5
Description	VarCom - PHASEFINDANGLE The position within one revolution.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	65536/electrical cycle

20A6h: Phase Find Gain

Object Description

Index	20A6
Description	VarCom - PHASEFINDGAIN Adjusts the gain of the phase finding mechanism.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	10.0
Unit	-

20A7h: Phase Find Current

Object Description

Index	20A7
Description	VarCom - PHASEFINDI Adjusts the current of the phase finding mechanism. Limited by Maximum Current (6073h).
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	IMAX
Unit	mA

20A8h: Phase Find Mode

Object Description

Index	20A8
Description	<p>VarCom - PHASEFINDMODE</p> <p>Defines commutation for phase finding.</p> <p>2 = Soft start. Default. Also referred to as a Wake-No-Shake routine.</p> <p>4 = Smooth start. Sets commutation angle to 180 degrees and increases current until a movement of 1 electrical angle is detected.</p> <p>5 = High torque start. Sets commutation angle to 180 degrees and increases current until a movement of 1 electrical angle is detected.</p> <p>11 = Manual commutation. Commutation offset is defined by the value of Forced Electrical Position (20A5h).</p> <p>12 = Zeroing. Applies the ZERO command and uses the resulting MPHASE. Supports systems with Z axis.</p>
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0002
Lower Limit	0x0000
Upper Limit	0x000B
Unit	-

20A9h: Phase Find Status

Object Description

Index	20A9
Description	VarCom - PHASEFINDST Indicates the state of the commutation Phase Find procedure for incremental encoders. Possible values: 0 = Not started 1 = Running 2 = Succeeded 3 = Failed
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20AAh: Phase Find Duration

Object Description

Index	20AA
Description	VarCom - PHASEFINDTIME Limits the duration of phase finding (20A8h) in soft start mode.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0064
Lower Limit	0x0000
Upper Limit	0x2710
Unit	ms

20ABh: Position Loop Controller Mode

Object Description

Index	20AB
Description	VarCom - POSCONTROLMODE Defines the type of position loop controller. Possible values: 0 = Linear control loop 1 = HD control loop; for backward compatibility only 2 = HD control loop with 250 s sample rate 5 = HD control loop with 125 s sample rate; recommended for all new applications
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20ACh: Position Limiting Mode

Object Description

Index	20AC
Description	VarCom - POSLIMMODE Enables/disables software position limits.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20ADh: PRB Generator Frequency

Object Description

Index	20AD
Description	VarCom - PRBFRQ 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

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	100.0
Lower Limit	0.0
Upper Limit	5000.0
Unit	Hz

20AEh: PRB Generator Mode

Object Description

Index	20AE
Description	VarCom - PRBMODE Defines if and how the PRB signal generator is activated. Possible values: 0 = PRB generator not activated 1 = PRB generator activated only during recording 2 = PRB generator activated continuously
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0002
Unit	-

20AFh: PRB Generator Configuration

Object Description

Index	20AF
Description	VarCom - PRBPARAM 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 by Max Current (6073h). Velocity Amplitude is limited by Max Profile Velocity (607Fh). Counter Period is relative to current loop update rate.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x5
Lower Limit	0x5
Upper Limit	0x5
Unit	-

Sub-Index	001
Description	Signal Type
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0003
Unit	-

Sub-Index	002
Description	Current Amplitude
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user current units

Sub-Index	003
Description	Velocity Amplitude
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

Sub-Index	004
Description	Counter Period
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	005
Description	Config
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20B0h: Position Command Generator Target Error

Object Description

Index	20B0
Description	VarCom - PTPTE The target error during a motion profile, which is the distance remaining to the destination in a point-to-point move.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

20B1h: Position Command Generator Velocity

Object Description

Index	20B1
Description	VarCom - PTPVCMD The derivative of the position command profile in velocity units.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

20B2h: PWM Frequency

Object Description

Index	20B2
Description	VarCom - PWMFRQ The frequency of the PWM signals.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	16.0
Lower Limit	0.0
Upper Limit	0.0
Unit	kHz

20B3h: Gearing Mode

Object Description

Index	20B3
Description	VarCom - GEARMODE The gearing source and method.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x04
Unit	-

20B5h: In Position Indication

Object Description

Index	20B5
Description	VarCom - INPOS Indicates whether the position error is within the allowed tolerance. 0 = Not in position 1 = In position
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20B6h: Hardware Position External (DSP)**Object Description**

Index	20B6
Description	VarCom - HWPEXTMACHN The position as measured by an external feedback device (DSP);. 32-bit counter of the pulse and direction input from the machine interface connector.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

20B8h: Fault Relay Status**Object Description**

Index	20B8
Description	VarCom - RELAY The state of the fault relay. 0 = Relay open 1 = Relay closed
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20B9h: Fault Relay Mode

Object Description

Index	20B9
Description	VarCom - RELAYMODE 0 = Relay opens upon fault 1 = Relay opens upon disable
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20BAh: Remote Hardware Enable Status

Object Description

Index	20BA
Description	VarCom - REMOTE The state of the external hardware enable input. 0 = Remote enable input off. 1 = Remote enable input on.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20BBh: Resolver Amplitude Range

Object Description

Index	20BB
Description	VarCom - RESAMPLRANGE The acceptable range of deviation of resolver sine/cosine signals, expressed as a percentage.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0023
Lower Limit	0x0000
Upper Limit	0x0064
Unit	percentage

20BCh: Resolver Conversion Bandwidth

Object Description

Index	20BC
Description	VarCom - RESBW The resolver conversion bandwidth.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x012C
Lower Limit	0x00C8
Upper Limit	0x0320
Unit	Hz

20BDh: Save/Load Status

Object Description

Index	20BD
Description	Save/load status. Copies all system configuration variables from working RAM to non-volatile memory. Write 01 to initiate the command.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

20BEh: Sine/Cosine Calibration Command

Object Description

Index	20BE
Description	VarCom - SININIT Activates a procedure that calibrates sine encoder or resolver sine and cosine signals. The calibration serves to reduce harmonic errors in the sine encoder or resolver reading.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20BFh: Sine/Cosine Calibration Mode

Object Description

Index	20BF
Description	VarCom - SININITMODE Enables/disables the automatic calibration of sine encoder or resolver sine and cosine signals at power up.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20C0h: Sine/Cosine Calibration Status

Object Description

Index	20C0
Description	VarCom - SININITST The status of the sine encoder or resolver calibration procedure.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20C1h: Sine/Cosine Calibration Parameters (CAN only)**Object Description**

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

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

20C2h: Synchronization Mode

Object Description

Index	20C2
Description	<p>VarCom - SYNCSOURCE</p> <p>Sets the method used to synchronize the drive clock to an external sync signal.</p> <p>When the drive detects a SYNC signal from EtherCAT or CANopen, it automatically sets SYNCSOURCE to a value of 5 or 6, respectively.</p> <p>Possible values:</p> <p>0 = Disabled; no sync</p> <p>1 = Sync drive clock to controller based on fast digital input 5</p> <p>2 = Sync drive clock to controller based on fast digital input 6</p> <p>3 = Sync drive clock based on pulse differential input (Pulse & Direction)</p> <p>4 = Sync signal source is pulse input from Machine I/F</p> <p>5 = Automatically set in EtherCAT drive (EC and EB models). Read only.</p> <p>6 = Automatically set in CAN drive (AF model). Read only.</p>
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0005
Unit	-

20C3h: Tracking Factor

Object Description

Index	20C3
Description	VarCom - TF The derivative factor for tracking with PDFF velocity controller.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0064
Lower Limit	0x0000
Upper Limit	0x00C8
Unit	percentage

20C4h: Motor Over-Temperature

Object Description

Index	20C4
Description	VarCom - THERM The state of the motor thermostat input that indicates an over-temperature condition. 0 = Thermostat input closed (normal) or ignored when Motor Over-Temperature Mode (20C6h) = 3. 1 = Thermostat input open, indicating overheating .
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20C5h: Motor Over-Temperature Clear Fault Level

Object Description

Index	20C5
Description	VarCom - THERMCLEARLEVEL The level at which a motor over-temperature fault is cleared.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000064
Lower Limit	0x00000000
Upper Limit	0x000F4240
Unit	ohm

20C6h: Motor Over-Temperature Mode

Object Description

Index	20C6
Description	VarCom - THERMODE Defines how the drive will respond to an over-temperature fault. Possible values: 0 = Disable drive immediately 3 = Ignore thermostat input 4 = Issue warning only 5 = Issue warning. If condition persists after Motor Over-Temperature Time (20C8h), issue fault
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0005
Unit	-

20C7h: Motor Temperature

Object Description

Index	20C7
Description	VarCom - THERMREADOUT The motor temperature.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	ohm

20C8h: Motor Over-Temperature Time

Object Description

Index	20C8
Description	VarCom - THERMTIME The number of seconds after detection of motor over-temperature until the drive opens the fault relay.33333333333333
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x001E
Lower Limit	0x0000
Upper Limit	0x012C
Unit	second

20C9h: Motor Over-Temperature Fault Level

Object Description

Index	20C9
Description	VarCom - THERMTRIPLEVEL The motor over-temperature fault level.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000096
Lower Limit	0x00000000
Upper Limit	0x000F4240
Unit	ohm

20CAh: Motor Over-Temperature Type

Object Description

Index	20CA
Description	VarCom - THERMTYPE The type of motor temperature sensor. 0 = Positive temperature coefficient (PTC) 1 = Negative temperature coefficient (NTC)
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20CBh: Tamagawa Multi-Turn Reset

Object Description

Index	20CB
Description	VarCom - TMTURNRESET Resets the counter of a Tamagawa multi-turn encoder. Write 01 to initiate the command.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

20CCh: Run Time (CAN only)

Object Description

Index	20CC
Description	VarCom - TRUN The total elapsed run time of the drive since production. Cannot be reset.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

20CDh: Under-Voltage Mode

Object Description

Index	20CD
Description	VarCom - UVMODE Defines how the drive will respond to an under-voltage fault. Possible values: 0 = Latches fault immediately if drive disabled or enabled. 1 = Issues warning if drive enabled. Ignores if drive disabled. 2 = Issues warning if drive enabled, then waits Under-Voltage Time (20Dh) before latching the fault. Ignores if drive disabled. 3 = Issues warning if drive disabled. Latches fault immediately if drive enabled.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0003
Unit	-

20CEh: Under-Voltage Recovery Mode

Object Description

Index	20CE
Description	VarCom - UVRECOVER 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

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20CFh: Under-Voltage Threshold 64

Object Description

Index	20CF
Description	VarCom - UVTHRESH The level for detection of an under-voltage condition.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	Hardware-dependent
Lower Limit	0x0014
Upper Limit	0x0190
Unit	V

20D0h: Under-Voltage Time

Object Description

Index	20D0
Description	VarCom - UVTIME The amount of time an under-voltage warning is displayed before it is latched in Under-Voltage Mode (20CDh) = 2.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x001E
Lower Limit	0x0000
Upper Limit	0x012C
Unit	second

20D1h: Bus Voltage (DC)

Object Description

Index	20D1
Description	VarCom - VBUS The drive bus voltage used for current controller design.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0140
Lower Limit	0x000A
Upper Limit	0x0352
Unit	V

20D3h: Velocity Error

Object Description

Index	20D3
Description	VarCom - VE The velocity error of the velocity loop.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

20D4h: Velocity Loop Controller

Object Description

Index	20D4
Description	VarCom - VELCONTROLMODE Defines the type of velocity loop controller. Possible values: 0 = PI controller (uses 2026h, 2027h) 1 = PDFF controller (uses 2025h, 2026h, 2027h) 2 = Standard pole placement controller (uses 2037h, 2039h, 2010h, 207Ah, 20C3h) 7 = HD velocity loop with integrator (uses 2017h, 201Ah) 3,4,5,6 = not for user
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x07
Unit	-

20D5h: Velocity Design Conversion (CAN only)

Object Description

Index	20D5
Description	VarCom - VELDESIGN 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 linear position controller.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

20D6h: Velocity Filter Mode

Object Description

Index	20D6
Description	VarCom - VELFILTMODE Defines the type of filter for extracting a velocity signal from the position feedback. 0 = No filter 1 = First order filter
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0000
Upper Limit	0x0003
Unit	-

20D7h: Drive Version (CAN only)

Object Description

Index	20D7
Description	VarCom - VER The firmware version of drive.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

20D8h: Velocity Loop Output Filter

Object Description

Index	20D8
Description	VarCom - VF User defined velocity loop output filter.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x08
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Polynom_Term_1
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	Polynom_Term_2
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	Polynom_Term_3
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	004
Description	Polynom_Term_4
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	005
Description	Polynom_Term_5
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	006
Description	Polynom_Term_6
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	007
Description	Polynom_Term_7
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	008
Description	Term_Execute
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

20D9h: Velocity Loop Input Filter

Object Description

Index	20D9
Description	VarCom - VFI User defined velocity loop input filter.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x08
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Polynom_Term_1
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	Polynom_Term_2
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	Polynom_Term_3
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	004
Description	Polynom_Term_4
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	005
Description	Polynom_Term_5
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	006
Description	Polynom_Term_6
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	007
Description	Polynom_Term_7
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	008
Description	Term_Execute
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x1
Unit	-

20DAh: Advanced Pole Placement H Polynomial

Object Description

Index	20DA
Description	VarCom - VH Extended velocity controller H-polynomial.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x0D
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	manu_spec_Vh_Polynom_Term_1
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	manu_spec_Vh_Polynom_Term_2
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	manu_spec_Vh_Polynom_Term_3
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	004
Description	manu_spec_Vh_Polynom_Term_4
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	005
Description	manu_spec_Vh_Polynom_Term_5
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	006
Description	manu_spec_Vh_Polynom_Term_6
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	007
Description	manu_spec_Vh_Polynom_Term_7
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	008
Description	manu_spec_Vh_Polynom_Term_8
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	009
Description	manu_spec_Vh_Polynom_Term_9
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	010
Description	manu_spec_Vh_Polynom_Term_10
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	011
Description	manu_spec_Vh_Polynom_Term_11
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	012
Description	manu_spec_Vh_Polynom_Term_12
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	013
Description	manu_spec_Vh_Polynom_Term_Execute
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

20DBh: Advanced Pole Placement R Polynomial

Object Description

Index	20DB
Description	VarCom - VR Extended velocity controller R-polynomial.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x0B
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Polynom_Term_1
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	Polynom_Term_2
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	Polynom_Term_3
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	004
Description	Polynom_Term_4
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	005
Description	Polynom_Term_5
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	006
Description	Polynom_Term_6
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	007
Description	Polynom_Term_7
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	008
Description	Polynom_Term_8
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	009
Description	Polynom_Term_9
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	010
Description	Polynom_Term_10
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	011
Description	Term_Execute
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

20DCh: Wake No Shake Status (CAN only)

Object Description

Index	20DC
Description	VarCom - WNSERR Wake No Shake Status
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

20DDh: Display Warnings (CAN only)

Object Description

Index	20DD
Description	VarCom - WRN Lists the warnings that have occurred since the buffer was last cleared.
Object Code	Variable
Data Type	VISIBLE_STRING

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

20DEh: External Encoder Resolution

Object Description

Index	20DE
Description	VarCom - XENCRES The resolution of the external encoder.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000800
Lower Limit	0x00000064
Upper Limit	0x00989680
Unit	-

20DFh: Zeroing Command

Object Description

Index	20DF
Description	VarCom - ZERO Activates Zeroing mode, which locks the rotor in place by passing a fixed current through two phases. This is useful for determining the commutation offset on motors that have a resolver or absolute encoder.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20E0h: Input Mode

Object Description

Index	20E0
Description	<p>VarCom - INMODE</p> <p>Defines the function of each digital input.</p> <p>Write the input index first. Then write the value to assign the function to the corresponding input index.</p> <p>Possible values:</p> <ul style="list-style-type: none"> 0 = Idle 1 = Remote enable 2 = Clear faults 3 = Phase lock loop (PLL) synchronization 4 = Emergency stop, activates Active Disable 5 = Limit switch positive 6 = Limit switch negative 7 = Reserved 8 = Home switch 9 = Script trigger 10 = Script bit 0 11 = Script bit 1 12 = Script bit 2 13 = Script bit 3 14 = Script bit 4 15 = Reserved 16 = Reserved 17 = Gearing pulse signal on digital input 5 only 18 = Gearing direction signal - on digital input 6 only 19 to 25 = Reserved 26 = Homing command 27 = Touch probe 1 28 = Reserved 29 = Reserved 30 = Hold and resume motion 31 = Reserved 32 = Operation mode change while drive enabled 33 = Explicitly sets OPMODE 4 and ENCFOLLOWER 1 34 = Explicitly sets OPMODE 4 and ENCFOLLOWER 2 35 = Explicitly sets OPMODE 4 and ENCFOLLOWER 3 36 = Explicitly sets OPMODE 4 and ENCFOLLOWER 4 37 = Explicitly sets OPMODE 4 and ENCFOLLOWER 5 38 = JOG motor to positive direction at speed JOGSPD1 39 = JOG motor to negative direction at speed -JOGSPD1 40 = JOG motor to positive direction at speed JOGSPD2 41 = JOG motor to negative direction at speed -JOGSPD2
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Input Index
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0001
Upper Limit	0x000B
Unit	-

Sub-Index	002
Description	Function Code
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0000
Upper Limit	0x0029
Unit	-

20E1h: Rotary Address Switch

Object Description

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

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

20E2h: Test Digital Display

Object Description

Index	20E2
Description	VarCom - DISPLAYTEST Tests the digital display on the front panel of the drive.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20E3h: Encoder Simulation Mode

Object Description

Index	20E3
Description	VarCom - ENCOUTMODE Indicates the status of the encoder simulation.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

20E4h: Encoder Simulation Line Resolution

Object Description

Index	20E4
Description	VarCom - ENCOUTRES The resolution of the encoder simulation output, in number of lines.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000800
Lower Limit	0xFF676980
Upper Limit	0x00989680
Unit	Number of lines

20E5h: Encoder Simulation Index Position

Object Description

Index	20E5
Description	VarCom - ENCOUTZPOS The index offset value of the encoder simulation output.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x02625A00
unit	counts

20E6h: Recording Done

Object Description

Index	20E6
Description	VarCom - RECDONE Indicates whether the recording is complete and data is available.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

20E7h: Get Recorded Data (CAN only)**Object Description**

Index	20E7
Description	VarCom - GET Gets the recorded data that was captured using the recording mechanism.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x06
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Packet Select
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	002
Description	Domain
Entry Category	Optional
Data Type	DOMAIN
Access	Read Only
PDO Mapping	No
Default Value	0x0
Lower Limit	-
Upper Limit	-
Unit	-

Sub-Index	003
Description	Data Length
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

Sub-Index	004
Description	Data Status
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	005
Description	RT Data Acknowledge
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	006
Description	Number of Channels
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20E8h: Trigger Recording (CAN only)**Object Description**

Index	20E8
Description	VarCom - RECTRIG Triggers the recording.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x05
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Var
Entry Category	Optional
Data Type	VISIBLE_STRING
Access	Read/Write
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

Sub-Index	002
Description	ThrsLvl
Entry Category	Optional
Data Type	REAL32
Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0
Upper Limit	0
Unit	-

Sub-Index	003
Description	PreTrg
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	004
Description	EdgePlr
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	005
Description	Activate
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

20E9h: Stop Recording (CAN only)

Object Description

Index	20E9
Description	VarCom - RECOFF Stops an active recording.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

20EAh: Record Command (CAN only)

Object Description

Index	20EA
Description	VarCom - RECORD The command for recording realtime values.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x09
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Sample Time
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	002
Description	Num Points
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0001
Upper Limit	0xFFFF
Unit	-

Sub-Index	003
Description	Var1
Entry Category	Optional
Data Type	VISIBLE_STRING
Access	Read/Write
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

Sub-Index	004
Description	Var2
Entry Category	Optional
Data Type	VISIBLE_STRING
Access	Read/Write
PDO Mapping	No
Default Value	0
Lower Limit	-
Upper Limit	-
Unit	-

Sub-Index	005
Description	Var3
Entry Category	Optional
Data Type	VISIBLE_STRING
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	-
Upper Limit	-
Unit	-

Sub-Index	006
Description	Var4
Entry Category	Optional
Data Type	VISIBLE_STRING
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	-
Upper Limit	-
Unit	-

Sub-Index	007
Description	Var5
Entry Category	Optional
Data Type	VISIBLE_STRING
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	-
Upper Limit	-
Unit	-

Sub-Index	008
Description	Var6
Entry Category	Optional
Data Type	VISIBLE_STRING
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	-
Upper Limit	-
Unit	-

Sub-Index	009
Description	Activate
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

20EBh: Recording Status

Object Description

Index	20EB
Description	VarCom - RECING Indicates if data recording is in progress.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

20ECh: Ready to Record

Object Description

Index	20EC
Description	VarCom - RECRDY Indicates the ready status of the recording mechanism.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

20EEh: Maximum Velocity for Drive and Motor

Object Description

Index	20EE
Description	VarCom - VMAX The maximum velocity for drive and motor combination.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

20EFh: Dead Time Compensation Minimal Level

Object Description

Index	20EF
Description	VarCom - KCD Minimum current level to start compensation for dead-time effect.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	10.0
Unit	-

20F0h: Maximum Current for Drive and Motor

Object Description

Index	20F0
Description	VarCom - IMAX The maximum current limit for a drive and motor combination.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x000249F0
Unit	mA

20F2h: Analog Input 1

Object Description

Index	20F2
Description	VarCom - ANIN1 The value of analog input 1.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	V

20F3h: Analog Input 1 Deadband

Object Description

Index	20F3
Description	VarCom - ANIN1DB The deadband range of analog input 1.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	V

20F4h: Analog Input 1 Current Scaling

Object Description

Index	20F4
Description	VarCom - ANIN1ISCALE The scaling value of the analog current command from input 1.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	V

20F5h: Analog Input 1 Low Pass Filter

Object Description

Index	20F5
Description	VarCom - ANIN1LPFHZ The corner frequency of a first order filter that is applied to analog input 1.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x03E8
Lower Limit	0x000A
Upper Limit	0x2710
Unit	Hz

20F6h: Analog Input 1 Offset

Object Description

Index	20F6
Description	VarCom - ANIN1OFFSET The offset voltage for analog input 1.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	V

20F7h: Analog Input 1 Velocity Scaling

Object Description

Index	20F7
Description	VarCom - ANIN1VSCALE The scaling value of the analog velocity command from input 1.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	V

20F8h: Analog Input 1 Zeroing

Object Description

Index	20F8
Description	VarCom - ANIN1ZERO Zeroes the value of analog input 1 by modifying the analog offset value.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

20F9h: Analog Input 2

Object Description

Index	20F9
Description	VarCom - ANIN2 The value of analog input 2.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	V

20FAh: Analog Input 2 Deadband

Object Description

Index	20FA
Description	VarCom - ANIN2DB The deadband range of analog input 2.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	V

20FBh: Analog Input 2 Current Scaling

Object Description

Index	20FB
Description	VarCom - ANIN2ISCALE The scaling value of the analog current command from input 2.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	V

20FCh: Analog Input 2 Low Pass Filter

Object Description

Index	20FC
Description	VarCom - ANIN2LPFHZ The corner frequency of a first order filter that is applied to analog input 2.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x03E8
Lower Limit	0x000A
Upper Limit	0x2710
Unit	Hz

20FDh: Analog Input 2 Offset

Object Description

Index	20FD
Description	VarCom - ANIN2OFFSET The offset voltage for analog input 2.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	V

20FFh: Analog Input 2 Zeroing

Object Description

Index	20FF
Description	VarCom - ANIN2ZERO Zeroes the value of analog input 2 by modifying the analog offset value.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2100h: Analog Input 2 Mode

Object Description

Index	2100
Description	VarCom - ANIN2MODE Defines the function of analog input 2. Possible values: -1= Hardware defined dual gain. ANIN2 is inactive, ANIN1 has a 16 bit resolution, ANIN2MODE is read only. 0 = Idle. ANIN2 input voltage is read only. 1 = Dual gain. External jumper connection between the analog inputs is required. 2 = Current limit mode. Second analog input limits current command.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0xFFFF
Upper Limit	0x0002
Unit	-

2103h: Homing Command

Object Description

Index	2103
Description	VarCom - HOMECMD Starts the homing process.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

2104h: Current Level for Homing on Hard Stop

Object Description

Index	2104
Description	VarCom - HOMEIHARDSTOP The current level at which a hard stop is detected. Used when the homing process uses a hard stop (instead of a limit switch) for direction-reversal.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	-
Upper Limit	-
Unit	-

2106h: Current Loop Compatibility Mode

Object Description

Index	2106
Description	VarCom - KCMODE The type of current control loop. Enables use of new firmware version while maintaining the existing current control settings.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

2108h: Position Command Moving Average Filter

Object Description

Index	2108
Description	VarCom - MOVESMOOTHAVG The moving average filter. Can be applied to a position or velocity reference command to smooth the command and shape it into an S-curve profile.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-
Upper Limit	-
Unit	-

2109h: Position Command Smoothing Mode

Object Description

Index	2109
Description	VarCom - MOVESMOOTHMODE Defines the method of smoothing for the position command.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	-
Upper Limit	-
Unit	-

210Bh: HD Anti-Vibration - Load to Motor Inertia Ratio

Object Description

Index	210B
Description	VarCom - NLANTIVIBLMJR The HD position control loop anti-vibration filter load to motor inertia ratio.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	0.0
Unit	-

210Ch: HD Anti-Vibration Filter - Divider**Object Description**

Index	210C
Description	VarCom - NLANTIVIBN The HD position control loop anti-vibration filter – divider.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.00999999977648
Lower Limit	0.00999999977648
Upper Limit	100.0
Unit	-

210Dh: HD Current Filter Low Pass Filter Rise Time**Object Description**

Index	210D
Description	VarCom - NLFILTT1 Used in the HD control loop to define the inverse of the cutoff frequency.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	0.0
Unit	-

2113h: Drive Ready

Object Description

Index	2113
Description	VarCom - READY Indicates whether the drive is ready for activation with only external remote enable switch still required.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	-
Upper Limit	-
Unit	-

2114h: Drive Status (CAN only)

Object Description

Index	2114
Description	VarCom - ST Returns detailed drive status messages.
Object Code	Record
Data Type	NLTUNE DOMAIN

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Status Select
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	002
Description	Domain
Entry Category	Optional
Data Type	DOMAIN
Access	Read Only
PDO Mapping	No
Default Value	0x0
Lower Limit	-
Upper Limit	-
Unit	-

2115h: Step Command

Object Description

Index	2115
Description	VarCom - STEP Generates a step or square wave velocity command. Sub-index 1 - Duration1 Sub-index 2 - Velocity1 Sub-index 3 - Duration2 Sub-index 4 - Velocity2 Sub-index 5 - Activate
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x06
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Duration1
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	002
Description	Velocity1
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	Duration2
Entry Category	Optional
Data Type	INTEGER16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

Sub-Index	004
Description	Velocity2
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	005
Description	Activate
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x1
Unit	-

Sub-Index	006
Description	Select
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x1
Unit	-

2116h: Position Motion Ended

Object Description

Index	2116
Description	VarCom - STOPPED Indicates whether the position profile has been completed, therefore allowing the next command to be issued.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0xFFFF
Lower Limit	0xFFFF
Upper Limit	0xFFFF
Unit	-

2117h: Units Linear Acc/Dec

Object Description

Index	2117
Description	VarCom - UNITSLINACC Defines the units of acceleration and deceleration variables in a linear system.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2118h: Units Linear Position

Object Description

Index	2118
Description	VarCom - UNITSLINPOS Defines the units of position variables in a linear system.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2119h: Units Linear Velocity

Object Description

Index	2119
Description	VarCom - UNITSLINVEL Defines the units of velocity variables in a linear system.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

211Ah: Units Rotary Acc/Dec

Object Description

Index	211A
Description	VarCom - UNITSROTACC Defines the units of acceleration and deceleration variables in a rotary system.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

211Bh: Units Rotary Position

Object Description

Index	211B
Description	VarCom - UNITSROTPOS Defines the units of position variables in a rotary system.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

211Ch: Units Rotary Velocity

Object Description

Index	211C
Description	VarCom - UNITSROTVEL Defines the units of velocity variables in a rotary system.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

211Dh: Velocity Filter Pole Frequency

Object Description

Index	211D
Description	VarCom - VELFILTRQ Used to set the first order filter, which is applied to the velocity feedback signal before applying the velocity controller.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	RW
PDO Mapping	No
Default Value	0x0014
Lower Limit	0x0014
Upper Limit	0x07D0
Unit	-

211Eh: Gearing

Object Description

Index	211E
Description	VarCom - GEAR Enables/disables gearing.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0x01
Unit	-

2120h: Gearing Acceleration Threshold

Object Description

Index	2120
Description	VarCom - GEARACCTHRESH The maximum acceleration for gearing.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2121h: Gearing Filter Acceleration Feedforward

Object Description

Index	2121
Description	VarCom - GEARFILTAFF The gear filter acceleration feedforward.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-
Upper Limit	-
Unit	-

2122h: Gearing Filter Mode

Object Description

Index	2122
Description	VarCom - GEARFILTMODE Defines whether gear filter is activated.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x02
Unit	-

2123h: Gearing Filter Depth

Object Description

Index	2123
Description	VarVom - GEARFILTT1 Gear filter depth (in 0.25 ms quanta).
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-
Upper Limit	-
Unit	-

2124h: Gearing Filter Velocity and Acceleration Depth

Object Description

Index	2124
Description	VarVom - GEARFILTT2 Gear filter velocity and acceleration filter depth (in 0.25 ms quanta).
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-
Upper Limit	-
Unit	-

2125h: Gearing Filter Velocity Feedforward

Object Description

Index	2125
Description	VarVom - GEARFILTVELFF The gear filter velocity feedforward.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-
Upper Limit	-
Unit	-

2126h: Gearing Ratio Numerator

Object Description

Index	2126
Description	VarCom - GEARIN The numerator of the gearing equation.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x80000001
Upper Limit	0x7FFFFFFF
Unit	-

2127h: Gearing Input Interpolation

Object Description

Index	2127
Description	VarCom - GEARINMODE Defines whether gearing input interpolation is activated.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

2128h: Gearing Following Limits Mode

Object Description

Index	2128
Description	VarCom - GEARLIMITSMODE Defines the type of limits for gear following.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

2129h: Gearing Ratio Denominator

Object Description

Index	2129
Description	VarCom - GEAROUT The denominator of the gearing equation.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0x1FFFFFFF
Unit	-

212Ah: Drive Info (CAN only)

Object Description

Index	212A
Description	Returns information about the drive.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x2
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Status Select
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	002
Description	Domain
Entry Category	Optional
Data Type	DOMAIN
Access	Read Only
PDO Mapping	No
Default Value	0x0
Lower Limit	-
Upper Limit	-
Unit	-

212Bh: Torque Window

Object Description

Index	212B
Description	Indicates the torque window.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x000000FE
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

212Ch: Block Controlword

Object Description

Index	212C
Description	Blocks bit 4 (enable) in the control word (6040h) 0 = bit 4 in controlword can be written in operational state only. 1234 = bit 4 in controlword can be written in all communication states.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

212Dh: HD Anti-Vibration 2 Filter - Sharpness

Object Description

Index	212D
Description	VarCom - NLANTIVIBSHARP2 The HD position control loop anti-vibration module 2 filter - sharpness.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.5
Lower Limit	0.01
Upper Limit	10.0
Unit	-

2131h: Touch Probe Event Counter

Object Description

Index	2131
Description	VarCom - PROBECOUNTER The number of captured events. The value is incremented each time a configured event occurs.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x00FF
Unit	-

2133h: Analog Output Value

Object Description

Index	2133
Description	VarCom - ANOUT Indicates the analog output value, in volts.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0.0
Lower Limit	-12.0
Upper Limit	12.0
Unit	V

2134h: Analog Output Command

Object Description

Index	2134
Description	VarCom - ANOUTCMD The analog output value set by user.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	mV

2135h: Analog Output Current Scaling

Object Description

Index	2135
Description	VarCom - ANOUTISCALE The scaling of the analog output voltage that represents the motor current or the current command.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	400.0
Unit	A/V

2136h: Analog Output Voltage Limit

Object Description

Index	2136
Description	VarCom - ANOUTLIM The maximum voltage of the analog output command for all modes.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	10.0
Lower Limit	1.0
Upper Limit	12.0
Unit	V

2137h: Analog Output Mode

Object Description

Index	2137
Description	<p>VarCom - ANOUTMODE</p> <p>Defines the function of the analog output.</p> <p>0 = User command. Uses value set by ANOUTCMD.</p> <p>1 = Tachometer mode. For velocity feedback.</p> <p>2 = Equivalent current monitoring.</p> <p>3 = Velocity error monitoring.</p> <p>4 = Current command monitoring.</p> <p>5 = Triangle wave at low frequency (0.041 Hz). For testing.</p> <p>6 = Current in-phase component (IQ) monitoring.</p> <p>7 = Reserved (output 0).</p> <p>8 = Reserved (output 0).</p> <p>9 = Reserved.</p> <p>10 = Reserved.</p> <p>11 = Triangle wave (10 Hz).</p> <p>12 = Rectangular wave (10 Hz).</p> <p>13 = Velocity command (VCMD).</p> <p>14 = Deactivated (object not supported; typically due to hardware limitation).</p>
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x0C
Unit	-

2138h: Analog Output Velocity Scaling

Object Description

Index	2138
Description	VarCom - ANOUTVSCALE The scaling of the analog output voltage that represents the actual velocity or the velocity error.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-239999.9375
Upper Limit	239999.9375
Unit	-

2139h: Secondary Feedback Mode

Object Description

Index	2139
Description	VarCom - SFBMODE Defines whether secondary feedback is enabled and whether it is used for the control loop.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

213Ah: Secondary Feedback Type

Object Description

Index	213A
Description	VarCom - SFBTYPE Defines the type of secondary encoder (rotary or linear) and the type of communication interface.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0001
Upper Limit	0x0001
Unit	-

213Dh: Motor to Load Scaling Numerator

Object Description

Index	213D
Description	VarCom - LMUNITSNUM The numerator of the mechanical ratio of the motor feedback to the load feedback.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x80000001
Upper Limit	0x7FFFFFFF
Unit	-

213Eh: Motor to Load Scaling Denominator

Object Description

Index	213E
Description	VarCom - LMUNITSDEN The denominator of the mechanical ratio of the motor feedback to the load feedback.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0x7FFFFFFF
Unit	-

213Fh: Secondary Feedback Offset

Object Description

Index	213F
Description	Secondary feedback offset.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x80000001
Upper Limit	0x7FFFFFFF
Unit	-

2140h: Secondary Feedback Position Actual Value

Object Description

Index	2140
Description	The actual position according to the secondary feedback device.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2141h: Secondary Feedback Load Velocity

Object Description

Index	2141
Description	VarCom - SFBVEL The velocity according to the feedback device on the load.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2142h: Primary Position Actual Value

Object Description

Index	2142
Description	The actual position according to the primary feedback device.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2143h: Motor Velocity

Object Description

Index	2143
Description	VarCom - MVEL The velocity according to the feedback device on the motor.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2144h: Secondary Feedback Position Error Max**Object Description**

Index	2144
Description	Secondary feedback maximum position error.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2145h: Secondary Feedback Position Error Threshold**Object Description**

Index	2145
Description	Secondary feedback position error threshold.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2147h: Touch Probe Sampled Data Rising

Object Description

Index	2147
Description	VarCom - PROBEDATARISE Reads and stores the captured data from the last event on the rising edge.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	PE_INTRP
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	V_INTRP
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	I_INTRP
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

2148h: Touch Probe Sampled Data Falling

Object Description

Index	2148
Description	VarCom - PROBEDATAFALL Reads and stores the captured data from the last event on the falling edge.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	PE_INTRP
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	V_INTRP
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	I_INTRP
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

2149h: Touch Probe Variables

Object Description

Index	2149
Description	Configures the variables to be probed (bit-wise). All combinations are supported. Default variable is position. bit 0: Position bit 1: Position error bit 2: Velocity bit 3: Current If two touch probe channels are in use, this setting affects both.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

214Ah: Software Position Limit Switch Hysteresis Value

Object Description

Index	214A
Description	VarCom - POSLIMHYST Hysteresis value around the software position limit switch. Used to prevent false activation of a software limit switch due to an unstable control loop
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

214Bh: Touch Probe 1 Stable Input Level Duration

Object Description

Index	214B
Description	VarCom - PROBELEVELPRD The minimum length of time required for a stable input level after a trigger event. Serves to overcome the bouncing effect of a switch.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0005
Lower Limit	0x0001
Upper Limit	0x0020
Unit	-

214Ch: sensAR Encoder Info (CAN only)

Object Description

Index	214C
Description	VarCom – SRVSNSINFO Returns information about the SensAR encoder.
Object Code	Record
Data Type	NLTUNE DOMAIN

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Status Select
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	002
Description	Domain
Entry Category	Optional
Data Type	DOMAIN
Access	Read Only
PDO Mapping	No
Default Value	0x0
Lower Limit	-
Upper Limit	-
Unit	-

214Eh: Position Modulo Mode

Object Description

Index	214E
Description	VarCom - MODMODE Enables/disables the position modulo. 0 = Normal operation 1 = Modulo operation
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

214Fh: Position Modulo Range

Object Description

Index	214F
Description	VarCom – PROTARY Specifies the lower and upper limits of the modulo.
Object Code	Array
Data Type	INTEGER32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Lower Limit
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	Upper Limit
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2150h: Counts Per Revolution

Object Description

Index	2150
Description	Counts per revolution.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x800
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

2158h: Force Digital Output State on Fault

Object Description

Index	2158
Description	VarCom - OUTFLTLVL Used to force digital outputs to a certain state when the drive is disabled due to a fault.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

2159h: Heartbeat Tolerance

Object Description

Index	2159
Description	<p>The tolerance allowed for a heartbeat, defined as a percentage. Also applied for BUSOFF and NODE GUARDING faults.</p> <p>Example: Assuming that a heartbeat is 200 ms (as set by object 1016h):</p> <ul style="list-style-type: none">A value of 0 in object 2159h will show an effective value of 200 msA value of 50 in object 2159h will show effective value of 300 msA value of 1000 in object 2159h will show effective value of 400 ms <p>Heartbeats are counted in integers only.</p> <p>Example: Assuming a heartbeat is 1 ms:</p> <ul style="list-style-type: none">A value of 0 in object 2159h will show an effective value of 1 msA value of 50 in object 2159h will show an effective value of 1 msA value of 100 in object 2159h will produce a change (2 ms)
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0064
Unit	percentage

215Ah: Sankyo Multi-Turn Reset

Object Description

Index	215A
Description	VarCom - SKTURNRESET Resets the counter of a Sankyo multi-turn encoder. Write 01 to initiate the command.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

215Bh: Voltage State

Object Description

Index	215B
Description	Voltage state. Automatic calibration process status.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	V

215Ch: Voltage Non-Volatile State

Object Description

Index	215C
Description	Voltage non-volatile state. Automatic calibration process status.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only	Read Only/Read Only/Read Only
PDO Mapping	No	no
Default Value	0x0000	0x0000
Lower Limit	0x0000	0x0000
Upper Limit	0xFFFF	0xFFFF
Unit	V	V

2161h: Secondary Feedback Position

Object Description

Index	2161
Description	VarCom - SFB The position value of the feedback device on the load, including any offsets that have been added.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	1.0
Lower Limit	0.0
Upper Limit	0.0
Unit	-

2162h: Secondary Feedback Offset - User Units

Object Description

Index	2162
Description	VarCom - SFBOFFSET The offset value added to the secondary feedback, in user units.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	0.0
Upper Limit	0.0
Unit	-

2168h: Secondary Feedback Position Error

Object Description

Index	2168
Description	Secondary feedback position error.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN position user units

216Bh: Touch Probe 2 Stable Input Level Duration**Object Description**

Index	216B
Description	The minimum length of time required for a stable input level after a trigger event.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x05
Lower Limit	0x0001
Upper Limit	0x0020
Unit	-

216Ch: CANopen Manufacturer Specific SDO Abort Code (CAN only)**Object Description**

Index	216C
Description	CANopen manufacturer specific SDO abort code.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

216Dh: Analog Input 2 Voltage in User Units

Object Description

Index	216D
Description	VarCom - ANIN2USER Returns the value of the analog input 2 voltage converted into a user-defined unit. The conversion for ANIN2USER is as follows: $\text{ANIN2USER} = \text{ANIN2} \times (\text{ANIN2USERNUM}/\text{ANIN2USERDEN}) + \text{ANIN2USEROFFSET}$
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-
Sub-Index	001
Description	Analog Input 2 User Command - high bits
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Analog Input 2 User Command - low bits
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

216Eh: Analog Input 2 Value Conversion - Denominator

Object Description

Index	216E
Description	VarCom - ANIN2USERDEN The denominator value in the ANIN2USER equation: $\text{ANIN2USER} = \text{ANIN2} \times (\text{ANIN2USERNUM}/\text{ANIN2USERDEN}) + \text{ANIN2USEROFFSET}$
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0x7FFFFFFF
Unit	V

216Fh: Analog Input 2 Value Conversion - Numerator

Object Description

Index	216F
Description	VarCom - ANIN2USERNUM The numerator value in the ANIN2USER equation: $\text{ANIN2USER} = \text{ANIN2} \times (\text{ANIN2USERNUM}/\text{ANIN2USERDEN}) + \text{ANIN2USEROFFSET}$ Defines the number of counts represented in ANIN2USER per ANIN2USERDEN volts.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000064
Lower Limit	0x80000001
Upper Limit	0x7FFFFFFF
Unit	-

2170h: Analog Input 2 Value Conversion - Offset

Object Description

Index	2170
Description	VarCom - ANIN2USEROFFSET The offset value in the ANIN2USER equation: $\text{ANIN2USER} = \text{ANIN2} \times (\text{ANIN2USERNUM}/\text{ANIN2USERDEN}) + \text{ANIN2USEROFFSET}$
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000001
Upper Limit	0x7FFFFFFF
Unit	-

2173h: Motor Pitch High Resolution

Object Description

Index	2173
Description	Linear motor pitch, high resolution.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x000003E8
Upper Limit	0x05F5E100
Unit	0.001 mm

2176h: BiSS-C Protocol Properties

Object Description

Index	2176
Description	VarCom - BISSFIELDS Sets the number of bits allocated for transmission of position data within a BiSS-C packet, and the number of effective bits.
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x04
Lower Limit	0x04
Upper Limit	0x04
Unit	-

Sub-Index	001
Description	Field 1
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0048
Unit	-

Sub-Index	002
Description	Field 2
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0048
Unit	-

Sub-Index	003
Description	Field 3
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0048
Unit	-

Sub-Index	004
Description	Field 4
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0048
Unit	-

2179h: Halls-Only Commutation Mode

Object Description

Index	2179
Description	VarCom - HALLSONLYCOMM Defines Halls-only commutation. 0 = Six-step commutation with MPHASE correction (backward compatible). 1 = Commutation is based on an extrapolated position while velocity exceeds the defined threshold of Hall signals per second and changes to six-step when velocity falls below 75% of the Hall signals per second threshold.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

217Ah: Debug Position Command

Object Description

Index	217A
Description	A debug object for reading the position command from master (object 607Ah).
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

217Bh: Zeroing MPHASE Value

Object Description

Index	217B
Description	VarCom - ZEROST Returns the motor phase degree after a successful zeroing command. -1 indicates that zeroing failed.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0xFFFF
Upper Limit	0x7FFF
Unit	degree

217Ch: Reference Offset Value

Object Description

Index	217C
Description	Var - REOFFSETVAL Internal offset after homing. When using an absolute encoder, this value is saved and used to maintain a home reference position when drive power is cycled.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0xFFFFFFFF
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

217Dh: Hardware Version

Object Description

Index	217D
Description	Hardware version. Sub-index 1 - Control board Sub-index 2 - Power board
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Control board version
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	002
Description	Power board version
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2182h: Hardware Position External (FPGA)

Object Description

Index	2182
Description	VarCom - HWPEXTCNTRLR Indicates the position as measured by an external feedback device (FPGA); 32-bit counter of the pulse and direction input from the controller interface connector.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2183h: Touch Probe 2 Event Counter

Object Description

Index	2183
Description	Returns the number of captured events for touch probe 2.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2184h: Touch Probe 2 Sampled Data Rising (CAN only)**Object Description**

Index	2184
Description	Reads and stores the captured data from the last event on the rising edge on touch probe 2.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	PE_INTRP
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	V_INTRP
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	I_INTRP
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

2185h: Touch Probe 2 Sampled Data Falling

Object Description

Index	2185
Description	Reads and stores the captured data from the last event on the falling edge on touch probe 2.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	PE_INTRP
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	V_INTRP
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	I_INTRP
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

2186h: Multi-turn Encoder Reset (CAN only)**Object Description**

Index	2186
Description	VarCom – MTTURNRESET Resets the position counter of an absolute multi-turn encoder, and clears battery low voltage fault.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x00FF
Unit	-

2187h: Ignore Absolute Encoder Battery Fault (CAN only)**Object Description**

Index	2187
Description	VarCom - IGNOREBATFLT Defines whether the drive will respond to an encoder battery voltage warning or fault. Allows a multi-turn absolute encoder to be used without a backup battery, as a single-turn absolute encoder.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

2188h: Advanced Pole Placement D Polynomial

Object Description

Index	2188
Description	VarCom - VD Extended velocity controller D-polynomial.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x09
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Polynom_Term_1
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	Polynom_Term_2
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	Polynom_Term_3
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	004
Description	Polynom_Term_4
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	005
Description	Polynom_Term_5
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	006
Description	Polynom_Term_6
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	007
Description	Polynom_Term_7
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	008
Description	Polynom_Term_8
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	009
Description	Term_Execute
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

2189h: Advanced Pole Placement Global Gain

Object Description

Index	2189
Description	VarCom - VG The gain of the Advanced Pole Placement controller.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Lower Limit	0.10000000149
Upper Limit	10.0
Unit	-

218Ah: PRB Current Command

Object Description

Index	218A
Description	VarCom – PRBICMD Indicates the PRB injection to current command.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

218Bh: PRB Hold Mode

Object Description

Index	218B
Description	VarCom – PRBHOLD When PRB Hold Mode is active and the PRB generator is activated only during recording (PRBMODE=1), the output of the linear velocity controller is synchronized to the data recording, and will be updated when a record sample is taken.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

218Dh: Delayed Position Error

Object Description

Index	218D
Description	VarCom – PEDELAYED Indicates the delayed position error.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

218Eh: Delay for Delayed Position Error

Object Description

Index	218E
Description	VarCom – PEDELAYTIME The delay time for the position command that will be used for calculating the delayed position error.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x001F
Unit	-

218Fh: KPP Change Mode

Object Description

Index	218F
Description	VarCom – KPPCHANGEMODE Defines the behavior of the linear position controller proportional gain (KPP). When set to 1 the linear position controller proportional gain is doubled during motion.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

2191h: PCOM 1 Module Configuration

Object Description

Index	2191
Description	VarCom - PCOMCNTRL1 Configures the Position-Compare Trigger Output (PCOM) module 1.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2192h: PCOM 2 Module Configuration

Object Description

Index	2192
Description	VarCom - PCOMCNTRL2 Configures the Position-Compare Trigger Output (PCOM) module 2.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2193h: PCOM 1 Statusword**Object Description**

Index	2193
Description	VarCom - PCOMSTATUS1 PCOM Actual Status 1
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2194h: PCOM 2 Statusword**Object Description**

Index	2194
Description	VarCom - PCOMSTATUS2 PCOM Actual Status 2
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2195h: PCOM 1 Direction**Object Description**

Index	2195
Description	VarCom - PCOMDIR1 PCOM Direction 1
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2196h: PCOM 2 Direction**Object Description**

Index	2196
Description	VarCom - PCOMDIR2 PCOM Direction 2
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2197h: PCOM 1 Table Length

Object Description

Index	2197
Description	VarCom - PCOMTABLELEN1 PCOM Table Length 1
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0020
Unit	-

2198h: PCOM 2 Table Length

Object Description

Index	2198
Description	VarCom - PCOMTABLELEN2 PCOM Table Length 2
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0020
Unit	-

2199h: PCOM 1 Output Pulse Width

Object Description

Index	2199
Description	VarCom - PCOMWIDTH1 PCOM Output Pulse Width 1
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000064
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

219Ah: PCOM 2 Output Pulse Width

Object Description

Index	219A
Description	VarCom - PCOMWIDTH2 PCOM Output Pulse Width 2
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000064
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

219Bh: PCOM 1 Periodic Start

Object Description

Index	219B
Description	VarCom - PCOMSTART1 PCOM Range Start Position 1
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

219Ch: PCOM 2 Periodic Start

Object Description

Index	219C
Description	VarCom - PCOMSTART2 PCOM Range Start Position 2
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

219Dh: PCOM 1 Periodic End**Object Description**

Index	219D
Description	VarCom - PCOMEND1 PCOM Range End Position 1
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

219Eh: PCOM 2 Periodic End**Object Description**

Index	219E
Description	VarCom - PCOMEND2 PCOM Range End Position 2
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

219Fh: PCOM 1 Periodic Interval**Object Description**

Index	219F
Description	VarCom - PCOMN1 PCOM Periodic Interval 1
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

21A0h: PCOM 2 Periodic Interval**Object Description**

Index	21A0
Description	VarCom - PCOMN2 PCOM Periodic Interval 2
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

21A1h: PCOM 1 Table Entry

Object Description

Index	21A1
Description	VarCom - PCOMTABLE1 PCOM Table Position 1
Object Code	Array
Data Type	INTEGER32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x03
Upper Limit	0x03
Unit	-

Sub-Index	001
Description	Address
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x000000FF
Unit	-

Sub-Index	002
Description	Value
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

Sub-Index	003
Description	Execute
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x00000001
Unit	-

21A2h: PCOM 2 Table Entry

Object Description

Index	21A2
Description	VarCom - PCOMTABLE2 PCOM Table Position 2
Object Code	Array
Data Type	INTEGER32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x03
Lower Limit	0x03
Upper Limit	0x03
Unit	-

Sub-Index	001
Description	Address
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x000000FF
Unit	-

Sub-Index	002
Description	Value
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

Sub-Index	003
Description	Execute
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0x00000001
Unit	-

21A3h: Differential Port Mode

Object Description

Index	21A3
Description	VarCom – DIFPORTMODE Defines the differential (RS422) digital port hardware and functionality.
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Address
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	002
Description	Value
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	CAN user position units

21A4h: Secondary Feedback Direction

Object Description

Index	21A4
Description	VarCom – SFBDIR The positive direction of feedback from the load.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

21A5h: Secondary Feedback Type AqB Encoder

Object Description

Index	21A5
Description	VarCom – SFBENCTYPE The type of AqB encoder used as a secondary feedback device.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0000
Upper Limit	0x000B
Unit	-

21A6h: Secondary Feedback Resolution

Object Description

Index	21A6
Description	VarCom – SFBRES The resolution of the feedback device on the load, in number of lines per revolution or lines per millimeter.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000800
Lower Limit	0x00000010
Upper Limit	0x00989680
Unit	-

21A8h: Motor Acceleration

Object Description

Index	21A8
Description	VarCom - MACC The acceleration value according to the feedback device on the motor.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

21A9h: Secondary Feedback Acceleration

Object Description

Index	21A9
Description	VarCom – SFBACC The acceleration value according to the feedback device on the load.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

21AAh: Motor Deceleration

Object Description

Index	21AA
Description	VarCom – MDEC The deceleration value according to the feedback device on the motor.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

21ABh: Secondday Feedback Deceleration

Object Description

Index	21AB
Description	VarCom – SFBDEC The deceleration value according to the feedback device on the load.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

21ACh: User Parameter

Object Description

Index	21AC
Description	VarCom – USERPARAM Intended for use by firmware developers.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

21ADh: Parameters Over FOE Results

Object Description

Index	21AD
Description	Parameters over FOE Results
Object Code	Array
Data Type	UNSIGNED16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x04
Lower Limit	0x04
Upper Limit	0x04
Unit	-

Sub-Index	001
Description	First Parsing Error
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	002
Description	Index of First Command Which Failed
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	003
Description	Number of Parsing Errors
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	004
Description	Number of Parsed Commands
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2200h: Gantry Settings

Object Description

Index	2200
Description	<p>Gantry configuration.</p> <p>Sub-index 1 - VarCom - GANTRYMODE</p> <p>Sub-index 2 - VarCom - GANTRYCMDTYPE</p> <p>Sub-index 3 - VarCom - GANTRYFINDOFF</p> <p>Sub-index 4 - VarCom - GANTRYALIGNMODE</p> <p>Sub-index 5 - VarCom - GANTRYTYPE</p> <p>Sub-index 6 - VarCom - GANTRYINTERFACE</p> <p>Sub-index 7 - VarCom - GANTRYOFFSETST</p> <p>Sub-index 8 - VarCom - GANTRYOFFSET</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x08
Lower Limit	0x08
Upper Limit	0x08
Unit	-

Sub-Index	001
Description	Gantry Mode
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0002
Unit	-

Sub-Index	002
Description	Gantry Command Type
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x1
Lower Limit	0x1
Upper Limit	0x2
Unit	-

Sub-Index	003
Description	Gantry Find Offset Command
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x1
Lower Limit	0x1
Upper Limit	0x1
Unit	-

Sub-Index	004
Description	Gantry Alignment Mode
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x1
Lower Limit	0x0
Upper Limit	0x2
Unit	-

Sub-Index	005
Description	Gantry Type
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x0
Upper Limit	0x1
Unit	-

Sub-Index	006
Description	Gantry Drive Communication Interface
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x0
Upper Limit	0x1
Unit	-

Sub-Index	007
Description	Gantry Difference Offset Validity
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x0
Upper Limit	0x1
Unit	-

Sub-Index	008
Description	Gantry Difference Offset
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2201h: Gantry Position Feedback

Object Description

Index	2201
Description	Gantry axes position feedback. Sub-index 1 - VarCom - GANTRYMSTRPFB Sub-index 2 - VarCom - GANTRYDIFFPFB
Object Code	CAN: Array ECT: Record
Data Type	INTEGER32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	CAN: 0x00000002 ECT: 0x2
Lower Limit	CAN: 0x80000000 ECT: 0x00
Upper Limit	CAN: 0x7FFFFFFF ECT: 0xFF
Unit	-

Sub-Index	001
Description	Gantry Master Position
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

Sub-Index	002
Description	Gantry Difference Position
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

2202h: Gantry Velocity Feedback

Object Description

Index	2202
Description	Gantry axes velocity feedback. Sub-index 1 - VarCom - GANTRYMSTRVFB Sub-index 2 - VarCom - GANTRYDIFFVFB
	GANTRYMSTRPFB
Object Code	CAN: Array ECT: Record
Data Type	CAN: INTEGER32 ECT: GANTRY_VELOCITY_FEEDBACK

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Average Position Velocity
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	User velocity units

Sub-Index	002
Description	Position Difference Velocity
Entry Category	Optional
Data Type	INTEGER32
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	User velocity units

2203h: Gantry Position Controllers Current Commands

Object Description

Index	2203
Description	Gantry axes current command. Sub-index 1 - VarCom - GANTRYMSTRICMD Sub-index 2 - VarCom - GANTRYDIFFICMD
Object Code	CAN: Array ECT: Record
Data Type	CAN: INTEGER16 ECT: GANTRY_POS_CONTROLLERS_CURRENT_COMM

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Current Command from Gantry Master Controller
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

Sub-Index	002
Description	Current Command from Gantry Difference Controller
Entry Category	Optional
Data Type	INTEGER16
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

2204h: Gantry Indicators

Object Description

Index	2204
Description	Gantry status indicators: Sub-index 1 - VarCom - GANTRYALIGNED Sub-index 2 - VarCom - GANTRYCOMMSTATE
Object Code	CAN: Array ECT: Record
Data Type	CAN: UNSIGNED16 ECT: Gantry Indicators

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	CAN: 0xFFFF ECT: 0xFF
Unit	-

Sub-Index	001
Description	Gantry Alignment Status
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	002
Description	Gantry Communication State
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

2205h: PCOM 1 Time Offset**Object Description**

Index	2205
Description	Time offsets and output states for output trigger for PCOM module 1.
Object Code	CAN: Array ECT: Record
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0x4
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	001
Description	Time offset 1 from SYNC0 for transition and output state (TM1) bit 0-30: time offset bit 31: state 0=low 1=high
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Time offset 2 from SYNC0 for transition and output state (TM2) bit 0-30: time offset bit 31: state 0=low 1=high
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Time offset 3 from SYNC0 for transition and output state (TM3) bit 0-30: time offset bit 31: state 0=low 1=high
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Time offset 4 from SYNC0 for transition and output state (TM4) bit 0-30: time offset bit 31: state 0=low 1=high
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

2206h: PCOM 2 Time Offset

Object Description

Index	2206
Description	Time offsets and output states for output trigger for PCOM module 2.
Object Code	Array ECT: Record
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0x4
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	001
Description	Time offset 1 from SYNC0 for transition and output state (TM1) bit 0-30: time offset bit 31: state 0=low 1=high
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Time offset 2 from SYNC0 for transition and output state (TM2) bit 0-30: time offset bit 31: state 0=low 1=high
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	003
Description	Time offset 3 from SYNC0 for transition and output state (TM3) bit 0-30: time offset bit 31: state 0=low 1=high
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	004
Description	Time offset 4 from SYNC0 for transition and output state (TM4) bit 0-30: time offset bit 31: state 0=low 1=high
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

220Ah: Gearing Filter Depth

Object Description

Index	220A
Description	VarCom – GEARFILTDEPTH Gearing filter depth, in 0.25 ms quanta.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Lower Limit	-3.40282346639e+038
Upper Limit	3.40282346639e+038
Unit	-

220Ch: Commutation Error Counter

Object Description

Index	220C
Description	VarCom - COMMERRMAXCNT The commutation error count since COMMERRMAXCNT was last cleared.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x0000
Upper Limit	CAN: 0x00 ECT: FFFF
Unit	-

220Dh: Commutation Error Threshold

Object Description

Index	220D
Description	VarCom - COMMERRTTHRESH Error-counter value that will generate a commutation fault
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xBB8
Unit	-

220Eh: Commutation Velocity Deviation

Object Description

Index	220E
Description	VarCom - COMMERRVTHRESH Value of velocity deviation that will generate a commutation fault.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x3C
Lower Limit	0x00000000
Upper Limit	0x1770
Unit	-

220Fh: Commutation Index Deviation

Object Description

Index	220F
Description	VarCom - COMMFLTRESH Value of commutation deviation from the index position that will generate a commutation fault.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x02
Lower Limit	0x0000
Upper Limit	0x14
Unit	-

2210h: Active Axis

Object Description

Index	2210
Description	No varcom .
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x1
Lower Limit	0x1
Upper Limit	0x2
Unit	-

2211h: Velocity Loop Second Filter Mode

Object Description

Index	2211
Description	VarCom – FILTEXTMODE Defines the function of an additional filter for the velocity control loop.
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	CAN: 0x7 ECT: 0xFF
Unit	-

2212h: Velocity Loop Second Filter Parameter 1

Object Description

Index	2212
Description	VarCom – FILTEXTHZ1 A multi-function parameter for setting the output filter of the velocity controller.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	CAN: 0xC8 ECT: 0x00
Lower Limit	CAN: 0x1 ECT: 0x0000
Upper Limit	CAN: 0x2710 ECT: 0xFFFF
Unit	Hz

2213h: Velocity Loop Second Filter Parameter 2

Object Description

Index	2213
Description	VarCom - FILTEXTHZ2 Velocity loop output extended filter second parameter
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	CAN: 0xC8 ECT: 0x00
Lower Limit	CAN: 0x1 ECT: 0x0000
Upper Limit	CAN: 0x2710 ECT: 0xFFFF
Unit	Hz

2214h: Velocity Loop Second Filter User-Defined

Object Description

Index	2214
Description	VarCom - VFEXT Velocity Loop Second Filter User Defined
Object Code	Record
Data Type	VF_VFI_T

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x8
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Polynom Term 1
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	Polynom Term 2
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	Polynom Term 3
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	004
Description	Polynom Term 4
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	005
Description	Polynom Term 5
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	006
Description	Polynom Term 6
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	007
Description	Polynom Term 7
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x0
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	008
Description	Term Execute
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x00
Upper Limit	0x1
Unit	-

2216h: HD Current Filter – First Notch Filter Mode**Object Description**

Index	2216
Description	VarCom - NLFILTMODE The mode of first notch filter for the HD control loop .
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x0000
Upper Limit	CAN: 0x1 ECT: 0xFFFF
Unit	-

2217h: HD Current Filter – Second Notch Filter Mode**Object Description**

Index	2217
Description	VarCom - NLFILTMODE2 The mode of second notch filter for the HD control loop .
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x0000
Upper Limit	CAN: 0x1 ECT: 0xFFFF
Unit	-

2218h: Error Correction Start Offset

Object Description

Index	2218
Description	VarCom - ERRCORSTARTOFF Offset to the first active entry at the error correction table
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x0000
Upper Limit	0x3E7
Unit	-

2219h: Error Correction Active Entries

Object Description

Index	2219
Description	VarCom - ERRCORACTIVENUM The number of active entries in error correction table
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x0000
Upper Limit	0x3E8
Unit	-

221Ah: Error Correction Start Position

Object Description

Index	221A
Description	<p>VarCom - ERRCORSTARTPOS</p> <p>The position corresponding the first active entry of the error correction table.</p> <p>This object is a 64-bit variable that is expressed by two 32-bit indexes.</p> <p>The value of the two indexes is determined by the calculation shown in the following example (which assumes a start position value of one hundred billion and fifty (microdegrees):</p> <p>Multiply the user value by 1000.</p> <p>Convert to hexadecimal representation:</p> $100000000050 * 1000 = 100000000050000 ==> 0x5AF3107B0350.$ <p>Assign low/high 32 bits to the sub-indexes:</p> <p>Sub-index 1: Low 32 bits = 107B0350</p> <p>Sub-index 2: High 32 bits = 5AF3</p>
Object Code	Array

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x2
Lower Limit	0x0
Upper Limit	0x2
Unit	-

Sub-Index	001
Description	Index
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Value
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x0
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

221Bh: Error Correction Interval

Object Description

Index	221B
Description	VarCom - ERRCORINTERVAL Distance between the positions at which errors are measured and added to the correction table.
Object Code	Variable
Data Type	REAL32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Lower Limit	-3.40282346639e+038
Upper Limit	3.40282346639e+038
Unit	-

221Ch: Error Correction Active Index

Object Description

Index	221C
Description	VarCom - ERRCORINDEX Index of the error correction table entry whose value is currently added to PFB.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0x80000000
Upper Limit	CAN: 0x7FFFFFFF ECT: 0xFFFFFFFF
Unit	-

221Dh: Error Correction Set Index Value

Object Description

Index	221D
Description	VarCom - ERRCORSETINDEX A correction value for a specific entry in the correction table.
Object Code	Array/Record
Data Type	

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x2
Lower Limit	0x00
Upper Limit	0xFF
Unit	-

Sub-Index	001
Description	Index
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x0001
Upper Limit	0x03E8
Unit	-

Sub-Index	002
Description	Value
Entry Category	Optional
Data Type	REAL32
Access	Read/Write
PDO Mapping	No
Default Value	0
Lower Limit	-3.40282346639e+038
Upper Limit	3.40282346639e+038
Unit	-

221Eh: Error Correction Reset Parameters

Object Description

Index	221E
Description	VarCom - ERRCORRESET Resets all error correction parameters and table entries to default values. Reset occurs when value set to 1.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

221Fh: Error Correction Enable

Object Description

Index	221F
Description	VarCom - ERRCOREN Request to activate or deactivate the error correction function.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x0000
Upper Limit	0x0001
Unit	-

2220h: Error Correction State**Object Description**

Index	2220
Description	VarCom - ERRCORST The status of the error correction function after ERRCOREN has been issued.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00
Lower Limit	0xFFFFD
Upper Limit	0x0004
Unit	-

2221h: Error Correction PFB Raw**Object Description**

Index	2221
Description	
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0x00
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

2222h: Error Correction Failed Index

Object Description

Index	2222
Description	VarCom - ERRCORFAILINDEX Index of the error correction table entry that failed due to an invalid error size.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0x00
Lower Limit	0xFFFF
Upper Limit	0x3E8
Unit	-

2223h: Error Correction Units

Object Description

Index	2223
Description	VarCom - ERRCORUNITS The units of the error position data delivered by the error correction table.
Object Code	Variable
Data Type	CAN: INTEGER16 ECT: UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x0000
Upper Limit	0x0004
Unit	-

2227h: EtherCAT Command Delay**Object Description**

Index	2227
Description	Returns the calculated delay between the time the target command is issued by the master and the corresponding PFB is reported to the master. In [ns] units.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	ns

10 Standard Servo Drive Objects

The following standard device profile objects are implemented in the CDHD2 servo drives.

For more information, refer to the relevant CAN documentation.

603Fh: Error Code

Object Description

Index	603F
Description	VarCom - FLT Indicates the error code of the last error that occurred in the drive device.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

6040h: Controlword**Object Description**

Index	6040
Description	<p>Used to control the CiA-402 FSA, CiA-402 modes and manufacturer-specific entities.</p> <p>Sets the operating states and modes of the state machine.</p> <p>This object is organized bit-wise. The bits have the following meaning:</p> <p>bit 0: Switch on</p> <p>bit 1: Enable voltage</p> <p>bit 2: Quick stop</p> <p>bit 3: Enable operation</p> <p>bits 4-6: Mode specific</p> <p>bit 7: Fault reset</p> <p>bit 8: Halt</p> <p>bit 9: Mode specific</p> <p>bit 10: Reserved</p> <p>bits 11-15: Manufacturer specific</p>
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

6041h: Statusword**Object Description**

Index	6041
Description	<p>Indicates the current state of the FSA, the operation mode and manufacturer specific entities.</p> <p>This object is organized bit-wise. The bits have the following meaning:</p> <p>bit 0: Ready to switch on</p> <p>bit 1: Switched on</p> <p>bit 2: Operation enabled</p> <p>bit 3: Fault</p> <p>bit 4: Voltage enabled</p> <p>bit 5: Quick stop</p> <p>6: Switch on disabled</p> <p>7: Warning</p> <p>8: Manufacturer specific</p> <p>9: Remote</p> <p>bit 10: Target reached</p> <p>bit 11: Internal limit active</p> <p>bits 12-13: Mode specific</p> <p>bits 14-15: Manufacturer specific</p>
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	<p>CAN: Yes</p> <p>ECT: TxPDO</p>
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

605Bh: Shutdown Option Code

Object Description

Index	605B
Description	Indicates the action to be performed upon a transition from Operation Enabled state to the Ready To Switch On state. Ramp down is the deceleration value of the operation mode in use. Possible values: 0 = Disables the drive, then switches off the drive power stage. 1 = Slows down with ramp down, then disables the drive. -1 = According to VarCom DISMODE
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0xFFFF
Lower Limit	0xFFFF
Upper Limit	0x0001
Unit	-

605Ch: Disable Operation Option Code

Object Description

Index	605C
Description	<p>Indicates the action to be performed upon a transition from Operation Enabled state to the Switched On state.</p> <p>Ramp down is the deceleration value of the operation mode in use.</p> <p>Possible values:</p> <p>0 = Disables the drive, then switches off the drive power stage.</p> <p>1 = Slows down with ramp down, then disables the drive.</p> <p>-1 = According to VarCom DISMODE</p>
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0xFFFF
Lower Limit	0xFFFF
Upper Limit	0x0001
Unit	-

605Dh: Halt Option Code

Object Description

Index	605D
Description	<p>Indicates the action to be performed when the halt function is executed. Ramp down is the deceleration value of the operation mode in use.</p> <p>Possible values:</p> <p>1 = Slow down on ramp down and remain in Operation Enabled</p> <p>2 = Slow down on quick stop ramp and remain in Operation Enabled</p> <p>3 = Slow down on the current limit and remain in Operation Enabled</p> <p>4 = Slow down on voltage limit and remain in Operation Enabled</p> <p>-x = manufacturer-specific</p>
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	CAN: No ECT: Not allowed
Default Value	0x0001
Lower Limit	0x0001
Upper Limit	0x0003
Unit	-

605Eh: Fault Response Options

Object Description

Index	605E
Description	<p>Indicates the action to be performed when a fault (excluding communication faults) causes the drive to switch to Fault Reaction Active (see object 6007h).</p> <p>Ramp down is the deceleration value of the operation mode in use.</p> <p>Possible values:</p> <p>0 = Disable drive, motor is free to rotate</p> <p>1 = Slow down on ramp down</p> <p>-1 = According to VarCom DISMODE</p>
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0xFFFF
Lower Limit	0xFFFF
Upper Limit	0x0001
Unit	-

6060h: Modes of Operation

Object Description

Index	6060
Description	<p>The requested operational mode. The actual operation mode is reflected in the Modes of Operation Display object.</p> <p>Possible values:</p> <p>0 = No mode change / no mode assigned</p> <p>1 = Profile position mode</p> <p>3 = Profile velocity mode</p> <p>4 = Profile torque mode</p> <p>5 = Reserved</p> <p>6 = Homing mode</p> <p>7 = Interpolated position mode</p> <p>8 = Cyclic synchronous position mode</p> <p>9 = Cyclic synchronous velocity mode</p> <p>10 = Cyclic synchronous torque mode</p> <p>-x = Manufacturer specific</p>
Object Code	Variable
Data Type	INTEGER8

Entry Description

Access	<p>CAN: SDO: Read/Write PDO: Write</p> <p>ECT: Read/Write</p>
PDO Mapping	<p>CAN: Yes</p> <p>ECT: RxPDO</p>
Default Value	0x00
Lower Limit	0x80
Upper Limit	0x0A
Unit	-

6061h: Modes of Operation Display

Object Description

Index	6061
Description	<p>The actual operation mode.</p> <p>Possible values:</p> <p>0 = No mode change / no mode assigned</p> <p>1 = Profile Position mode</p> <p>2 = Velocity mode</p> <p>3 = Profile velocity mode</p> <p>4 = Profile torque mode</p> <p>5 = Reserved</p> <p>6 = Homing mode</p> <p>7 = Interpolated position mode</p> <p>8 = Cyclic synchronous position mode</p> <p>9 = Cyclic synchronous velocity mode</p> <p>10 = Cyclic synchronous torque mode</p> <p>-x = Manufacturer specific</p>
Object Code	Variable
Data Type	INTEGER8

Entry Description

Access	Read Only
PDO Mapping	<p>CAN: Yes</p> <p>ECT: RxPDO</p>
Default Value	0x00
Lower Limit	0x80
Upper Limit	0x0A
Unit	-

6062h: Position Demand Value

Object Description

Index	6062
Description	The demanded position value.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

6063h: Position Actual Internal Value

Object Description

Index	6063
Description	The actual value of the position measurement device.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

6064h: Position Actual Value**Object Description**

Index	6064
Description	VarCom - PFB The actual value of the position measurement device
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

6065h: Following Error Window

Object Description

Index	6065
Description	VarCom - PEMA X 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 FFFF FFFFh, the following control is disabled.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000001
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	CAN user position units

6066h: Following Error Time Out**Object Description**

Index	6066
Description	<p>The time for a following error condition, after which bit 13 of the status word is set to 1 in the profile position mode and in the cyclic synchronous position mode.</p> <p>The response of the drive when a following error occurs is manufacturer-specific.</p>
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

6067h: Position Window

Object Description

Index	6067
Description	VarCom - PEINPOS 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 be reached. If the value of the position window is FFFF FFFFh the position window control is switched off.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	CAN user position units

6068h: Position Window Time**Object Description**

Index	6068
Description	VarCom - PEINPOSTIME The time during which the actual position within the position window is measured.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x000A
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

606Bh: Velocity Demand Value**Object Description**

Index	606B
Description	VarCom - VCMD The output value of the trajectory generator.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

606Ch: Velocity Actual Value

Object Description

Index	606C
Description	VarCom - V The actual velocity value derived either from the velocity sensor or the position sensor.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

606Dh: Velocity Window

Object Description

Index	606D
Description	The velocity window.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	CAN user velocity units

606Eh: Velocity Window Time

Object Description

Index	606E
Description	The velocity window time.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

606Fh: Velocity Threshold

Object Description

Index	606F
Description	The velocity threshold.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	CAN user velocity units

6070h: Velocity Threshold Time

Object Description

Index	6070
Description	The velocity threshold time.
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	ms

6071h: Target Torque

Object Description

Index	6071
Description	VarCom - T (Current Command) The input value for the torque controller in profile torque mode.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	mNm

6073h: Maximum Current

Object Description

Index	6073
Description	<p>VarCom - ILIM (User Current Limit)</p> <p>The maximum permissible torque creating current in the motor. Defined as MICON (Motor Continuous Current)/1000</p> <p>Thus, if MICON = 10A: A value of 100 for 6073h = 1A A value of 500 for 6073h = 5A A value of 1000 for 6073h = 10A A value of 2000 for 6073h = 20A</p>
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	mA

6074h: Torque Demand Value

Object Description

Index	6074
Description	VarCom - ICMD (Current Command) The output value of torque limit function.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	mNm

6075h: Motor Rated Current

Object Description

Index	6075
Description	VarCom - MICON T The motor rated current. It is taken from the motor nameplate. Depending on the motor and drive technology this current is DC, peak or root mean square (rms) current. All relative current data refers to this value.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	mA

6076h: Motor Rated Torque

Object Description

Index	6076
Description	The motor rated torque. It is obtained from the motor nameplate. All related torque data must refer to this value. For linear motors, the object name is not changed, but the motor rated force value must be entered as multiples of mN.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	mNm

6077h: Torque Actual Value

Object Description

Index	6077
Description	The actual value of the torque. It corresponds to the torque in the motor.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	mNm

6078h: Current Actual Value**Object Description**

Index	6078
Description	VarCom - I (Motor Current) The actual value of the current. It corresponds to the current in the motor.
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	mA

6079h: DC Link Circuit Voltage**Object Description**

Index	6079
Description	VarCom - VBUSREADOUT 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

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	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

Entry Description

Access	Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

607Ch: Home Offset

Object Description

Index	607C
Description	VarCom - HOMEOFFSET 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

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

607Dh: Software Position Limit

Object Description

Index	607D
Description	Sub-index 1 - VarCom - POSLIMNEG Sub-index 2 - VarCom - POSLIMPOS The configured maximum and minimum 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

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x00000002
Lower Limit	0x00000002
Upper Limit	0x00000002
Unit	-

Sub-Index	001
Description	Min Software Position Limit
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

Sub-Index	002
Description	Max Software Position Limit
Entry Category	Optional
Data Type	INTEGER32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

607Eh: Polarity

Object Description

Index	607E
Description	<p>Determines the sign of the position demand value or the velocity demand value.</p> <p>This object is organized bit-wise.</p> <p>The bits have the following meaning:</p> <p>bit 7: Position polarity is affected</p> <p>bit 6: Velocity polarity is affected</p> <p>Bit values:</p> <p>0 = multiply the demand value by 1</p> <p>1 = multiply the demand value by -1</p>
Object Code	Variable
Data Type	UNSIGNED8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0xC0
Unit	-

607Fh: Maximum Profile Velocity

Object Description

Index	607F
Description	VarCom - VLIM The maximum velocity allowed in either direction during a profiled motion.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user velocity units

6080h: Motor Maximum Speed

Object Description

Index	6080
Description	VarCom - MSPEED 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

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	rpm

6081h: Profile Velocity in Profile Position Mode

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

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	CAN user velocity units

6083h: Profile Acceleration

Object Description

Index	6083
Description	VarCom - ACC The commanded acceleration. It is used in the following modes: Profile position mode Profile velocity mode Interpolated position mode
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

6084h: Profile Deceleration**Object Description**

Index	6084
Description	VarCom - DEC The commanded acceleration. It is used in the following modes: Profile position mode Profile velocity mode Interpolated position mode If this parameter is not supported, then Profile Acceleration is used for deceleration.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

6085h: Quick Stop Deceleration

Object Description

Index	6085
Description	VarCom - DECSTOP The deceleration rate for an Active Disable/emergency stop. 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

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

6087h: Torque Slope

Object Description

Index	6087
Description	The rate of change of torque.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x186A0
Lower Limit	0x1
Upper Limit	0x1C9C380
Unit	mNm/s

608Fh: Position Encoder Resolution

Object Description

Index	608F
Description	<p>The resolution of the motor encoder in number of lines per revolution of the motor.</p> <p>The position encoder resolution is calculated as:</p> $\text{position encoder resolution} = \text{encoder increments} / \text{motor revolutions}$ <p>The drive must be configured whenever this object is modified.</p>
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-
Sub-Index	001
Description	Encoder Increments
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000800
Lower Limit	0x00000010
Upper Limit	0x00989680
Unit	-

Sub-Index	002
Description	Motor Revolutions
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0x00000001
Unit	-

6091h: Fieldbus Gearing Ratio

Object Description

Index	6091
Description	<p>Sub-index 1 - VarCom - FBGMS - Gear Motor Shaft Scaling</p> <p>Sub-index 2 - VarCom - FBGDS - Gear Driving Shaft Scaling</p> <p>The configured number of motor shaft revolutions and number of driving shaft revolutions.</p> <p>The gear ratio is calculated as:</p> <p><i>gear ratio = motor shaft revolutions / driving shaft revolutions</i></p>
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Motor Revolutions
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Shaft Revolutions
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

6092h: Feed Constant

Object Description

Index	6092
Description	Sub-index 1 - VarCom - PNUM Sub-index 2 - VarCom - PDEN The configured feed constant, which is the measurement distance per one revolution of the output shaft of the gearbox. The feed constant is calculated as: $\text{feed constant} = \text{feed} / \text{driving shaft revolutions}$
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Feed
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00057E40
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user position units

Sub-Index	002
Description	Shaft Revolutions
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	-

6098h: Homing Method

Object Description

Index	6098
Description	<p>VarCom - HOMETYPE</p> <p>The homing method to be used.</p> <p>Possible values:</p> <p>0 = No homing method assigned</p> <p>1 = Homing method 1</p> <p>.</p> <p>.</p> <p>36 = Homing method 36</p> <p>-x = Manufacturer specific</p> <p>Refer to the CiA-402 standard for the detailed description of each homing method.</p>
Object Code	Variable
Data Type	INTEGER8

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x01
Lower Limit	0xC0
Upper Limit	0x24
Unit	-

6099h: Homing Speeds

Object Description

Index	6099
Description	Sub-index 1 - VarCom - HOMESPEED1 Sub-index 2 - VarCom - HOMESPEED2 The commanded speeds used during the homing procedure.
Object Code	Array
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Fast Homing Speed
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user velocity units

Sub-Index	002
Description	Slow Homing Speed
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user velocity units

609Ah: Homing Acceleration

Object Description

Index	609A
Description	VarCom - HOMEACC The acceleration and deceleration to be used during homing operation.
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

60B0h: Position Offset**Object Description**

Index	60B0
Description	<p>The offset of the target position.</p> <p>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.</p> <p>This object is used in the cyclic synchronous position mode.</p>
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

60B1h: Velocity Offset

Object Description

Index	60B1
Description	<p>VarCom - EXTADDITIVEVCMD</p> <p>Velocity offset value. Takes a commanded velocity value from the host controller and adds it to the velocity command entering the velocity loop.</p> <p>In Cyclic Synchronous Position mode this object contains the input value for velocity feed forward.</p> <p>In Cyclic Synchronous Velocity mode it contains the commanded offset of the drive device.</p> <p>The value itself is absolute and thus independent of how often it is transmitted over the communication system; that is, twice transmitted does not mean double value. Since the additive velocity value represents an offset to the target velocity, it can be also used to control the drive with relative values in regard to the target velocity.</p>
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

60B2h: Torque Offset

Object Description

Index	60B2
Description	<p>VarCom - EXTADDITIVEICMD</p> <p>Torque offset value. Takes a commanded current value from the host controller and adds it to the current command entering the current loop.</p> <p>In Cyclic Synchronous Position mode and Cyclic Synchronous Velocity mode, this object contains the input value for torque feed forward.</p> <p>In Cyclic Synchronous Torque mode, it contains the commanded additive torque of the drive, which is added to the target torque value.</p> <p>The value itself is absolute and thus independent of how often it is transmitted over the communication system; that is, twice transmitted does not mean double value.</p>
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0000
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

60B8h: Touch Probe Function

Object Description

Index	60B8
Description	<p>VarCom - PROBECONFIG</p> <p>The configured function of the touch probe.</p> <p>This object is bit-structured. The following value definition is valid:</p> <p>bit 0: bit value = 0: switch off touch probe 1 bit value = 1: enable touch probe 1</p> <p>bit 1: bit value = 0: trigger first event bit value = 1: continuous</p> <p>bit 2: bit value = 0: trigger touch probe 1 input bit value = 1: trigger with zero pulse signal or position encoder</p> <p>bit 3: reserved</p> <p>bit 4: bit value = 0: switch off sampling at positive edge of touch probe 1 bit value = 1: enable sampling at positive edge of touch probe 1</p> <p>bit 5: bit value = 0: switch off sampling at negative edge of touch probe 1 bit value = 1: enable sampling at negative edge of touch probe 1</p> <p>bit 6,7: user-defined (e.g. for testing)</p> <p>bit 8: bit value = 0: switch off touch probe 2 bit value = 1: enable touch probe 2</p> <p>bit 9: bit value = 0: trigger first event bit value = 1: continuous</p> <p>bit 10: bit value = 0: trigger with touch probe 2 input bit value = 1: trigger with zero pulse signal or position encoder</p> <p>bit 11: reserved</p> <p>bit 12: bit value = 0: switch off sampling at positive edge of touch probe 2 bit value = 1: enable sampling at positive edge of touch probe 2</p> <p>bit 13: bit value = 0: switch off sampling on negative edge of touch probe 2 bit value = 1: enable sampling at negative edge of touch probe 2</p> <p>bit 14,15: user-defined (e.g. for testing)</p>
Note	<p>To enable touch probe operation when the motor encoder does not have physical index (such as sensAR, Endat 2.2, Tamagawa), enable a simulated index by setting ENCOUTMODE=1</p>

Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

60B9h: Touch Probe Status

Object Description

Index	60B9
Description	<p>VarCom - PROBESTATUS</p> <p>The status of the touch probe.</p> <p>This object is bit-structured. The following value definition is valid:</p> <p>bit 0: bit value = 0: touch probe 1 is switched off bit value = 1: touch probe 1 is enabled</p> <p>bit 1: bit value = 0: touch probe 1 no positive edge value stored bit value = 1: touch probe 1 negative edge position stored</p> <p>bit 2: bit value = 0: touch probe 1 no negative edge value stored bit value = 1: touch probe 1 positive edge position stored</p> <p>bit 3-5: reserved</p> <p>bit 6,7: user-defined (e.g. for testing)</p> <p>bit 8: bit value = 0: touch probe 2 is switched off bit value = 1: touch probe 2 is enabled</p> <p>bit 9: bit value = 0: touch probe 2 no positive edge value stored bit value = 1: touch probe 2 negative edge position stored</p> <p>bit 10: bit value = 0: touch probe 2 no negative edge value stored bit value = 1: touch probe 2 positive edge position stored</p> <p>bit 11-13: reserved</p> <p>bit 14,15: user-defined (e.g. for testing)</p>
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

60BAh: Touch Probe 1 Position Positive Value**Object Description**

Index	60BA
Description	The position value of touch probe 1 at the positive edge.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

60BBh: Touch Probe 1 Position Negative Value**Object Description**

Index	60BB
Description	The position value of touch probe 1 at the negative edge.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

60BCh: Touch Probe 2 Position Positive Value**Object Description**

Index	60BC
Description	The position value of touch probe 2 at the positive edge.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

60BDh: Touch Probe 2 Position Negative Value**Object Description**

Index	60BD
Description	The position value of touch probe 2 at the negative edge.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

60C0h: Interpolation Submode

Object Description

Index	60C0
Description	<p>VarCom - FBINTTYPE</p> <p>Defines the interpolation mode.</p> <p>0 = Linear interpolation</p> <p>1= Manufacturer-specific: Cubic interpolation with position and velocity.</p> <p>2= Manufacturer-specific: 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.</p> <p>3= Manufacturer-specific: Cubic interpolation with position only – loose. Does not force the interpolated path to pass via the original position commands sent by the controller, thus resulting in a smoother velocity profile.</p> <p>If linear interpolation is the only algorithm available, it is not necessary to implement this object.</p> <p>If the linear interpolation mode is selected, the interpolation data given in the interpolation data record is used.</p> <p>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.</p>
Object Code	Variable
Data Type	INTEGER16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0x0003
Unit	-

Range	<p>0 = Linear interpolation.</p> <p>1= Cubic interpolation with position and velocity.</p> <p>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.</p> <p>3= Cubic interpolation with position only – loose. Does not force the interpolated path to pass via the original position commands sent by the controller, thus resulting in a smoother velocity profile.</p>
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60C1h: Interpolation Data Record

Object Description

Index	60C1
Description	<p>This object indicates the number of data words, which are needed for execution of the interpolation algorithm. The number of data words in the record is defined by interpolation data configuration</p> <p>The interpretation of the data words in the interpolation data record may vary due to the various possible modes and submodes that can be selected.</p> <p>For the linear interpolation mode, each interpolation data record simply is regarded as a new position set-point.</p>
Object Code	Array
Data Type	INTEGER32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x00000004
Lower Limit	0x00000001
Upper Limit	0x000000FE
Unit	-

Sub-Index	001
Description	Data Record 1
Entry Category	Optional
Data Type	INTEGER32
Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	002
Description	Data Record 2
Entry Category	Optional
Data Type	INTEGER32
Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	003
Description	Data Record 3
Entry Category	Optional
Data Type	INTEGER32
Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

Sub-Index	004
Description	Data Record 4
Entry Category	Optional
Data Type	INTEGER32
Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	-

60C2h: Fieldbus Interpolation Time

Object Description

Index	60C2
Description	Sub-index 1 - VarCom - FBITPRD Sub-index 2 - VarCom - FBITIDX The configured interpolation cycle time. The EtherCAT/CANopen Master must set the interpolated time period, and must use the time period to send the SYNC message for clock synchronization.
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x00
Upper Limit	0x02
Unit	-

Sub-Index	001
Description	Interpolation time
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x02
Lower Limit	0x01
Upper Limit	0xFF
Unit	10 ^(interpolation time index) [second]

Sub-Index	002
Description	Interpolation time index
Entry Category	Optional
Data Type	INTEGER8
Access	Read/Write
PDO Mapping	No
Default Value	0xFD
Lower Limit	0x80
Upper Limit	0x3F
Unit	-

60C4h: Interpolation Data Configuration

Object Description

Index	60C4
Description	<p>Configures and handles the buffer for the data records, and configures the data records.</p> <p>Sub-index 1 - The number of interpolation data records.</p> <p>Sub-index 2 - The number of interpolation data records.</p> <p>Sub-index 3 - Specifies the buffer organization:</p> <p style="padding-left: 40px;">0 = FIFO</p> <p style="padding-left: 40px;">1 = ring</p> <p>Sub-index 4 - The next free buffer entry point.</p> <p>Sub-index 5 - The size of the data record.</p> <p>Sub-index 6 - Clears the buffer.</p> <p>Writing 0 to sub-index 6 clears the buffer inputs, disables access, and clears all IP data records.</p> <p>Writing 1 to sub-index 6 enables access to the input buffers.</p>
Object Code	Record
Data Type	Manufacturer-specific, varies by sub-index.

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x06
Lower Limit	0x06
Upper Limit	0x06
Unit	-

Sub-Index	001
Description	Maximum Buffer Size
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read Only
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Actual Buffer Size
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000001
Lower Limit	0x00000001
Upper Limit	0x00000001
Unit	-

Sub-Index	003
Description	Buffer Organization
Entry Category	Optional
Data Type	UNSIGNED8
Access	Read/Write
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

Sub-Index	004
Description	Buffer Position
Entry Category	Optional
Data Type	UNSIGNED16
Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

Sub-Index	005
Description	Size of Data Record
Entry Category	Optional
Data Type	UNSIGNED8
Access	WO
PDO Mapping	No
Default Value	0x04
Lower Limit	0x04
Upper Limit	0x04
Unit	bytes

Sub-Index	006
Description	Buffer Clear
Entry Category	Optional
Data Type	UNSIGNED8
Access	WO
PDO Mapping	No
Default Value	0x00
Lower Limit	0x00
Upper Limit	0x01
Unit	-

60C5h: Maximum 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

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0xFFFFFFFF
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

60C6h: Maximum 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

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0xFFFFFFFF
Lower Limit	0x00000001
Upper Limit	0xFFFFFFFF
Unit	CAN user acc/dec units

60D0h: Touch Probe Source (CAN only)**Object Description**

Index	60D0
Description	Touch Probe Source
Object Code	Array
Data Type	INTEGER16

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x0002
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

Sub-Index	001
Description	Touch Probe 1 Source
Entry Category	Optional
Data Type	INTEGER16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x002
Upper Limit	0x002
Unit	-

Sub-Index	002
Description	Touch Probe 2 Source
Entry Category	Optional
Data Type	INTEGER16
Access	Read/Write
PDO Mapping	No
Default Value	0x0001
Lower Limit	0x8000
Upper Limit	0x7FFF
Unit	-

60D5h: Touch Probe 1 Positive Edge Counter

Object Description

Index	60D5
Description	Touch probe 1 positive edge counter
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

60D6h: Touch Probe 1 Negative Edge Counter**Object Description**

Index	60D6
Description	Touch probe 1 negative edge counter
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

60D7h: Touch Probe 2 Positive Edge Counter**Object Description**

Index	60D7
Description	Touch probe 2 positive edge counter
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

60D8h: Touch Probe 2 Negative Edge Counter**Object Description**

Index	60D8
Description	Touch probe 2 negative edge counter
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

60F2h: Positioning Option Code

Object Description

Index	60F2
Description	The configured positioning behavior, as described by the profile positioning mode or the interpolated positioning mode. This object is organized bit-wise. The bits have the following meaning: bit 0,1: relative option bit 2,3: change immediately option bit 4,5: request-response option bit 6,7: reserved bit 8-11: ip option bit 12-14: reserved bit 15: manufacturer-specific
Object Code	Variable
Data Type	UNSIGNED16

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0x0000
Lower Limit	0x0000
Upper Limit	0xFFFF
Unit	-

60F4h: Following Error Actual Value

Object Description

Index	60F4
Description	VarCom - PE The actual value of the following error.
Object Code	Variable
Data Type	INTEGER32
Access	Read Only

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	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

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user position units

60FDh: Digital Inputs

Object Description

Index	60FD
Description	<p>VarCom - IN</p> <p>Indicates the state of the digital inputs. The digital inputs object has 32 bits. The first 16 bits (bits 0-15) indicate the status of various types of switches. Those switches are functions assigned to some of the digital inputs.</p> <p>bit 0: Negative limit switch 1=digital input assigned to the negative limit switch is on. 0=digital input assigned to the negative limit switch is off.</p> <p>bit 1: Positive limit switch 1=digital input assigned to the positive limit switch is on. 0=digital input assigned to the positive limit switch is off.</p> <p>bit 2: Home switch 1=digital input assigned to the home switch is on. 0=digital input assigned to the home switch is off.</p> <p>bit 3: STO status 1= 24V is not supplied to drive STO module; drive is in Safe Torque Off state. 0= 24V is supplied to drive STO module</p> <p>The last 16 bits indicate the status of each digital input, regardless of the input's functionality. bit 16: digital input 1 bit 17: digital input 2 ... bit 25: digital input 10 bit 26: digital input 11 If input is on, corresponding bit is set.</p>
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read Only
PDO Mapping	CAN: Yes ECT: TxPDO
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

60FEh: Digital Outputs

Object Description

Index	60FE
Description	<p>VarCom - OUT</p> <p>Indicates the state of the digital outputs. The object has two sub-indices.</p> <p>Sub-index 1 has 32 bits. The bits in the first word (bits 0-15) indicate the status of the brake.</p> <p>bit 0 = brake (CDHD2 drives do not support this bit)</p> <p>0 = Digital output is off, brake is not set</p> <p>1 = Digital output is on, brake is set</p> <p>The bits in the second word (bits 16-31) indicate the state of each digital output, regardless of the output's functionality. For example, to read the status of digital output 1 (regardless of its functionality; it can be idle), read bit 16.</p> <p>bit 16: Digital output 1</p> <p>bit 17: Digital output 2</p> <p>bit 18: Digital output 3</p> <p>... and so on</p> <p>Possible bit values:</p> <p>0 = off</p> <p>1 = on</p> <p>Sub-index 2 - Mask for the physical outputs.</p> <p>Possible bit values:</p> <p>0 = Disable output (output state will not be changed)</p> <p>1 = Enable output (output state can be changed)</p>
Object Code	CAT: Array ECT: Record
Data Type	UNSIGNED32

Entry Description

Sub-Index	000
Description	Number of Entries
Entry Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0x02
Lower Limit	0x02
Upper Limit	CAT: 0x02 ECT: 0xFF
Unit	-

Sub-Index	001
Description	Physical Outputs
Entry Category	Optional
Data Type	UNSIGNED32
Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

Sub-Index	002
Description	Output Mask
Entry Category	Optional
Data Type	UNSIGNED32
Access	Read/Write
PDO Mapping	No
Default Value	0x00000000
Lower Limit	0x00000000
Upper Limit	0xFFFFFFFF
Unit	-

60FFh: Target Velocity**Object Description**

Index	60FF
Description	The configured target velocity. It is as input for the trajectory generator.
Object Code	Variable
Data Type	INTEGER32

Entry Description

Access	CAN: SDO: Read/Write PDO: Write ECT: Read/Write
PDO Mapping	CAN: Yes ECT: RxPDO
Default Value	0x00000000
Lower Limit	0x80000000
Upper Limit	0x7FFFFFFF
Unit	CAN user velocity units

6502h: Supported Drive Modes

Object Description

Index	6502
Description	<p>This object provides information on the supported drive modes. This object is organized bit-wise. The bits have the following meaning:</p> <ul style="list-style-type: none"> bit 0: Profile position mode bit 1: Velocity mode bit 2: Profile velocity mode bit 3: Profile torque mode bit 4: Reserved bit 5: Homing mode bit 6: Interpolated position mode bit 7: Cyclic synchronous position mode bit 8: Cyclic synchronous velocity mode bit 9: Cyclic synchronous torque mode bit 10-15: Reserved bit 16-31: Manufacturer-specific <p>The bit values have the following meaning:</p> <ul style="list-style-type: none"> 0 = mode is not supported 1 = mode is supported
Object Code	Variable
Data Type	UNSIGNED32

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	--
Lower Limit	--
Upper Limit	--
Unit	-

11 CANopen and EtherCAT Error Codes

11.1 Warning Codes

CDHD2 warnings are reported in object **2011h**.

CDHD2 warnings are 64 bits, divided into two 32-bit segments.

Refer to the section **Warning Messages** in the *CDHD2 User Manual*.

11.2 Error Codes

If the master device issues an invalid SDO request to the drive, the drive returns a service request error (abort) code to the master.

An SDO operation may return one of the SDO abort codes specified in the CANopen standard, listed in Table 11-1.

If an SDO fails due to a manufacturer-specific error, the SDO abort code will be 08000000h (general error) and the detailed error code will be available in object **216Ch**.

Refer to the section **Error Messages** in the *CDHD2 User Manual*.

Table 11-1. CANopen Standard SDO Abort Codes

Abort Code	Description
0503 0000h	Toggle bit not alternated.
0504 0000h	SDO protocol timed out.
0504 0001h	Client/server command specifier not valid or unknown.
0504 0002h	Invalid block size (block mode only).
0504 0003h	Invalid sequence number (block mode only).
0504 0004h	CRC error (block mode only).
0504 0005h	Out of memory.
0601 0000h	Unsupported access to an object.
0601 0001h	Attempt to read a write only object.
0601 0002h	Attempt to write a read only object.
0602 0000h	Object does not exist in the object dictionary.
0604 0041h	Object cannot be mapped to the PDO.
0604 0042h	The number and length of the objects to be mapped would exceed PDO length.
0604 0043h	General parameter incompatibility reason.
0604 0047h	General internal incompatibility in the device.
0606 0000h	Access failed due to an hardware error.
0607 0010h	Data type does not match, length of service parameter does not match
0607 0012h	Data type does not match, length of service parameter too high
0607 0013h	Data type does not match, length of service parameter too low

0609 0011h	Sub-index does not exist.
0609 0030h	Invalid value for parameter (download only).
0609 0031h	Value of parameter written too high (download only).
0609 0032h	Value of parameter written too low (download only).
0609 0036h	Maximum value is less than minimum value.
060A 0023h	Resource not available: SDO connection
0800 0000h	General error
0800 0020h	Data cannot be transferred or stored to the application.
0800 0021h	Data cannot be transferred or stored to the application because of local control.
0800 0022h	Data cannot be transferred or stored to the application because of the present device state.
0800 0023h	Object dictionary dynamic generation fails or no object dictionary is present (e.g. object dictionary is generated from file and generation fails because of an file error).
0800 0024h	No data available

11.3 Emergency Error (Fault) Codes

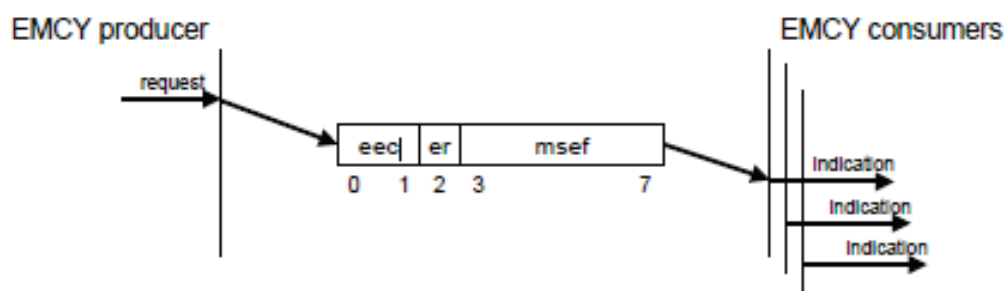
Refer to the section **Fault Messages** in the *CDHD2 User Manual*.

Unlike the synchronous service request error (abort) codes which are always sent as response to a request, the emergency error (fault) codes are asynchronous. These events can occur at any time regardless of the user command (for example, temperature is too high).

Upon detection of internal device errors, the drive 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 11-2. Emergency Message Frame

Byte	0	1	2	3	4	5	6	7
Description	Emergency error code		Error register		Manufacturer-specific			



When an illegal state occurs in the drive, the drive 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 drive cannot be enabled.

If, for example, the Motor Feedback interface cable is disconnected from the drive, 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).

EtherCAT and CANopen Reference Manual
CDHD2 Servo Drive