

Kinetix 3 Host Commands for Serial Communication

Catalog Numbers 2071-AP0, 2071-AP1, 2071-AP2, 2071-AP4, 2071-AP8, 2071-A10, 2071-A15



Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication [SGI-1.1](#) available from your local Rockwell Automation sales office or online at <http://www.rockwellautomation.com/literature/>) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

Allen-Bradley, Kinetix, MicroLogix, Rockwell Software, Rockwell Automation, TechConnect, and Ultra3000 are trademarks of Rockwell Automation, Inc.

Trademarks not belonging to Rockwell Automation are property of their respective companies.

This manual contains new and updated information. Changes throughout this revision are marked by change bars, as shown to the right of this paragraph.

New and Updated Information

This table contains the changes made to this revision.

Topic	Page
Added the exception code Servo On Write Error	12
Renumbered the Modbus address and the Kinetix® 3 Parameters in Group 5 - Supplemental Drive Control table	14
Updated Modbus address range of 600...4999 and bullets	15
Updated Group 0 to Special Index	15
Added Modbus 4009, Index 0 Next Index to the Indexing Parameters table	15
Added Group 1 - Homing	16
Added Important statement and parameter usage information	23
Added descriptive text to Monitoring Parameter (Function Code 0x04)	24
Updated the Special Symbols table	29
Updated the [Pr - 0.00] parameter range	48
Updated the [Pr - 0.01] parameter to reserved	48
Updated the [Pr - 0.04] parameter units to %	51
Updated the [Pr - 0.07] parameter range	55
Updated the [Pr - 1.01] parameter range	67
Updated the [Pr - 1.11] parameter range	70
Updated the [Pr - 1.13] parameter range	70
Updated the [Pr - 1.17] parameter default	72
Updated the [Pr - 1.34] parameter range	78
Updated the [Pr - 2.00] parameter range and default value	81
Updated the Group 2 - Speed Control Modbus addresses	81...84
Update the [Pr - 4.00] parameter units to 0.1% of rated continuous current/V	90
Updated the Group 5 - Supplemental Drive Controls Modbus Addresses	92...96
Update the [Pr - 5.05] parameter range and default values	93
Updated Group 0 - Indexing System Modbus addresses	114...116
Update [IN01.09] range and default values	122
Updated hex values in Variables table	131
Updated Variable 15 digital outputs bit16 to D05	133
Updated Variable 26 Digital Outputs	134

Notes:

Preface	About This Publication.....	9
	Who Should Use This Manual.....	9
	Conventions Used in This Manual.....	9
	Additional Resources.....	9
	 Chapter 1	
Modbus Protocol	Function Codes.....	11
	Exception Codes.....	12
	Address Maps.....	13
	Standard Parameters.....	13
	Indexing Parameters.....	15
	Save Parameters.....	23
	Monitoring Parameter (Function Code 0x04).....	24
	Fault and Warning Status Parameter - Input Registers.....	24
	Output Function Status Parameter.....	25
	Running Parameter (Function Code 0x06 or 0x10).....	26
	Input Function Parameter (Function Code 0x03, 0x06, or 0x10).....	26
	 Chapter 2	
Communication Protocol (RS-232/ ASCII)	Introduction.....	29
	Special Symbols.....	29
	Packet Structure.....	29
	Checksum.....	30
	 Chapter 3	
General Commands (ASCII)	Read Parameter (SET).....	31
	Write Parameter (STR).....	32
	Write Parameter (CHP).....	32
	Indexing Command Extended (XCE).....	33
	Read Indexing Parameter (XET).....	33
	Write Indexing Parameter (XHP).....	34
	Write Indexing Parameter (XTR).....	34
	Fault Reset (RST).....	35
	Monitor Variable (MDM).....	35
	Triggered Data Collection (MOT).....	36
	Variable Roll Monitoring (MOR).....	38
	Automatic Task (TAT).....	39
	Manual Task (TMN).....	40
	Read Fault Contents (EHY).....	41
	Jog (JOG).....	41
	Read Drive Status (STS).....	42
	Other Functions (ETC).....	43
	Verify Software Version (VER).....	44

Verify Servo Connection (LIV)	44
Read Fault Detailed Data (DIE)	44
Enable Drive (SVRON)	45
Disable Drive (SVROF)	45
Reset Drive (HWR)	45

Appendix A

Standard Drive Parameters

Parameter Groupings	47
Parameter Descriptions	48
Group 0 - System Level	48
Group 1 - Gain Control	67
Group 2 - Speed Control	81
Group 3 - Position Control	85
Group 4 - Torque Controls	90
Group 5 - Supplemental Drive Controls	92
Group 6 - Supplemental Gain and Report Settings	97
Group 7 - Manufacturing Settings	101
Group 8 - Reserved Parameters	102
Group 9 - Motor Controls	103

Appendix B

Indexing Drive Parameters

Parameter Groupings	113
Parameter Descriptions	114
Group 0 - Indexing System	114
Group 1 - Homing	117
Group 2 - Indexing Options	124
Group 3 - Index Move Profile	125
Group 4 - Index Position/Distance	125
Group 5 - Index Registration Distance	125
Group 6 - Index Batch Count	125
Group 7 - Index Dwell	126
Group 8 - Index Velocity	126
Group 9 - Index Move Profile	126
Group 10 - Index Acceleration	127
Group 11 - Index Deceleration	127
Group 12 - Index Next Index	128

Appendix C

Warnings and Fault Codes

Warnings	129
Fault Codes	129

Appendix D

Monitor Variables

Variables	131
Compiled Variables	133
Variable 15 - Digital Inputs and Outputs	133

Variable 25 - Digital Inputs	133
Variable 26 - Digital Outputs	134
Variable 29 - Indexing Inputs	134
Variable 30 - Indexing Outputs	135
Index	137

Notes:

About This Publication

This manual describes the host command set for end-user interface with a Kinetix 3 drive via serial communication. Use this manual for designing, programming, and troubleshooting host commands for serial communication with the Kinetix 3 drives.

Who Should Use This Manual

This manual is intended for engineers, programmers, or technicians directly involved in the installation, operation, programming, and field maintenance of a Kinetix 3 drive by using host mode commands.

If you do not have a basic understanding of the Kinetix 3 drive, contact your local Rockwell Automation sales representative before using this product for the availability of training courses.

Conventions Used in This Manual

The conventions starting below are used throughout this manual:

- Bulleted lists such as this one provide information, not procedural steps
- Numbered lists provide sequential steps or hierarchical information

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Kinetix 3 Component Servo Drive Installation Instructions, publication 2071-IN001	Mounting and wiring instructions, and mounting dimensions.
Kinetix 3 I/O Breakout Board Installation Instructions, publication 2071-IN002	
Kinetix 3 Motor Feedback Breakout Board Installation Instructions, publication 2071-IN003	
Kinetix 3 Serial Communication Cables Installation Instructions, publication 2090-IN019	
Kinetix 3 Component Servo Drive User Manual, publication 2071-UM001	Information on installing, configuring, starting up, and troubleshooting for your Kinetix 3 servo drive system.
Ultraware User Manual, publication 2098-UM001	Information on configuring and operating Ultraware software with servo drives and motors.

You can view or download publications at <http://www.rockwellautomation.com/literature>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Notes:

Modbus Protocol

This chapter defines the Modbus protocol as it applies to a Kinetix 3 drive.

Function Codes

The register number of Modbus devices may begin with 0 or 1, because this is determined by the Modbus host you have selected. If your controller requires it, a '1' must be added to the register number.

The maximum number of parameters that can be read or written at the same time is the same as the number of Modbus addresses, which is the same as the number of the parameters in each group. In other words, all the parameters in each group can be read together or written together.

Function Code	Description
03 (0x03)	Read Holding Registers
04 (0x04)	Read Input Registers
06 (0x06)	Write Single Register
16 (0x10)	Write Multiple Register

Exception Codes

The Kinetix 3 Modbus protocol uses the following exception codes from the Modbus specifications.

Exception Code	Name	Meaning
0x01	Illegal Function	The function code received in the query is not an allowable action for the slave.
0x02	Illegal Data Address	The data address received in the query is not an allowable address for the slave.
0x03 ⁽¹⁾	Illegal Data Value	The length of query data field is not valid for the slave.
0x06	Slave Device Busy	The slave is engaged in processing Run command. The master should retransmit the message later when the slave is free.
0x07	Illegal CRC Value	The CRC value received in the query is wrong value.
0x0C	Illegal Frame	The byte length of the Query Reception frame is out of the limit.
0x0D ⁽²⁾	Illegal Sequence	The data sequence received in the query is not an allowable write command for the slave.
0x0E ⁽¹⁾	Illegal Data Range	The value of query data field is not valid for the slave.
0x0F ⁽³⁾	Illegal Command	The slave is in Run control and received an invalid command.
0x10 ⁽⁴⁾	Illegal Control	The slave is not in the Network mode, but received a network control command.
0x1E	Servo On Write Error	Attempted to write to parameters that are inaccessible when the servo drive is enabled.
0x1F	Servo Error Fail	When the slave is Servo Error condition, and receives a Servo ON command from master.
0x21	Drive Type Fail	When drive type of the slave is Indexing, slave receives run command 02, 03, 04.

(1) Exception code 0x03 indicates an Illegal Data Value. It means the length of data string is incorrect. Exception code 14(0x0E) indicates an Illegal Data Range. It means that data range exceeds the limit of the minimum or maximum value.

(2) Exception code 0x0D is generated if the master accesses a 32-bit data address with function code 06 or either the high or low address of 32-bit data with function code 10.

(3) Exception code 15(0x0F) indicates an Illegal Command was issued. It occurs when a received Run control cannot be executed at the moment.

(4) Exception code 16(0x10) is an Illegal Control. It occurs when the Network Control Mode is not set, but the drive requests a Run Control command or an I/O Control command through the network.

Address Maps

All standard and indexing parameters (Pr-x.xx or Inxx.xx) require a unique register address. The host computer assigns the initial address number and determines whether the register numbers begin with 0 or 1.

Standard Parameters

Group 0 - System Level							
Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
0	Pr-0.00	10	Pr-0.09	20	Pr-0.19	30	Pr-0.29
1	Reserved	11	Pr-0.10	21	Pr-0.20	31	Pr-0.30
2	Reserved	12	Pr-0.11	22	Pr-0.21	32	Pr-0.31
3	Pr-0.02	13	Pr-0.12	23	Pr-0.22	33	Pr-0.32
4	Pr-0.03	14	Pr-0.13	24	Pr-0.23	34...42	Reserved
5	Pr-0.04	15	Pr-0.14	25	Pr-0.24	43...99	Reserved
6	Pr-0.05	16	Pr-0.15	26	Pr-0.25		
7	Pr-0.06	17	Pr-0.16	27	Pr-0.26		
8	Pr-0.07	18	Pr-0.17	28	Pr-0.27		
9	Pr-0.08	19	Pr-0.18	29	Pr-0.28		

Group 1 - Gain Control							
Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
100	Pr-1.00	111	Pr-1.11	122	Pr-1.22	133	Pr-1.33
101	Pr-1.01	112	Pr-1.12	123	Pr-1.23	134	Pr-1.34
102	Pr-1.02	113	Pr-1.13	124	Pr-1.24	135	Pr-1.35
103	Pr-1.03	114	Pr-1.14	125	Pr-1.25	136	Pr-1.36
104	Pr-1.04	115	Pr-1.15	126	Pr-1.26	137	Pr-1.37
105	Pr-1.05	116	Pr-1.16	127	Pr-1.27	138	Pr-1.38
106	Pr-1.06	117	Pr-1.17	128	Pr-1.28	139	Pr-1.39
107	Pr-1.07	118	Pr-1.18	129	Pr-1.29	140	Pr-1.40
108	Pr-1.08	119	Pr-1.19	130	Pr-1.30	141	Pr-1.41
109	Pr-1.09	120	Pr-1.20	131	Pr-1.31	142	Pr-1.42
110	Pr-1.10	121	Pr-1.21	132	Pr-1.32	143...199	Reserved

Group 2 - Speed Control

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
200	Pr-2.00	206	Pr-2.04	212	Pr-2.10
201	Pr-2.01	207	Pr-2.05	213	Pr-2.11
202	Pr-2.02[Lo]	208	Pr-2.06	214	Pr-2.12
203	Pr-2.02[Hi]	209	Pr-2.07	215	Pr-2.13
204	Pr-2.03[Lo]	210	Pr-2.08	216...299	Reserved
205	Pr-2.03[Hi]	211	Pr-2.09		

Group 3 - Position Control

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
300	Pr-3.00	303	Pr-3.03	306	Pr-3.06	309...399	Reserved
301	Pr-3.01	304	Pr-3.04	307	Reserved		
302	Pr-3.02	305	Pr-3.05	308	Pr-3.08		

Group 4 - Torque Control

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
400	Pr-4.00	402	Pr-4.02	404	Pr-4.04	406	Pr-4.06
401	Pr-4.01	403	Pr-4.03	405	Pr-4.05	407...499	Reserved

Group 5 - Supplemental Drive Control

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
500	Pr-5.00	506	Pr-5.06	512	Reserved	518	Pr-5.16[Lo]
501	Pr-5.01	507	Pr-5.07	513	Pr-5.12	519	Pr-5.16[Hi]
502	Pr-5.02	508	Pr-5.08	514	Pr-5.13	520...599	Reserved
503	Pr-5.03	509	Pr-5.09	515	Pr-5.14		
504	Pr-5.04	510	Pr-5.10[Lo]	516	Pr-5.15[Lo]		
505	Pr-5.05	511	Pr-5.10[Hi]	517	Pr-5.15[Hi]		

Indexing Parameters

Special Index Group 0			
Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
4000	Index 0 Distance Low	4005	Index 0 Accel Low
4001	Index 0 Distance High	4006	Index 0 Accel High
4002	Index 0 Velocity	4007	Index 0 Dwell
4003	Index 0 Decel Low	4008	Index 0 Option
4004	Index 0 Decel High	4009	Index 0 Next Index
		4010...4199	Reserved

Group 0 - Indexing System			
Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
5000	In00.00	5006	In00.03.Hi
5001	In00.01.Lo	5007	In00.04
5002	In00.01.Hi	5008	In00.05.Lo
5003	In00.02.Lo	5009	In00.05.Hi
5004	In00.02.Hi	5010	In00.06.Lo
5005	In00.03.Lo	5011	In00.06.Hi
		5012...5199	Reserved

Group 1 - Index Homing

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
5200	In01.00	5206	In01.05.Lo	5212	In01.08.Hi
5201	In01.01	5207	In01.05.Hi	5213	In01.09
5202	In01.02	5208	In01.06	5214	In01.10
5203	In01.03	5209	In01.07.Lo	5215	In01.11
5204	In01.04.Lo	5210	In01.07.Hi	5216	In01.12.Lo
5205	In01.04.Hi	5211	In01.08.Lo	5217	In01.12.Hi
				5218...5399	Reserved

Group 2 – Index Option

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
5400	In02.00	5416	In02.16	5432	In02.32	5448	In02.48
5401	In02.01	5417	In02.17	5433	In02.33	5449	In02.49
5402	In02.02	5418	In02.18	5434	In02.34	5450	In02.50
5403	In02.03	5419	In02.19	5435	In02.35	5451	In02.51
5404	In02.04	5420	In02.20	5436	In02.36	5452	In02.52
5405	In02.05	5421	In02.21	5437	In02.37	5453	In02.53
5406	In02.06	5422	In02.22	5438	In02.38	5454	In02.54
5407	In02.07	5423	In02.23	5439	In02.39	5455	In02.55
5408	In02.08	5424	In02.24	5440	In02.40	5456	In02.56
5409	In02.09	5425	In02.25	5441	In02.41	5457	In02.57
5410	In02.10	5426	In02.26	5442	In02.42	5458	In02.58
5411	In02.11	5427	In02.27	5443	In02.43	5459	In02.59
5412	In02.12	5428	In02.28	5443	In02.43	5460	In02.60
5413	In02.13	5429	In02.29	5444	In02.44	5461	In02.61
5414	In02.14	5430	In02.30	5445	In02.45	5462	In02.62
5415	In02.15	5431	In02.31	5446	In02.46	5463	In02.63
				5447	In02.47	5464...5599	Reserved

Group 3 - Reserved

Modbus Address	Kinetix 3 Parameter
5600...5799	Reserved

Group 4 – Index Position/Distance

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
5800	In04.00.Lo	5834	In04.17.Lo	5868	In04.34.Lo	5902	In04.51.Lo
5801	In04.00.Hi	5835	In04.17. Hi	5869	In04.34. Hi	5903	In04.51.Hi
5802	In04.01.Lo	5836	In04.18.Lo	5870	In04.35.Lo	5904	In04.52.Lo
5803	In04.01.Hi	5837	In04.18. Hi	5871	In04.35. Hi	5905	In04.52.Hi
5804	In04.02.Lo	5838	In04.19.Lo	5872	In04.36.Lo	5906	In04.53.Lo
5805	In04.02.Hi	5839	In04.19. Hi	5873	In04.36. Hi	5907	In04.53.Hi
5806	In04.03.Lo	5840	In04.20.Lo	5874	In04.37.Lo	5908	In04.54.Lo
5807	In04.03.Hi	5841	In04.20. Hi	5875	In04.37. Hi	5909	In04.54.Hi
5808	In04.04.Lo	5842	In04.21.Lo	5876	In04.38.Lo	5910	In04.55.Lo
5809	In04.04.Hi	5843	In04.21. Hi	5877	In04.38. Hi	5911	In04.55.Hi
5810	In04.05.Lo	5844	In04.22.Lo	5878	In04.39.Lo	5912	In04.56.Lo
5811	In04.05.Hi	5845	In04.22. Hi	5879	In04.39. Hi	5913	In04.56.Hi
5812	In04.06.Lo	5846	In04.23.Lo	5880	In04.40.Lo	5914	In04.57.Lo
5813	In04.06.Hi	5847	In04.23. Hi	5881	In04.40. Hi	5915	In04.57.Hi
5814	In04.07.Lo	5848	In04.24.Lo	5882	In04.41.Lo	5916	In04.58.Lo
5815	In04.07.Hi	5849	In04.24. Hi	5883	In04.41. Hi	5917	In04.58.Hi
5816	In04.08.Lo	5850	In04.25.Lo	5884	In04.42.Lo	5918	In04.59.Lo
5817	In04.08.Hi	5851	In04.25. Hi	5885	In04.42. Hi	5919	In04.59.Hi
5818	In04.09.Lo	5852	In04.26.Lo	5886	In04.43.Lo	5920	In04.60.Lo
5819	In04.09.Hi	5853	In04.26. Hi	5887	In04.43. Hi	5921	In04.60.Hi
5820	In04.10.Lo	5854	In04.27.Lo	5888	In04.44.Lo	5922	In04.61.Lo
5821	In04.10.Hi	5855	In04.27. Hi	5889	In04.44. Hi	5923	In04.61.Hi
5822	In04.11.Lo	5856	In04.28.Lo	5890	In04.45.Lo	5924	In04.62.Lo
5823	In04.11.Hi	5857	In04.28. Hi	5891	In04.45. Hi	5925	In04.62.Hi
5824	In04.12.Lo	5858	In04.29.Lo	5892	In04.46.Lo	5926	In04.63.Lo
5825	In04.12.Hi	5859	In04.29. Hi	5893	In04.46. Hi	5927	In04.63.Hi
5826	In04.13.Lo	5860	In04.30.Lo	5894	In04.47.Lo	5928...5999	Reserved
5827	In04.13.Hi	5861	In04.30. Hi	5895	In04.47. Hi		
5828	In04.14.Lo	5862	In04.31.Lo	5896	In04.48.Lo		
5829	In04.14.Hi	5863	In04.31. Hi	5897	In04.48. Hi		
5830	In04.15.Lo	5864	In04.32.Lo	5898	In04.49.Lo		
5831	In04.15.Hi	5865	In04.32. Hi	5899	In04.49. Hi		
5832	In04.16.Lo	5866	In04.33.Lo	5900	In04.50.Lo		
5833	In04.16. Hi	5867	In04.33. Hi	5901	In04.50. Hi		

Group 5 - Reserved

Modbus Address	Kinetix 3 Parameter
6000...6199	Reserved

Group 6 - Reserved

Modbus Address	Kinetix 3 Parameter
6200...6399	Reserved

Group 7 – Index Dwell

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
6400	In07.00	6417	In07.17	6434	In07.34	6451	In07.51
6401	In07.01	6418	In07.18	6435	In07.35	6452	In07.52
6402	In07.02	6419	In07.19	6436	In07.36	6453	In07.53
6403	In07.03	6420	In07.20	6437	In07.37	6454	In07.54
6404	In07.04	6421	In07.21	6438	In07.38	6455	In07.55
6405	In07.05	6422	In07.22	6439	In07.39	6456	In07.56
6406	In07.06	6423	In07.23	6440	In07.40	6457	In07.57
6407	In07.07	6424	In07.24	6441	In07.41	6458	In07.58
6408	In07.08	6425	In07.25	6442	In07.42	6459	In07.59
6409	In07.09	6426	In07.26	6443	In07.43	6460	In07.60
6410	In07.10	6427	In07.27	6444	In07.44	6461	In07.61
6411	In07.11	6428	In07.28	6445	In07.45	6462	In07.62
6412	In07.12	6429	In07.29	6446	In07.46	6463	In07.63
6413	In07.13	6430	In07.30	6447	In07.47	6464 ...6599	Reserved
6414	In07.14	6431	In07.31	6448	In07.48		
6415	In07.15	6432	In07.32	6449	In07.49		
6416	In07.16	6433	In07.33	6450	In07.50		

Group 8 – Index Velocity

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
6600	In08.00	6616	In08.16	6632	In08.32	6648	In08.48
6601	In08.01	6617	In08.17	6633	In08.33	6649	In08.49
6602	In08.02	6618	In08.18	6634	In08.34	6650	In08.50
6603	In08.03	6619	In08.19	6635	In08.35	6651	In08.51
6604	In08.04	6620	In08.20	6636	In08.36	6652	In08.52
6605	In08.05	6621	In08.21	6637	In08.37	6653	In08.53
6606	In08.06	6622	In08.22	6638	In08.38	6654	In08.54
6607	In08.07	6623	In08.23	6639	In08.39	6655	In08.55
6608	In08.08	6624	In08.24	6640	In08.40	6656	In08.56
6609	In08.09	6625	In08.25	6641	In08.41	6657	In08.57
6610	In08.10	6626	In08.26	6642	In08.42	6658	In08.58
6611	In08.11	6627	In08.27	6643	In08.43	6659	In08.59
6612	In08.12	6628	In08.28	6644	In08.44	6660	In08.60
6613	In08.13	6629	In08.29	6645	In08.45	6661	In08.61
6614	In08.14	6630	In08.30	6646	In08.46	6662	In08.62
6615	In08.15	6631	In08.31	6647	In08.47	6663	In08.63
						6664 ... 6799	Reserved

Group 9 - Reserved

Modbus Address	Kinetix 3 Parameter
6800 ... 6999	Reserved

Group 10 – Index Acceleration							
Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
7000	In10.00.Lo	7032	In10.16.Lo	7064	In10.32.Lo	7096	In10.48.Lo
7001	In10.00.Hi	7033	In10.16. Hi	7065	In10.32. Hi	7097	In10.48. Hi
7002	In10.01.Lo	7034	In10.17.Lo	7066	In10.33.Lo	7098	In10.49.Lo
7003	In10.01.Hi	7035	In10.17. Hi	7067	In10.33. Hi	7099	In10.49. Hi
7004	In10.02.Lo	7036	In10.18.Lo	7068	In10.34.Lo	7100	In10.50.Lo
7005	In10.02.Hi	7037	In10.18. Hi	7069	In10.34. Hi	7101	In10.50. Hi
7006	In10.03.Lo	7038	In10.19.Lo	7070	In10.35.Lo	7102	In10.51.Lo
7007	In10.03.Hi	7039	In10.19. Hi	7071	In10.35. Hi	7103	In10.51. Hi
7008	In10.04.Lo	7040	In10.20.Lo	7072	In10.36.Lo	7104	In10.52.Lo
7009	In10.04.Hi	7041	In10.20. Hi	7073	In10.36. Hi	7105	In10.52. Hi
7010	In10.05.Lo	7042	In10.21.Lo	7074	In10.37.Lo	7106	In10.53.Lo
7011	In10.05.Hi	7043	In10.21. Hi	7075	In10.37. Hi	7107	In10.53. Hi
7012	In10.06.Lo	7044	In10.22.Lo	7076	In10.38.Lo	7108	In10.54.Lo
7013	In10.06.Hi	7045	In10.22. Hi	7077	In10.38. Hi	7109	In10.54. Hi
7014	In10.07.Lo	7046	In10.23.Lo	7078	In10.39.Lo	7110	In10.55.Lo
7015	In10.07.Hi	7047	In10.23. Hi	7079	In10.39. Hi	7111	In10.55. Hi
7016	In10.08.Lo	7048	In10.24.Lo	7080	In10.40.Lo	7112	In10.56.Lo
7017	In10.08.Hi	7049	In10.24. Hi	7081	In10.40. Hi	7113	In10.56. Hi
7018	In10.09.Lo	7050	In10.25.Lo	7082	In10.41.Lo	7114	In10.57.Lo
7019	In10.09.Hi	7051	In10.25. Hi	7083	In10.41. Hi	7115	In10.57. Hi
7020	In10.10.Lo	7052	In10.26.Lo	7084	In10.42.Lo	7116	In10.58.Lo
7021	In10.10.Hi	7053	In10.26. Hi	7085	In10.42. Hi	7117	In10.58. Hi
7022	In10.11.Lo	7054	In10.27.Lo	7086	In10.43.Lo	7118	In10.59.Lo
7023	In10.11.Hi	7055	In10.27. Hi	7087	In10.43. Hi	7119	In10.59. Hi
7024	In10.12.Lo	7056	In10.28.Lo	7088	In10.44.Lo	7120	In10.60.Lo
7025	In10.12.Hi	7057	In10.28. Hi	7089	In10.44. Hi	7121	In10.60. Hi
7026	In10.13.Lo	7058	In10.29.Lo	7090	In10.45.Lo	7122	In10.61.Lo
7027	In10.13.Hi	7059	In10.29. Hi	7091	In10.45. Hi	7123	In10.61. Hi
7028	In10.14.Lo	7060	In10.30.Lo	7092	In10.46.Lo	7124	In10.62.Lo
7029	In10.14.Hi	7061	In10.30. Hi	7093	In10.46. Hi	7125	In10.62. Hi
7030	In10.15.Lo	7062	In10.31.Lo	7094	In10.47.Lo	7126	In10.63.Lo
7031	In10.15.Hi	7063	In10.31. Hi	7095	In10.47. Hi	7127	In10.63. Hi
						7128 ... 7199	Reserved

Group 11 – Index Deceleration

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
7200	In11.00.Lo	7232	In11.16.Lo	7264	In11.32.Lo	7296	In11.48.Lo
7201	In11.00.Hi	7233	In11.16.Hi	7265	In11.32.Hi	7297	In11.48.Hi
7202	In11.01.Lo	7234	In11.17.Lo	7266	In11.33.Lo	7298	In11.49.Lo
7203	In11.01.Hi	7235	In11.17.Hi	7267	In11.33.Hi	7299	In11.49.Hi
7204	In11.02.Lo	7236	In11.18.Lo	7268	In11.34.Lo	7300	In11.50.Lo
7205	In11.02.Hi	7237	In11.18.Hi	7269	In11.34.Hi	7301	In11.50.Hi
7206	In11.03.Lo	7238	In11.19.Lo	7270	In11.35.Lo	7302	In11.51.Lo
7207	In11.03.Hi	7239	In11.19.Hi	7271	In11.35.Hi	7303	In11.51.Hi
7208	In11.04.Lo	7240	In11.20.Lo	7272	In11.36.Lo	7304	In11.52.Lo
7209	In11.04.Hi	7241	In11.20.Hi	7273	In11.36.Hi	7305	In11.52.Hi
7210	In11.05.Lo	7242	In11.21.Lo	7274	In11.37.Lo	7306	In11.53.Lo
7211	In11.05.Hi	7243	In11.21.Hi	7275	In11.37.Hi	7307	In11.53.Hi
7212	In11.06.Lo	7244	In11.22.Lo	7276	In11.38.Lo	7308	In11.54.Lo
7213	In11.06.Hi	7245	In11.22.Hi	7277	In11.38.Hi	7309	In11.54.Hi
7214	In11.07.Lo	7246	In11.23.Lo	7278	In11.39.Lo	7310	In11.55.Lo
7215	In11.07.Hi	7247	In11.23.Hi	7279	In11.39.Hi	7311	In11.55.Hi
7216	In11.08.Lo	7248	In11.24.Lo	7280	In11.40.Lo	7312	In11.56.Lo
7217	In11.08.Hi	7249	In11.24.Hi	7281	In11.40.Hi	7313	In11.56.Hi
7218	In11.09.Lo	7250	In11.25.Lo	7282	In11.41.Lo	7314	In11.57.Lo
7219	In11.09.Hi	7251	In11.25.Hi	7283	In11.41.Hi	7315	In11.57.Hi
7220	In11.10.Lo	7252	In11.26.Lo	7284	In11.42.Lo	7316	In11.58.Lo
7221	In11.10.Hi	7253	In11.26.Hi	7285	In11.42.Hi	7317	In11.58.Hi
7222	In11.11.Lo	7254	In11.27.Lo	7286	In11.43.Lo	7318	In11.59.Lo
7223	In11.11.Hi	7255	In11.27.Hi	7287	In11.43.Hi	7319	In11.59.Hi
7224	In11.12.Lo	7256	In11.28.Lo	7288	In11.44.Lo	7320	In11.60.Lo
7225	In11.12.Hi	7257	In11.28.Hi	7289	In11.44.Hi	7321	In11.60.Hi
7226	In11.13.Lo	7258	In11.29.Lo	7290	In11.45.Lo	7322	In11.61.Lo
7227	In11.13.Hi	7259	In11.29.Hi	7291	In11.45.Hi	7323	In11.61.Hi
7228	In11.14.Lo	7260	In11.30.Lo	7292	In11.46.Lo	7324	In11.62.Lo
7229	In11.14.Hi	7261	In11.30.Hi	7293	In11.46.Hi	7325	In11.62.Hi
7230	In11.15.Lo	7262	In11.31.Lo	7294	In11.47.Lo	7326	In11.63.Lo
7231	In11.15.Hi	7263	In11.31.Hi	7295	In11.47.Hi	7327	In11.63.Hi
						7328 ... 7399	Reserved

Group 12 – Next Index

Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter	Modbus Address	Kinetix 3 Parameter
7400	In12.00	7416	In12.16	7432	In12.32	7448	In12.48
7401	In12.01	7417	In12.17	7433	In12.33	7449	In12.49
7402	In07.02	7418	In12.18	7434	In12.34	7450	In12.50
7403	In12.03	7419	In12.19	7435	In12.35	7451	In12.51
7404	In12.04	7420	In12.20	7436	In12.36	7452	In12.52
7405	In12.05	7421	In12.21	7437	In12.37	7453	In12.53
7406	In12.06	7422	In12.22	7438	In12.38	7454	In12.54
7407	In12.07	7423	In12.23	7439	In12.39	7455	In12.55
7408	In12.08	7424	In12.24	7440	In12.40	7456	In12.56
7409	In12.09	7425	In12.25	7441	In12.41	7457	In12.57
7410	In12.10	7426	In12.26	7442	In12.42	7458	In12.58
7411	In12.11	7427	In12.27	7443	In12.43	7459	In12.59
7412	In12.12	7428	In12.28	7444	In12.44	7460	In12.60
7413	In12.13	7429	In12.29	7445	In12.45	7461	In12.61
7414	In12.14	7430	In12.30	7446	In12.46	7462	In12.62
7415	In12.15	7431	In12.31	7447	In12.47	7463	In12.63
						7464 ...7599	Reserved

Save Parameters

When the Standard and Indexing parameters are written by using function code 0x06, their values are stored to the volatile RAM temporarily and are lost after powering off. To permanently store the parameters values in the nonvolatile flash memory, write a 1 to the address 9999, by using the function code 0x06, 0x10.

IMPORTANT Nonvolatile memory is limited to 100,000 erase/program cycles.

Modbus Address	Data Status	Description
9999 (decimal)	1	Write data into nonvolatile memory

Monitoring Parameter (Function Code 0x04)

The Read or Multi-read of monitoring variables are possible through function code 04 Read Input Register. All display parameters of the drive are mapped to function code 04 range. The default address is 0x00.

Display Parameter - Input Registers (Default = 0)

Modbus Address	Drive	Name	Unit
0	dis-00	Velocity Feedback	rpm
1	dis-01	Velocity Command	rpm
2	dis-02	Velocity Error	rpm
3	dis-03	Torque Command	0.10%
4...5	dis-04	Position Feedback	counts
6...7	dis-05	Position Command	counts
8...9	dis-06	Position Error	counts
10	dis-07	Pulse Command Frequency	0.1pps
11	dis-08	Electrical Angle	0.1'
12	dis-09	Mechanical Angle	0.1'
13	dis-10	Regeneration Load Ratio	%
14	dis-11	DC-Link Voltage	V
15	dis-12	Multi-Turn Data	Turn number
16...17	dis-13	Offset in Velocity Command	0.1mV
18...19	dis-14	Torque Offset	0.1mV
20...24	dis-15	Input/Output Signal Status	?-
25...32	dis-16	Display Error History	8Alarm
33	dis-17	Display Software Version	1word
34...35	dis-18	Display Motor info	2word
36	dis-19	Analog Velocity Command Voltage	0.01V
37	dis-20	Analog Current Command Voltage	0.01V
38	dis-21	Drive Rated Output Power	1word
39...40	dis-22	Absolute Single Turn Data	?-
41...42	dis-23	Encoder Feedback Counter	counts
43...99	Reserved	-	-

Fault and Warning Status Parameter - Input Registers

Fault and Warning Status Parameter - Input Registers (Default = 0)

Modbus Address	Function	Name	Unit
100	Error Check	Servo Error Code	Word
101	Warning Check	Servo Warning Code	Word
102...199	Reserved	-	-

Output Function Status Parameter

Modbus Address	Output Function	Description	Unit	Position [bits]
200	/S_ALM	Alarm	Bit	[0]
	/P-COM	Within position window	Bit	[1]
	/TG-ON	Up to speed	Bit	[2]
	BK	Brake control	Bit	[3]
	/V-COM	Within Speed window	Bit	[4]
	/A-VLD	Absolute position valid	Bit	[5]
	/RDY	Drive Ready	Bit	[6]
	/T-LMT /NEAR	Current Limited	Bit	[7]
	/V-LMT /WARN	Velocity Limited	Bit	[8]
	/NEAR	Near position	Bit	[9]
	/WARN	Warning	Bit	[10]
	Reserved	-	Bit	[11]
	Reserved	-	Bit	[12]
	/IMO	In Motion	Bit	[13]
	/I-DW	In Dwell	Bit	[14]
/HOMC	Axis Homed	Bit	[15]	
201	/O_ISEL0	Index Select 0 Out	Bit	[0]
	/O_ISEL1	Index Select 1 Out	Bit	[1]
	/O_ISEL2	Index Select 2 Out	Bit	[2]
	/O_ISEL3	Index Select 3 Out	Bit	[3]
	/O_ISEL4	Index Select 4 Out	Bit	[4]
	/O_ISEL5	Index Select 5 Out	Bit	[5]
	/E_SEQU	End of Sequence	Bit	[6]
	Reserved	-	Bit	[7...15]

Running Parameter (Function Code 0x06 or 0x10)

Run Parameter - Holding Registers (Default = 2000)				
Modbus Address	Attribute	RUN	Name	Access Unit
2000	User Open	run-00	Jog Operation	1-byte
2001		run-01	Off-Line Auto Tuning	1 bit
2002		run-02	Reserved	-
2003		run-03	Auto Adjustment of Speed Command Offset	1 bit
2004		run-04	Auto Adjustment of Current Command Offset	1 bit
2005...2007		run-05...run-07	Reserved	-
2008		run-08	Alarm Reset	1 bit
2009		run-09	Reserved	-
2010		run-10	Absolute Encoder Reset	1 bit
2011		run-11	2-Group Gain Storing	1 bit
2012		run-12	Parameter Initialization	1 bit
2013...2015		run-13...run-15	Reserved	-
2016		run-16	Hardware Reset	1 bit
2017...2099		run-17...run-99	Reserved	-

Input Function Parameter (Function Code 0x03, 0x06, or 0x10)

Input Function Control - Holding Registers				
Modbus Address	I/O Function	Description	Unit	Position Bit
3000	/SV-ON	Drive Enable	bit	0
	-	Reserved	-	[1] and [2]
	/P-CON	Integrator Inhibit	bit	[3]
	/A-RST	Fault Reset	bit	[4]
	/N-CL	Negative Current Limit	bit	[5]
	/P-CL	Positive Current Limit	bit	[6]
	/C-SEL	Operation Mode Override	bit	[7]
	/C-DIR	Preset Direction	bit	[8]
	/C-SP1	Preset Select 1	bit	[9]
	/C-SP2	Preset Select 2	bit	[10]
	/C-SP3	Preset Select 3	bit	[11]
	/C-SP4	Preset Select 4	bit	[12]
	/INHIB	Pause Follower	bit	[13]
	/G-SEL	Alternate Gain Select	bit	[14]
	/PCLR	Position clear	bit	[15]

Input Function Control - Holding Registers

Modbus Address	I/O Function	Description	Unit	Position Bit
3001	/ABS-DT	Position Strobe	bit	[0]
	/START	Motor Moving Enable	bit	[1]
	/Z-CLP	Zero Speed Clamp Enable	bit	[2]
	/GEAR	2nd Electronic Gear Bank Selection	bit	[3]
	/R-ABS	Reset multi-turn data of Absolute Encoder	bit	[4]
	-	Reserved	-	[5]
	/SHOME	Start Homing	bit	[6]
	/STOP	Stop Indexing	bit	[7]
	/PAUSE	Pause Indexing	bit	[8]
	/I-SEL0	Index Select 0 Input	bit	[9]
	/I-SEL1	Index Select 1 Input	bit	[10]
	/I-SEL2	Index Select 2 Input	bit	[11]
	/I-SEL3	Index Select 3 Input	bit	[12]
	/I-SEL4	Index Select 4 Input	bit	[13]
	/I-SEL5	Index Select 5 Input	bit	[14]
/H_STOP	Stop Homing	bit	[15]	
3002	/START_I	Start Index	bit	[0]
	/BANK_SEL	Gain Bank Select	bit	[1]
	-	Reserved	-	[2...15]

Notes:

Communication Protocol (RS-232/ASCII)

Introduction

The drive command protocol is a client-server protocol. A host computer is the server, and each drive is a client. This chapter provides details about the Special Symbols, Packet Structure, and Checksum in the serial communication protocol.

Special Symbols

Special symbols used in the host commands include the following.

Symbol	Value	Description
STX	0x02	Start of text
ETX	0x03	End of text
ACK	0x06	Acknowledged
BEL	0x07	Acknowledge alarm
NAK	0x15	Not acknowledged
CAN	0x18	Cancellation of command (For example, the drive sends CAN if the drive is already enabled, but the JOG ON is requested.)
ETB	0x17	End of block
GS	0x1D	Cannot save parameter
RS	0x1E	Range over
US	0x1F	Undefined

Packet Structure

The packet structure is shown below.

	Start	ID	Host/ Response	Command	Data	Separator	Checksum	End
Symbol	STX	dd	# or \$	SET or...	d...d	:	cc	ETX
Bytes	1	2	1	3	0 - n	1	1	1

Some simple commands might not have the Data field (for example, Fault Reset). Maximum packet size is 400 bytes. Each letter and digit in Command and Data fields represents a single ASCII character.

All commands begin with an [STX](#), and terminate with an [ETX](#).

If the drive receives the command without a communication error, the response is in the same format as the host command. Numeric parameters are encoded as strings.

If the drive receives the host's command with a communication error (for example, parity or checksum errors), the drive sends an **NAK**. The host should assume a communication error occurred if a response from the drive does not occur within a time-out period (generally 200 ms).

If drive does not recognize the command, it sends a **US** response.

Checksum

The checksum range consists of ID to Separator fields. Checksum is the ASCII hex code of the least significant digit from the sum of hexadecimal codes in the checksum range.

For example, this VER command has a checksum of 42 (ASCII hex code of B).

Command	STX	0	1	#	V	E	R	:	B	ETX
ASCII	2	30	31	23	56	45	52	3A	42	3

$$30H+31H+23H+56H+45H+52H+3AH = 1ABH$$

The ASCII hex code of B is 42.

However, this VER command response also has a checksum of 35 (ASCII hex code of 5).

Command	STX	0	1	&	V	E	R		9	.	0	2	:	5	ETX
ASCII	2	30	31	24	56	45	52	20	39	2E	30	32	3A	35	3

$$30H+31H+24H+56H+45H+52H+20H+31H+2EH+30H+32H+3AH = 295H$$

The ASCII hex code of 5 is 35.

General Commands (ASCII)

This chapter defines the general ASCII commands available to control a Kinetix 3 drive.

Read Parameter (SET)

Attribute	Value	
Command	SET	
Description	Read parameter value	
Format	STX ID # SET PPP : BSS ETX	
Data	Argument	Description
	PPP	Parameter #; for example, [Pr - 2.03] , PPP=203=0x0CB Refer to this chapter, Appendix A, Standard Drive Parameters , and Appendix B, Indexing Drive Parameters for a available parameter descriptions.
Response Format	STX ID \$SET V : BSS ETX	
Response Data	Argument	Description
	V	Bit-field type = 4-byte hexadecimal value. Integer type = Signed integer of variable length

Write Parameter (STR)

Attribute	Value	
Command	STR	
Description	Write parameter value to RAM, and then save data from RAM to nonvolatile memory.	
Format	STX ID # STR PPP V : BSS ETX	
Data	Argument	Description
	PPP	Parameter #; for example, [Pr - 2.03] , PPP=203=0x0CB Refer to Standard Drive Parameters beginning on page 47 for a description of available parameters. Group 7 - Manufacturing Settings are product settings that are programmed during manufacturing.
	V	Bit-field type = 4-byte hexadecimal value. Normal type = Signed integer of variable length
Response Format	ACK	
Error Response	If the drive is unable to change the variable because it is enabled, it sends GS. If the value is out of range, RS is returned.	
Next Command	STX ID # STR : BSS ETX	
Usage Note	To determine whether task is complete, send STR without arguments.	
Response Format	If task is not complete: STX ID \$BSY : BSS ETX or If task is complete: STX ID \$TOK : BSS ETX	

Write Parameter (CHP)

Attribute	Value	
Command	CHP	
Description	Write parameter value to RAM	
Format	STX ID # CHP PPP V : BSS ETX	
Data	Argument	Description
	PPP	Parameter #; for example, [Pr - 2.03] , PPP=203=0x0CB Refer to Standard Drive Parameters beginning on page 47 for a description of available parameters. Group 7 - Manufacturing Settings are product settings that are programmed during manufacturing.
	V	Bit-field type = 4-byte hexadecimal value. Normal type = Signed integer of variable length
Response Format	ACK	
Error Response	If unable to change the variable because drive is enabled, GS is sent. If value is out of range, RS is returned.	

Indexing Command Extended (XCE)

Attribute	Value	
Command	XCE	
Description	Execute Indexing Control Panel command	
Format	STX ID # XCE NNNNN & VVVVV: BSS ETX	
Data	Argument	Description
	NNNNN	Index number. 0...63. Data Format 16-bit unsigned integer
	VVVVV	Indexing Function Command. 0 = Start Homing 1 = Stop Homing 2 = Start Indexing Data Format 16-bit unsigned integer
Response Format	ACK If there is an error while executing the command, the GS , RS , US , NAK , CAN exception codes can be used for the response.	
Usage Note	This command executes only Indexing commands. If the command to be executed is not specific to an Index number, the NNNNN field should be 0.	

Read Indexing Parameter (XET)

Attribute	Value	
Command	XET	
Description	Read parameter value	
Format	STX ID # XET PPPP : BSS ETX	
Data	Argument	Description
	PPPP	Parameter #; for example, in the case of [IN00.02] , PPPP=0200, the two initial arguments (PPxx) indicate the indexing (Ix) group. Refer to Indexing Drive Parameters beginning on page 113 for a description of available indexing parameters. Group 7 - Manufacturing Settings are product settings that are programmed during manufacturing.
Response Format	STX ID \$XET V : BSS ETX	
Response Data	Argument	Description
	V	Bit-field type = 4-byte hexadecimal value. Integer type: Signed integer of variable length

Write Indexing Parameter (XHP)

Attribute	Value	
Command	XHP	
Description	Write parameter value to RAM.	
Format	STX ID # XHP PPPP V : BSS ETX	
Data	Argument	Description
	PPPP	Parameter #; for example, in the case of [IN00.02] , PPPP=0200, the two initial arguments (PPxx) indicate the indexing (lx) group. Refer to Indexing Drive Parameters beginning on page 113 for a description of available indexing parameters.
	V	Bit-field type = 4-byte hexadecimal value. Normal type = Signed integer of variable length
Response Format	ACK	
Error Response	If the drive is unable to change the variable because it is enabled, it sends GS. If the value is out of range, RS is returned.	

Write Indexing Parameter (XTR)

Attribute	Value	
Command	XTR	
Description	Write parameter value to RAM, and then saves data from RAM to nonvolatile memory	
Format	STX ID # XTR PPPP V : BSS ETX	
Data	Argument	Description
	PPPP	Parameter #; In the case of PPPP=0200, the two initial arguments (PPxx) indicate the indexing (lx) group. Refer to Indexing Drive Parameters beginning on page 113 for a description of available indexing parameters.
	V	Bit-field type = 4-byte hexadecimal value. Normal type = Signed integer of variable length
Response Format	ACK	
Error Response	If the drive is unable to change the variable because it is enabled, it sends GS. If the value is out of range, RS is returned.	

Fault Reset (RST)

Attribute	Value
Command	RST
Description	Clear fault
Format	STX ID # RST : BSS ETX
Response	ACK
Usage Note	Fault Reset had no effect unless action was taken to resolve the fault. Refer to Warnings and Fault Codes beginning on page 129 for a description of faults and warnings.

Monitor Variable (MDM)

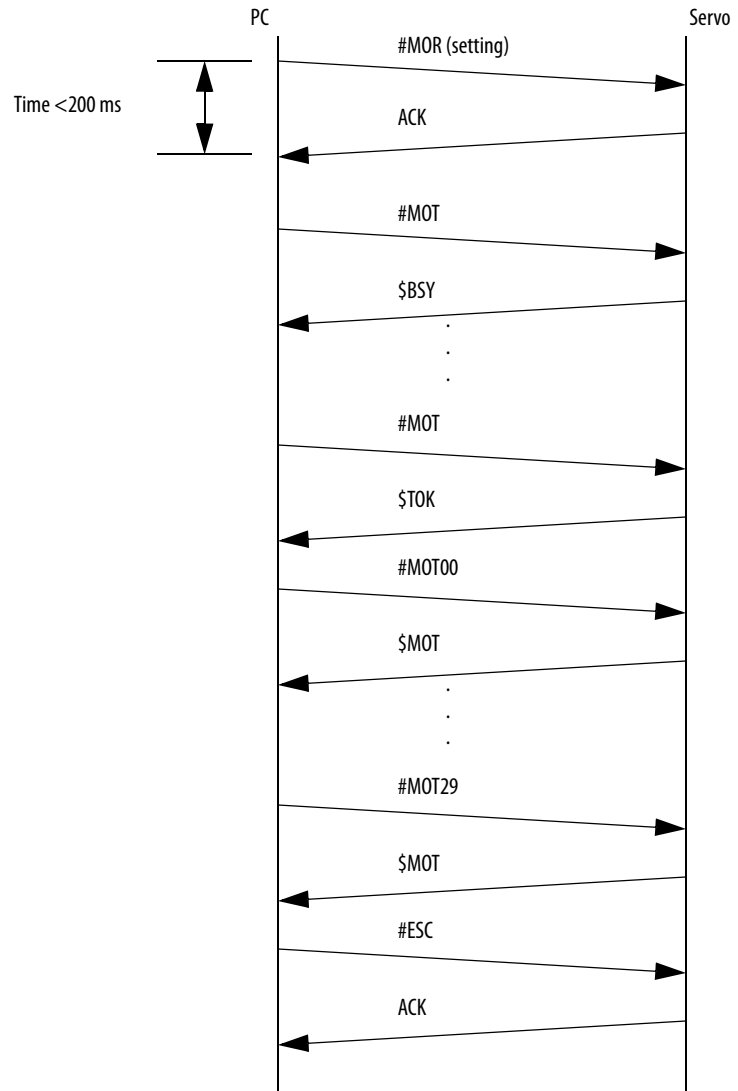
Attribute	Value				
Command	MDM				
Description	Monitor variables				
Format	STX ID # MDM P1 P2 P3 P4 P5 : BSS ETX				
Data	<table border="1"> <thead> <tr> <th>Argument</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>P1...P5</td> <td>Variables to monitor.</td> </tr> </tbody> </table>	Argument	Description	P1...P5	Variables to monitor.
Argument	Description				
P1...P5	Variables to monitor.				
Usage Note	MDM command can monitor up to five variables. Refer to Monitor Variables on page 131 for the list of variables.				
Response Format	STX ID \$ MDM V1&V2&V3&V4&V5 : BSS ETX				
Response Data	<table border="1"> <thead> <tr> <th>Argument</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>V1...V5</td> <td>Variable values are 4 or 8-bytes signed See tables below for descriptions of specific variables.</td> </tr> </tbody> </table>	Argument	Description	V1...V5	Variable values are 4 or 8-bytes signed See tables below for descriptions of specific variables.
Argument	Description				
V1...V5	Variable values are 4 or 8-bytes signed See tables below for descriptions of specific variables.				

Triggered Data Collection (MOT)

Attribute	Value	
Command	MOT	
Description	Sets, watches, and reads trigger monitor	
Format	STX ID # MOT Ch1 Ch2 Src SP Num Mode Pos Level : BSS ETX	
Data	Argument	Description
	Ch1, Ch2	Input signals, See Appendix A (variables 0x00...0x0F only)
	Src	Trigger Source (0x000...0x009, 0x101...0x112) Refer to Monitor Variables on page 131 for the list of variables. 0x101-0x10A: DI#1...DI#10 0x10B: Emergency Stop Input 0x10C-0x10E: DO#1...DO#3 0x10F: Safety Alarm Output 0x110-0x112: DO#4...DO#6
	SP	Sample Period, Range 0x01...0x64 (0.2...20 ms)
	Num	Number of data points *10, Range 0x01...0x1E (1...30)
	Mode	Trigger mode 1 = Positive Edge 2 = Negative Edge
	Pos	Trigger Position (1...9) The percentage of data to be received before the trigger point. For example, if Pos = 3 then 30% of data received before the trigger point and 70% of data received after the trigger point.
	Level	Trigger level/threshold; the value of the Trigger Source. Values are 4 or 8-bytes signed.
Usage Note	This command is sent to the drive prior to monitoring or reading the Triggered Data Collection (MOT) command variants below. See Figure 1 for command examples.	
Response	ACK	
Next Command	MOT	
Format	STX ID # MOT : BSS ETX	
Usage Note	This command is sent to the drive to verify data is available.	
Response	If data is not ready: STX ID \$ BSY : BSS ETX If data is ready: STX ID \$ TOK : BSS ETX	
Next Command	MOT	
Format	STX ID # MOT NumD : BSS ETX	
Data	Argument	Description
	NumD	Data Point to retrieve the data from; Range 00...(Num-1)
Usage Note	This command can be used when previous command returned TOK. Send ESC to stop data collection.	
Response Format	STX ID \$ MOT V1&V2&...V20 : BSS ETX	
Response Data	Argument	Description
	V1...V20	Data transmission is done in blocks of 10. Because there are 2 channels, 20 values are returned, with values alternating between the first channel and the second channel. Values are a signed integer of variable length (4 or 8-bytes).

Attribute	Value
Next Command	STX ID # ESC : BSS ETX
Response	ACK

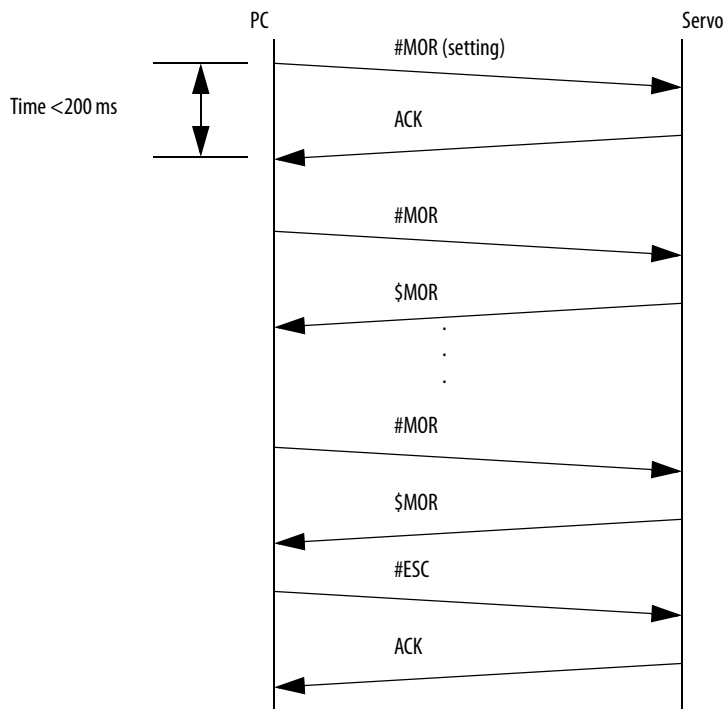
Figure 1 - Triggered Data Collection (MOT) Command String Example



Variable Roll Monitoring (MOR)

Attribute	Value	
Command	MOR	
Description	Set up variable roll monitor	
Format Data	STX ID # MOR SP P1 P2 : BSS ETX	
	Argument	Description
	SP	Sampling period range 0x01 . . . 0x64 (01 . . . 100 ms)
	P1, P2	Variables to monitor. Range 0x00 . . . 0x1D
Usage Note	Sets up the variable roll monitoring. This command is sent to the drive prior to sending a Monitor Variable (MDM) command. See Figure 2 for command examples.	
Response	ACK	
Next Command	STX ID # MOR : BSS ETX	
Usage Note	Request to store data in the linear buffer (with a capacity of 100 data points). If the buffer is full and data has not been retrieved, the buffer is emptied. If data is requested before data is in the buffer, the drive sends ACK.	
Response Format	STX ID \$ MOR V1&V2& . . . Vn : BSS ETX	
Response Data	Argument	Description
	V1 . . . Vn	Signed integer of variable length
Next Command	STX ID #ESC : BSS ETX	
Usage Note	Send ESC to stop monitoring of the data.	
Response	ACK	

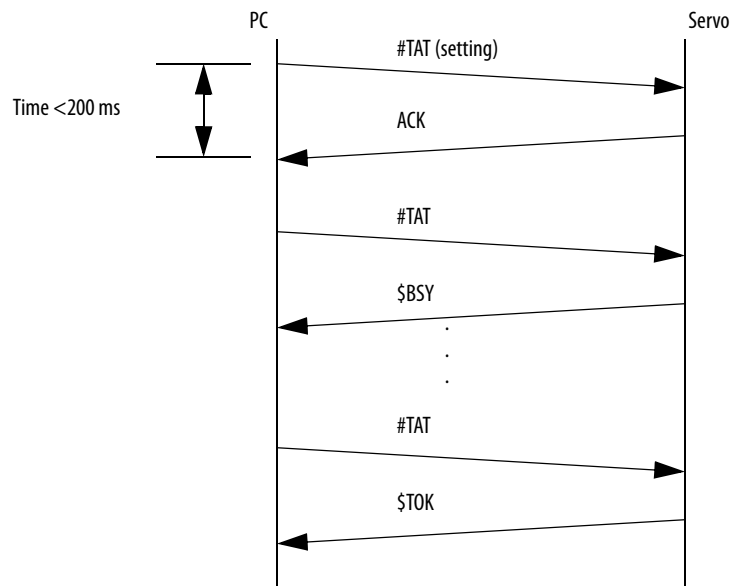
Figure 2 - Variable Roll Monitoring (MOR) Command String Example



Automatic Task (TAT)

Attribute	Value		
Command	TAT		
Format	STX ID # TAT T1 : BSS ETX		
Data	Argument	Description	
	T1	Automatic task number. See the following Values and Task Descriptions.	
		Value	Task Description
		0x01	Auto Tuning
		0x02	Move to Marker
		0x03	Auto Adjustment of Velocity Command Offset
		0x04	Auto Adjustment of Current Command Offset
0x07	Auto Adjustment of Current Feedback Offset		
Response	ACK		
Usage Note	Send TAT command without arguments to find out if a task is completed. See Figure 3 for command examples.		
Next Command	STX ID # TAT : BSS ETX		
Response Format	STX ID \$ BSY : BSS ETX - if task is not complete STX ID \$ TOK : BSS ETX - task is complete		

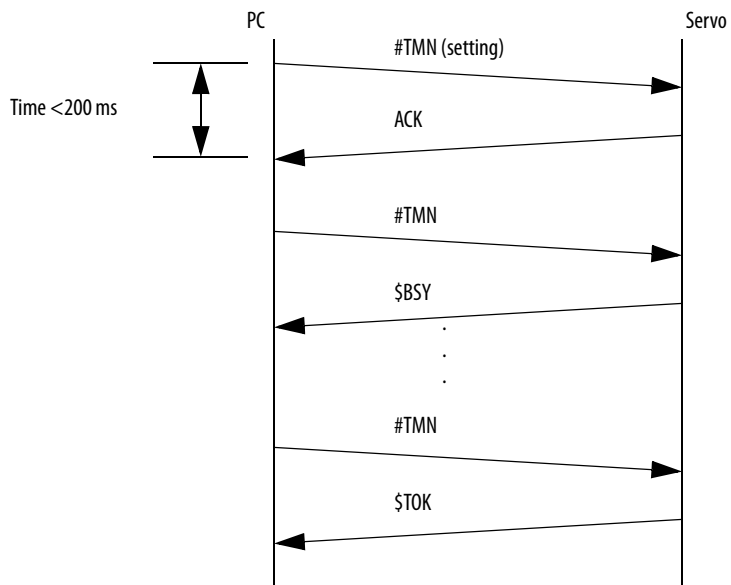
Figure 3 - Automatic Task (TAT) Command String Example



Manual Task (TMN)

Attribute	Value		
Command	TMN		
Format	STX ID # TMN 1 : BSS ETX		
Data	Argument	Description	
	T1	Manual task number. See the following Values and Task Descriptions.	
		Value	Task Description
		0x01	- Speed Command Offset - Decrement by 0.1 mV.
		0x02	+ Speed Command Offset - Increment by 0.1 mV.
		0x03	Save Speed Command Offset change.
		0x04	- Current Command Offset - Decrement by 0.1 mV.
		0x05	+ Current Command Offset - Increment by 0.1 mV.
		0x06	Save Current Command Offset change.
0x07	Discard changes and exit.		
Response	ACK		
Usage Note	Most manual tasks are complete by the time ACK is received. Commands 0x03 and 0x06 may take longer, because they save data to nonvolatile memory. Send TMN command without arguments to find out if a task is completed. See Figure 4 for command examples.		
Next Command	STX ID # TAT : BSS ETX		
Response Format	STX ID \$ BSY : BSS ETX - if task is not complete STX ID \$ TOK : BSS ETX - task is complete		

Figure 4 - Manual Task (TMN) Command String Example



Read Fault Contents (EHY)

Attribute	Value	
Command	EHY	
Description	Read faults See Read Fault Detailed Data (DIE) on page 44 for alternative fault data.	
Format	STX ID # EHY F1 : BSS ETX	
Data	Argument	Description
	F1	Fault Number. Range is 0x01 . . . 0x08 where latest fault status is stored in 0x01, and oldest fault is stored in 0x08.
Response Format	STX ID \$ EHYE FCode FChars : BSS ETX	
Data	Data	Description
	FCode	Fault Code. See Appendix C for a list of fault codes.
	FChars	Fault Name Abbreviated. See Appendix C .
Usage Note	Use this command to find out more about one of the eight faults. To receive all fault statuses, use EHY * command below.	

Attribute	Value	
Command	EHY *	
Description	Read all fault codes	
Format	STX ID # EHY * : BSS ETX	
Data	Argument	Description
	*	Asterik (*) means all faults
Response Format	STX ID \$ EHY Fcode1&Fcode2&...Fcode8 : BSS ETX	
Data	Data	Description
	Fcode1 . . . Fcode8	Fault Code. See Appendix C for a list of fault codes.

Jog (JOG)

Attribute	Value	
Command	JOG	
Description	Jog forward or reverse	
Format	STX ID # JOG P1 : BSS ETX	
Data	Argument	Description
	P1	0 = prepare for jog operation + = jog forward - (dash) = jog reverse
Response	ACK	
Usage Note	To keep jogging, send JOG command more than once within 500 ms. To end Jog mode, send SVROF	

Read Drive Status (STS)

Attribute	Value	
Command	STS	
Description	Read status	
Format	STX ID # STS : BSS ETX	
Response Format	STX ID \$ STS Mode S1 S2 S3 S4 S5 SS FChars : BSS ETX	
Response Data	Arguments	Description
	Mode	One of these operating modes F = Follower mode S = Analog Velocity mode P = Preset Velocity mode C = Analog Current mode D = Dual Current Command mode PF, PS, PC FS, FC, SC = Mixed modes Refer to [Pr - 0.00], Operations Mode on page 48 for additional information.
	S1	S1 means: In Follower mode: 1 = In Position 0 = Not In Position In Analog Velocity or Preset Velocity modes: 1 = In Speed Window 0 = not In Speed Window If position or speed data is not available S1=0.
	S2	One of the following: 1 = Up to Speed 0 = Not Up to Speed If speed data is not available, S2=0.
	S3	One of the following: 1 = Drive is Enabled 0 = Drive is Disabled
	S4	One of the following: 1 = Positive Overtravel is active 0 = Positive Overtravel is inactive
	S5	One of the following: 1 = Negative Overtravel is active 0 = Negative Overtravel is inactive
	SS	One of the following: Edd = fault occurred (See Appendix C) dd = 2-byte error code, 0x00...0xFF Wdd = warning occurred (See Appendix C) dd = 2-byte warning code RDY = no errors or warnings
FChars	Abbreviation of the fault/warning name. In the case of Estop fault, Fchars = ESTOP FChars size is 5 bytes when fault occurs and 3 bytes when warning occurs.	

Other Functions (ETC)

Attribute	Value		
Command	ETC		
Format	STX ID # ETC F1 : BSS ETX		
Data	Argument	Description	
	F1	Manual task number. See the following Values and Task Descriptions.	
		Value	Task Description
		0x09	Clear Fault History
		0x0A	Reset Absolute Encoder ⁽¹⁾
		0x0B	Store 2-Group Gain
		0x0C	Reset to Factory settings ⁽²⁾
		0x0D	Test Run
		0x0E	Upgrade Firmware
0x0F	Erase Manufacturing Information		
Response	ACK		
Usage Note	Send ETC command without arguments to find out if a task is completed.		
Next Command	STX ID # ETC : BSS ETX		
Response Format	STX ID \$ BSY : BSS ETX - if task is not complete or STX ID \$ TOK : BSS ETX - task is complete		

(1) Resetting of an absolute (17-bit) encoder is possible only when the drive is disabled. The command Reset Absolute Encoder sets the rotation data to 0, and clears all encoder related faults and warnings.

(2) Parameters in the table below are not affected by the Reset to Factory settings.

Parameter Number	Description
6.00	Analog Velocity Command Offset
6.01	Analog Current Command Offset
6.02	U Phase Current Sensing Offset
6.03	W Phase Current Sensing Offset
7.00 . . . 7.07	Group 7 - Manufacturing Settings

Verify Software Version (VER)

Attribute	Value	
Command	VER	
Description	Verify software version	
Format	STX ID # VER : BSS ETX	
Response Format	STX ID \$ VER V : BSS ETX	
Response Data	Argument	Description
	V: Firmware version Size: 5 bytes, including a space Example: STX01\$VER 1.00:BSS ETX	

Verify Servo Connection (LIV)

Attribute	Value	
Command	LIV	
Description	Verify servo connection	
Format	STX ID # LIV : BSS ETX	
Response Format	ACK if there is a connection	

Read Fault Detailed Data (DIE)

Attribute	Value	
Command	DIE	
Description	Read detailed fault data stored in [Pr - 6.07] Fault Detail Data Selection 1. Sample period in $\mu\text{s} = [\text{Pr} - 6.07] * 200$. See Read Fault Contents (EHY) on page 41 for alternative fault data.	
Format	STX ID # DIE A1 A2 : BSS ETX	
Data	Argument	Description
	A1	Channel to get the data for. Range 1...4 Channels are stored in [Pr - 6.07]...[Pr - 6.10], Fault Detail Data Selection 4
	A2	Data Number; Range 0...50 0 means all data
Usage Note	Send DIE 02 00 to receive all the data for A1= 02. Send DIE 00 01 to receive data for data number 1 of 4 variables. DIE 00 00 is invalid.	
Response Format	STX ID \$ DIE D1&D2&...DN : BSS ETX	
Error Response	STX ID \$ DIE FFFF : BSS ETX means data number is invalid.	
Response Data	Argument	Description
	D1...Dn	Detailed data, where n depends on A1 and A2 If A1=00 and A2 = 01, then n = 4 If A1=01...04 and A2 = 01...50, then n=1 If A1=01...04 and A2 = 00, then n= 50

Enable Drive (SVRON)

Attribute	Value
Command	SVRON
Description	Enables the drive
Format	STX ID # SVRON : BSS ETX
Response	ACK

Disable Drive (SVROF)

Attribute	Value
Command	SVROF
Description	Disables the drive
Format	STX ID # SVROF : BSS ETX
Response	ACK

Reset Drive (HWR)

Attribute	Value
Command	HWR
Description	Reset the drive by using watchdog counter.
Format	STX ID # HWR : BSS ETX
Response	ACK
Usage Note	Stops the watchdog timer, allowing a hardware signal to reboot (reset) the drive.

Notes:

Standard Drive Parameters

Parameters control Kinetix 3 drive operations. They are grouped by the type of drive, Standard or Indexing, and the settings they define.

Descriptions of Indexing Drive Parameters begin on [page 113](#).

Parameter Groupings

Standard drive parameters are grouped into these drive settings:

- Group 0 - Basic drive system and I/O settings
- Group 1 - Gain and gain tuning settings
- Group 2 - Velocity control settings
- Group 3 - Position control settings
- Group 4 - Torque control settings
- Group 5 - Supplementary drive system and I/O settings
- Group 6 - Supplementary gain settings and fault reports
- Group 7 - Factory default settings
- Group 8 - Parameters reserved
- Group 9 - Motor and drive operating mode parameters

Parameter Descriptions

Parameter descriptions list the size of each parameter and the data options within the parameter.

Descriptions of Indexing Drive Parameters begin on [page 113](#).

Group 0 - System Level

[Pr - 0.00]	Operations Mode	
Ultraware Name	Operation Modes (Main/Override)	
Range	1...12	
Display (Value)	Normal operating mode	Override operating mode
F (1)	Follower	Follower
S (2)	Analog Velocity Input	Analog Velocity Input
C (3)	Analog Current Input	Analog Current Input
SF (4)	Analog Velocity Input	Follower
CF (5)	Analog Current Input	Follower
CS (6)	Analog Current Input	Analog Velocity Input
P (7)	Preset Velocity	Preset Velocity
PF (8)	Preset Velocity	Follower
PS (9)	Preset Velocity	Analog Velocity Input
PC (10)	Preset Velocity	Analog Current Input
D (11)	Reserved	Reserved
I (12)	Indexing	Indexing
Default	1	
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	
Modbus Address	0	
[Pr - 0.01]	Reserved	
	Reserved for future use.	

[Pr - 0.02]	Motor Basic Modes	
Data Size	4 digits	
Digit 0	Fault and Disable Braking	
Ultraware Name	Stopping Functions: Fault and Disable Braking	
Range	Value	Description
	0x0	Brake and hold
	0x1	Brake and release
	0x2	Free stop
	0x3	Free stop and hold
Default	0	
Digit 1	Overtravel stop method	
Ultraware Name	Stopping Functions: Over Travel Stop Method	
Range	Value	Description
	0x0	Stop by change of mode to Normal Current. Set stopping current with Overtravel Current Limit parameter [Pr - 4.05] .
	0x1	Dynamic Brake
Default	0	
Digit 2	Motor Forward Dir	
Ultraware Name	Command Polarity	
Range	Value	Description
	0x0	The command signal is not inverted so that a positive command value results in clockwise rotation, as viewed from shaft end.
	0x1	The command signal is inverted so that a positive command value results in counter-clockwise rotation, as viewed from shaft end.
Default	0	
Digit 3	Power input	
Ultraware Name	AC Line Loss Check	
Range	Value	Description
	0x0	Enables the following: <ul style="list-style-type: none"> 50...400W drive: Enable single-phase open check 800...1.5kW drive: Enable three-phase open check
	0x1	Disable
	0x2	Single-phase input
Default	0	
When Enabled	Servo-Off -> Setting	
Applicable Operating Mode	All	
Modbus Address	3	

[Pr - 0.03]		Auto Tuning Functions	
Data Size	4 digits		
Digit 0	Off-line Tuning Mode		
Ultraware Name	Off-line Tuning Mode		
Range	Value	Description	
	0x0	Inertia Moment Estimation	
	0x1	Inertia Moment Estimation and Resonant Frequency Detection	
	0x2	Resonance frequency Detection	
Default	1		
Digit 1	Reserved		
Digit 2	Autotuning Speed		
Ultraware Name	Autotuning Speed		
Range	2...9		
Default	7		
Units	rpm/100		
Digit 3	Dynamic Tuning Response Speed		
Ultraware Name	Online Tuning Response		
Range	Value	Description	
	0x0	Off	
	0x1	Slowest	
	0x2	Slower	
	0x3	Slow	
	0x4	Medium-Slow	
	0x5	Medium	
	0x6	Medium-Fast	
	0x7	Fast	
	0x8	Faster	
	0x9	Fastest	
Default	0		
Units	-		
When Enabled	Servo-Off -> Setting		
Applicable Operating Mode	All		
Modbus Address	4		

(Internal value used for Modbus reading/writing functions) (Internal value used for Modbus reading/writing functions)

[Pr - 0.04]	Inertia Ratio	
Description	Load Inertia / Motor Inertia	
Ultraware Name	Inertia Ratio	
	Internal Value ⁽¹⁾	Display Value
Range	0...6000	0...60.00
Default	100	1.00
Units	(Load inertia/Motor inertia)*100	Load inertia/Motor inertia
When Enabled	Immediately	
Applicable Operating Mode	All	
Modbus Address	5	

(1) Internal value used for Modbus reading/writing functions

[Pr - 0.05]	Auxiliary Function Selection 1	
Applicable Operating Mode	All	
Data Size	4 digits	
Digit 0	Encoder Back-up Battery	
Ultraware Name	Encoder Back-up Battery	
Range	Value	Description
	0x0	Battery Installed
	0x1	Battery Not Installed
Default	0	
Digit 1	Velocity Observer	
Ultraware Name	Velocity Observer	
Range	Value	Description
	0x0	Disable
	0x1	Enable
Default	0	
Digit 2	Alternative Gain Change Enable	
Ultraware Name	Gain Change Enable	
Range	Value	Description
	0x0	Disable
	0x1	Enable
Default	0x0	
Digit 3	Emergency stop input	
Range	Value	Description
	0x0	Disable
	0x1	Enable
Default	0	
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	
Modbus Address	6	

[Pr - 0.06]	Auxiliary Function Selection 2	
Applicable Operating Mode	All	
Data Size	3 digits	
Digit 0	Automatic Motor Identification	
Ultraware Name	Auto Motor Identification	
Range	Value	Description
	0x0	Disabled
	0x1	Enabled
Default	1	
Digit 1	Incremental Feedback Loss (Encoder Line Break Detection)	
Ultraware Name	Incremental Feedback Loss	
Range	Value	Description
	0x0	Monitored
	0x1	Ignored
Default	0	
Digit 2	Mode of Gain Switching	

[Pr - 0.06]	Auxiliary Function Selection 2 (continued)	
Range	Value	Description
	0	Fixed to the 1st gain
	1	Fixed to 2nd gain
	2	2nd gain selection when the gain switching input is turned on.
	3	2nd gain selection when the toque command is larger than the set-up levels of the gain control switching and hysteresis of control switching.
	4	2nd gain selection when the command speed is larger than the set-up levels of the gain control switching and hysteresis of control switching.
	5	2nd gain selection when the positional deviation is larger than the setup set-up levels of the gain control switching and hysteresis of control switching.
	6	2nd gain selection when more then one command pulse exist between 200 μ s.
	7	2nd gain selection when the positional deviation counter value exceeds the set-up of the positioning complete range.
	8	2nd gain selection when the motor actual speed exceeds the set-up levels of the gain control switching and hysteresis of control switching). Switches to the 2nd gain while the position command exists.
	9	Switches to the 1st gain when no-position command status lasts for the set up of delay time of gain switching [x 200 μ s] and the speed falls slower than the set-up levels of the gain control switching level and hysteresis of control switching.
Default	0	
When Enabled	Immediately	
Applicable Operating Mode	All	
Modbus Address	7	

[Pr - 0.07]	Drive Address
Applicable Operating Mode	All
Ultraware Name	Drive Address
Range	1...248
Default	248
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	8

[Pr - 0.08]	Password
Applicable Operating Mode	All
Ultraware Name	Drive Password
Range	0...9999 Usage Note. Unprotected Code: 777
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	9

[Pr - 0.09]	Serial Port Configuration	
Applicable Operating Mode	All	
Data Size	4 digits	
Digit 0	Baud Rate	
Ultraware Name	Baud Rate	
Range	Value	Description
	0x0	9600 bps
	0x1	14400 bps
	0x2	19200 bps
	0x3	38400 bps
	0x4	56000 bps
	0x5	57600 bps
Default	0x5 for Ultraware connection 0x2 for 1203-USB connection	
Digit 1	Data bits, Parity, Stop bit	
Ultraware Name	Data bits, Parity, Stop bit	
Range	Value	Description
	0x0	8, No, 1
	0x1	8, Even, 1
	0x2	8, Odd, 1
	0x3	8, No, 2
	0x4	8, Even, 2
	0x5	8, Odd, 2

[Pr - 0.09]		Serial Port Configuration (continued)	
Default	0x0		
Digit 2	Protocol		
Ultraware Name	Protocol		
Range	Value	Description	
	0x0	ASCII	
	0x1	Modbus-RTU	
Default	0 for Ultraware connection 1 for 1203-USB connection		
Digit 3	Communication Method		
Ultraware Name	Communication Method		
Range	Value	Description	
	0	RS232	
	1	RS485	
Default	0 for Ultraware connection 1 for 1203-USB connection		
When Enabled	Immediately		
Applicable Operating Mode	All		
Modbus Address	10		

[Pr - 0.10]		Allocation of Input Signals 1	
Range for all digits	0...B, where 0 is Off, B is On and 1...A are digital inputs		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Drive enable (SV-ON)	0x1	ON
1	Positive overtravel (P-OT)	0xb	ON
2	Negative overtravel (N-OT)	0xb	ON
3	Integrator inhibit (CON)	0x4	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	All		
Modbus Address	11		

(1) [Refer to Setting Values for Parameters \[Pr - 0.10\]...\[Pr - 0.21\] on page 61.](#)

[Pr - 0.11]	Allocation of Input Signals 2		
Range for all digits	0...B, where 0 is Off, B is On and 1...A are digital inputs		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Fault reset (A-RST)	0x5	OFF
1	Negative current limit (N-TL)	0x6	OFF
2	Positive current limit (P-TL)	0x7	OFF
3	Operation mode override (C-SEL)	0x0	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	All		
Modbus Address	12		

(1) [Refer to Setting Values for Parameters \[Pr - 0.10\]...\[Pr - 0.21\] on page 61.](#)

[Pr - 0.12]	Allocation of Input Signals 3		
Range for all digits	0...B, where 0 is Off, B is On and 1...A are digital inputs		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Preset direction (C-DIR)	0x0	OFF
1	Preset select 1 (C-SP1)	0x0	OFF
2	Preset select 2 (C-SP2)	0x0	OFF
3	Preset select 3 (C-SP3)	0x0	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	All		
Modbus Address	13		

(1) [Refer to Setting Values for Parameters \[Pr - 0.10\]...\[Pr - 0.21\] on page 61.](#)

[Pr - 0.13]	Allocation of Input Signals 4		
Range for all digits	0...B, where 0 is Off, B is On and 1...A are digital inputs		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Zero speed clamp enable (Z-CLP)	0x0	OFF
1	Pause follower (INHIBIT)	0x0	OFF
2	Alternate gain select (G-SEL)	0x0	OFF
3	Position clear (PCLR)	0x0	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	All		
Modbus Address	14		

(1) [Refer to Setting Values for Parameters \[Pr - 0.10\]...\[Pr - 0.21\] on page 61.](#)

[Pr - 0.14]	Allocation of Input Signals 5		
Range for all digits	0...B where 0 is Off, B is On, and 1...A are digital inputs		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Position strobe (ABS-DT)	0x0	OFF
1	Motor moving enable (START)	0x0	OFF
2	Analog speed command select (C-SP4)	0x0	OFF
3	2nd electronic gear bank selection (GEAR)	0x0	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	All		
Modbus Address	15		

(1) [Refer to Setting Values for Parameters \[Pr - 0.10\]...\[Pr - 0.21\] on page 61.](#)

[Pr - 0.15]	Allocation of Input Signals 6		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Reset multi-turn data of absolute encoder (R_ABS)	0x0	OFF
1	Gain bank select (BANK_SEL)	0x0	OFF
2	Reserved	0x0	OFF
3	Reserved	0x0	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	All		
Modbus Address	16		

(1) [Refer to Setting Values for Parameters \[Pr - 0.10\]... \[Pr - 0.21\] on page 61.](#)

[Pr - 0.16]	Allocation of Input Signals 7		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Home sensor (H_SENS)	0x0	OFF
1	Start homing (SHOME)	0x0	OFF
2	Stop indexing (STOP)	0x0	OFF
3	Pause indexing (PAUSE)	0x0	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	Indexing		
Modbus Address	17		

(1) [Refer to Setting Values for Parameters \[Pr - 0.10\]... \[Pr - 0.21\] on page 61.](#)

[Pr - 0.17]	Allocation of Input Signals 8		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Index select 0 input (I_SEL0)	0x0	OFF
1	Index select 1 input (I_SEL1)	0x0	OFF
2	Index select 2 input (I_SEL2)	0x0	OFF
3	Index select 3 input (I_SEL3)	0x0	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	Indexing		
Modbus Address	18		

(1) [Refer to Setting Values for Parameters \[Pr - 0.10\]... \[Pr - 0.21\] on page 61.](#)

[Pr - 0.18]	Allocation of Input Signals 9		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Index select 4 input (I_SEL4)	0x0	OFF
1	Index select 5 input (I_SEL5)	0x0	OFF
2	Stop homing (H_STOP)	0x0	OFF
3	Start index (START_I)	0x0	OFF
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	Indexing		
Modbus Address	19		

(1) [Refer to Setting Values for Parameters \[Pr-0.10\]...\[Pr-0.21\] on page 61.](#)

[Pr - 0.19]	Allocation of Input Signals 10		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Reserved	0x0	OFF
1	Reserved	0x0	OFF
2	Reserved	0x0	OFF
3	Reserved	0x0	OFF
When Enabled	Reserved		
Applicable Operating Mode	Indexing		
Modbus Address	20		

[Pr - 0.20]	Allocation of Input Signals 11		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Reserved	0x0	OFF
1	Reserved	0x0	OFF
2	Reserved	0x0	OFF
3	Reserved	0x0	OFF
When Enabled	Reserved		
Applicable Operating Mode	Indexing		
Modbus Address	21		

[Pr - 0.21]	Allocation of Input Signals 12		
Data Size	4 digits		
Digit	Description	Default	Unmapped IO Status
0	Reserved	0x0	OFF
1	Reserved	0x0	OFF
2	Reserved	0x0	OFF
3	Reserved	0x0	OFF
When Enabled	Reserved		
Applicable Operating Mode	Indexing		
Modbus Address	22		

Table 1 - Setting Values for Parameters [Pr - 0.10]...[Pr - 0.21]

Setting Value ⁽¹⁾	B	A	9	6	7	6	5	4	3	2	1	0
Input Channel No.	Input Signal	19	9	8	7	6	5	4	3	2	1	Input Signal
CN1 Pin No.	On	26	27	29	9	8	7	6	5	4	3	Off

(1) Setting values are reserved (not available) for [\[Pr - 0.19\]](#) and [\[Pr - 0.20\]](#).

[Pr - 0.22]	Allocation of Output Signals 1	
Range for all digits	0...3, where 0 is Off and 1...6 are digital outputs	
Data Size	4 digits	
Digit	Description	Default
0	Within position window (P-COM)	0x1
1	Up to speed (TG-ON)	0x2
2	Brake control (BK)	0x3
3	Within speed window (V-COM)	0x0
When Enabled	Servo-Off -> Setting ⁽¹⁾	
Applicable Operating Mode	All	
Modbus Address	23	

(1) Refer to [Setting Values for Parameters \[Pr - 0.22\]...\[Pr - 0.32\]](#) on page 66.

[Pr - 0.23]	Allocation of Output Signals 2	
Range for all digits	0...3, where 0 is Off and 1...6 are digital outputs	
Data Size	4 digits	
Digit	Description	Default
0	Current limited (T_LMT)	0x0
1	Velocity limited (V-LMT)	0x0
2	Near position (NEAR)	0x0
3	Warning (WARN)	0x0
When Enabled	Servo-Off -> Setting ⁽¹⁾	
Applicable Operating Mode	All	
Modbus Address	24	

(1) Refer to [Setting Values for Parameters \[Pr-0.22\]...\[Pr-0.32\] on page 66](#).

[Pr - 0.24]	Allocation of Output Signals 3	
Range for all digits	0...3, where 0 is Off and 1...6 are digital outputs	
Data Size	4 digits	
Digit	Description	Default
0	Absolute position valid (A_VLD)	0x0
1	Ready	0x0
2	Reserved	0x0
3	Reserved	0x0
When Enabled	Servo-Off -> Setting ⁽¹⁾	
Applicable Operating Mode	All	
Modbus Address	25	

(1) Refer to [Setting Values for Parameters \[Pr-0.22\]...\[Pr-0.32\] on page 66](#).

[Pr - 0.25]	Allocation of Output Signals 4	
Range for all digits	0...3, where 0 is Off and 1...6 are digital outputs	
Data Size	4 digits	
Digit	Description	Default
0	In Motion (IMO)	0x0
1	In Dwell (I_DW)	0x0
2	Axis Homed (HOMC)	0x0
3	Index Select 0 Out (O_ISEL0)	0x0
When Enabled	Servo-Off -> Setting ⁽¹⁾	
Applicable Operating Mode	Indexing	
Modbus Address	26	

(1) Refer to [Setting Values for Parameters \[Pr - 0.22\]...\[Pr - 0.32\]](#) on page 66.

[Pr - 0.26]		Allocation of Output Signals 5	
Range for all digits	0 . . . 3, where 0 is Off and 1 . . . 6 are digital outputs		
Data Size	4 digits		
Digit	Description	Default	
0	Index Select 1 Out (O_ISEL1)	0x0	
1	Index Select 2 Out (O_ISEL2)	0x0	
2	Index Select 3 Out (O_ISEL3)	0x0	
3	Index Select 4 Out (O_ISEL4)	0x0	
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	Indexing		
Modbus Address	27		

(1) Refer to [Setting Values for Parameters \[Pr-0.22\]...\[Pr-0.32\] on page 66](#).

[Pr - 0.27]		Allocation of Output Signals 6	
Range for all digits	0 . . . 3, where 0 is Off and 1 . . . 6 are digital outputs		
Data Size	4 digits		
Digit	Description	Default	
0	Index Select 5 Out (O_ISEL5)	0x0	
1	End of Sequence (E_SEQU)	0x0	
2	Reserved	0x0	
3	Reserved	0x0	
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	Indexing		
Modbus Address	28		

(1) Refer to [Setting Values for Parameters \[Pr-0.22\]...\[Pr-0.32\] on page 66](#).

[Pr - 0.28]		Allocation of Output Signals 7	
Range for all digits	0 . . . 3, where 0 is Off and 1 . . . 6 are digital outputs		
Data Size	4 digits		
Digit	Description	Default	
0	Reserved	0x0	
1	Reserved	0x0	
2	Reserved	0x0	
3	Reserved	0x0	
When Enabled	Reserved		
Applicable Operating Mode	Indexing		
Modbus Address	29		

[Pr - 0.29]	Allocation of Output Signals 8	
Range for all digits	0...3, where 0 is Off and 1...6 are digital outputs	
Data Size	4 digits	
Digit	Description	Default
0	Reserved	0x0
1	Reserved	0x0
2	Reserved	0x0
3	Reserved	0x0
When Enabled	Reserved	
Applicable Operating Mode	Indexing	
Modbus Address	30	

[Pr - 0.30]	Allocation of Output Signals 9	
Range for all digits	0...3, where 0 is Off and 1...6 are digital outputs	
Data Size	4 digits	
Digit	Description	Default
0	Reserved	0x0
1	Reserved	0x0
2	Reserved	0x0
3	Reserved	0x0
When Enabled	Reserved	
Applicable Operating Mode	Indexing	
Modbus Address	31	

[Pr - 0.31]		Allocation of Output Signals 10	
Range for all digits	0...3, where 0 is Off and 1...6 are digital outputs		
Data Size	4 digits		
Digit	Description	Default	
0	Reserved	0x0	
1	Reserved	0x0	
2	Reserved	0x0	
3	Reserved	0x0	
When Enabled	Reserved		
Applicable Operating Mode	Indexing		
Modbus Address	32		

[Pr - 0.32]		I/O Control Authority	
Applicable Operating Mode	All		
Data Size	2 digits		
Digit 0	Modbus Input Function Control		
Ultraware Name	Modbus Input Function Control		
Range	Value	Description	
	0x0	Disable	
	0x1	Enable	
Default	0		
Digit 1	Modbus Run Function Control		
Ultraware Name	Modbus Run Function Control		
Range	Value	Description	
	0x0	Disable	
	0x1	Enable	
Default	0		
When Enabled	Servo-Off -> Setting ⁽¹⁾		
Applicable Operating Mode	All		
Modbus Address	33		

(1) Refer to [Setting Values for Parameters \[Pr - 0.22\]...\[Pr - 0.32\]](#) in the table immediately below.

Setting Values for Parameters [Pr - 0.22]...[Pr - 0.32]							
Setting Value ⁽¹⁾	6	5	4	3	2	1	0
Input Channel No.	AL #3	AL #2	AL#1	DO#3	DO#2	DO#1	Input Signal
CN1 Pin No.	39	38	37	47,48	43,44	41,42	Off

(1) Setting Values are reserved (not available) for [\[Pr - 0.28\]](#) and [\[Pr - 0.31\]](#).

Group 1 - Gain Control

[Pr - 1.00]	Velocity Regulator Response Level
Ultraware Name	Velocity Regulator Response level
Range	1...150
Default	50
Units	%
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	100

[Pr - 1.01]	System Gain
Ultraware Name	System Gain
Range	10...500
Default	50
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	101

[Pr - 1.02]	Velocity Regulator P Gain
Ultraware Name	Main Velocity Regulator Gains: Proportional Gain
Range	0...10,000
Default	60
Units	-
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Speed, Preset
Modbus Address	102

[Pr - 1.03]	Velocity Regulator I Gain
Ultraware Name	Main Velocity Regulator Gains: Integral Gain
Range	0...60,000
Default	26
Units	-
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Speed, Preset
Modbus Address	103

[Pr - 1.04]	Velocity Regulator D gain
Ultraware Name	Main Velocity Regulator Gains: Derivative Gain
Range	0 . . . 1000
Default	0
Units	-
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Speed, Preset
Modbus Address	104

[Pr - 1.05]	Velocity Error Filter
Ultraware Name	Calibration: Error Filter Bandwidth
Range	0 . . . 2500
Default	30
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Speed, Preset
Modbus Address	105

[Pr - 1.06]	Position Regulator Kp Gain
Ultraware Name	Main Position Regulator Gains: Kp
Range	0 . . . 700
Default	20
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Speed, Preset
Modbus Address	106

[Pr - 1.07]	Current Command Lowpass Filter Bandwidth
Ultraware Name	Main Current Regulator Gains: Low Pass Filter Bandwidth
Range	0 . . . 10,000
Default	300
Units	Hz
Applicable Operating Mode	All
When Enabled	Immediately
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	107

[Pr - 1.08]	Velocity Command Lowpass Filter Bandwidth
Ultraware Name	Main Velocity Regulator Gains: Low Pass Filter Bandwidth
Range	0 . . . 10,000
Default	1000
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Speed, Preset
Modbus Address	108

[Pr - 1.09]	Position Command Lowpass Filter Bandwidth
Ultraware Name	Main Position Regulator Gains: Low Pass Filter Bandwidth
Range	0 . . . 1000
Default	0
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	Follower
Modbus Address	109

[Pr - 1.10]	1st Resonant Frequency Suppression Filter
Ultraware Name	Main Current Regulator Gains: 1st Resonant Frequency Suppression Filter
Description	Suppresses Vibration by cutting off Current Command in assigned frequency band
Range	0 . . . 10,000
Default	10,000
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	110

[Pr - 1.11]	1st Resonant Frequency Suppression Filter Width
Ultraparameter Name	Main Current Regulator Gains: 1st Resonant Frequency Suppression Filter Width
Description	Set up the notch width of 1st resonance suppressing filter in 20 steps. Higher the setup, larger the notch width you can obtain.
Range	1...20
Default	10
Units	
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	111

[Pr - 1.12]	2nd Resonant Frequency Suppression Filter
Ultraparameter Name	2nd Main Current Regulator Gains: 2nd Resonant Frequency Suppression Filter
Description	Suppresses Vibration by cutting off Current Command in assigned frequency band
Range	0...10,000
Default	10,000
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	112

[Pr - 1.13]	2nd Resonant Frequency Suppression Filter Width
Ultraparameter Name	Main Current Regulator Gains: 2nd Resonant Frequency Suppression Filter Width
Description	Set up the notch width of 2nd resonance suppressing filter in 20 steps. The higher the setup, larger the notch width you can obtain.
Range	1...20
Default	10
Units	-
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	113

[Pr - 1.14]	2nd Resonant Frequency Suppression Filter Depth
Ultraware Name	Main Current Regulator Gains: 2nd Resonant Frequency Suppression Filter Depth
Description	Set up the 2nd notch depth of the resonance suppressing filter. The higher the setup, the shallower the notch depth and the smaller the phase delay you can obtain.
Range	0 . . . 100
Default	100
Units	-
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	114

[Pr - 1.15]	Position Regulator Kff gain
Ultraware Name	Main Position Regulator Gains: Kff
Range	0 . . . 100
Default	0
Units	%
When Enabled	Immediately
Applicable Operating Mode	Follower
Modbus Address	115

[Pr - 1.16]	Position Regulator Kff Bandwidth
Ultraware Name	Main Position Regulator Gains: Kff Low Pass Filter Bandwidth
Range	0 . . . 2500
Default	200
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	Follower
Modbus Address	116

[Pr - 1.17]	Velocity Regulator I Gain Mode	
Ultraware Name	Main Velocity Regulator Gains: I Gain Mode	
Description	During transient response, Speed Response Overshoot can be suppressed by a speed controller change from a Proportional Integral (PI) controller into a Proportional (P) controller. It reduces position completion time during position control.	
Range	Value	Description
	0x0	Do not use P/PI Mode Conversion.
	0x1	When Current Command exceeds Current Value in [Pr - 1.18], Speed Controller is changed from PI Controller to P Controller.
	0x2	When Speed Command exceeds Speed Value in [Pr - 1.18], Speed Controller is changed from PI Controller to P Controller.
	0x3	When Position error exceeds Position error Value in [Pr - 1.18], Speed Controller is changed from PI Controller to P Controller.
	0x4	Automatically velocity controller is changed from PI Controller to P Controller.
Default	0	
When Enabled	Servo-Off -> Setting	
Applicable Operating Mode	All	
Modbus Address	117	

[Pr - 1.18]	Velocity Regulator I Gain Disable Threshold
Ultraware Name	Main Velocity Regulator Gains: I Gain Disable Threshold
Range	0...3000
Default	100
Units	If [Pr - 1.17] = 1, units are % of rated continuous current If [Pr - 1.17] = 2, units are rotary motors: rpm; linear motors: mm/s If [Pr - 1.17] = 3, units are Counts
When Enabled	Follower, Analog Velocity, Preset
Applicable Operating Mode	Immediately
Modbus Address	118

[Pr - 1.19]	Position Regulator High Error Output Offset
Ultraware Name	Main Position Regulator Gains: High Error Output Offset
Range	0...450
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	All
Applicable Operating Mode	Immediately
Modbus Address	119

[Pr - 1.20]	Position Regulator High Error Output Threshold
Ultraware Name	Main Position Regulator Gains: High Error Output Threshold
Range	0...50,000
Default	1000
Units	Counts
When Enabled	All
Applicable Operating Mode	Immediately
Modbus Address	120

[Pr - 1.21]		Current Regulator Bandwidth Reduction Scale	
Ultraware Name	Main Current Regulator Gains: Gain		
Range	Value	Description	
	0x0	High bandwidth	
	0x1	Medium bandwidth (0.6667 * high)	
	0x2	Low bandwidth (0.3334 * high)	
Default	0x1		
When Enabled	All		
Applicable Operating Mode	Immediately		
Modbus Address	121		

[Pr - 1.22]		On-line Vibration Mode	
Data Size	1 digits		
Digit 0	On-line Vibration Suppression Mode		
Ultraware Name	On-line Vibration Suppression Mode		
Range	Value	Description	
	0x0	Disable	
	0x1	Normal and High Velocity Mode	
	0x2	Slow Velocity Mode without initial value	
Default	0x0		
Digit 1	On-line Vibration Suppression Gain		
Ultraware Name	On-line Vibration Suppression Gain		
Range	Value	Description	
	0x0	Low	
	0x1	High	
Default	0x0		
When Enabled	All		
Applicable Operating Mode	Servo-Off -> Setting		
Modbus Address	122		

[Pr - 1.23]	Velocity Regulator Configuration	
Applicable Operating Mode	All	
Data Size	1 digits	
Digit 0	Velocity Command Filter on Follower	
Ultraware Name	Velocity Command Filter on Follower	
Range	Value	Description
	0x0	Disable
	0x1	Enable
Default	0x0	
When Enabled	Immediately	
Applicable Operating Mode	Servo-Off -> Setting	
Modbus Address	123	

[Pr - 1.24]	Delay Time of Gain Switching	
Ultraware Name	Gain Switching: Delay Time of Gain Switching	
Range	0...10,000	
Default	0	
Units	X 200 µs	
When Enabled	Immediately	
Applicable Operating Mode	Follower, Analog Velocity, Preset	
Modbus Address	124	

[Pr - 1.25]	Level of Gain Switching	
Ultraware Name	Gain Switching: Level of Gain Switching	
Range	0...10,000	
Default	0	
Units	-	
When Enabled	Immediately	
Applicable Operating Mode	Follower, Analog Velocity, Preset	
Modbus Address	125	

[Pr - 1.26]	Hysteresis of Gain Switching
Ultraparameter Name	Gain Switching: Hysteresis of Gain Switching
Range	0 . . . 10,000
Default	0
Units	-
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	126

[Pr - 1.27]	Position Gain Switching Time
Ultraparameter Name	Gain Switching: Level of Gain Switching
Range	0 . . . 10,000
Default	0
Units	x 200 μ s
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	127

[Pr - 1.28]	2nd Velocity Regulator P Gain
Ultraparameter Name	2nd Regulator Gain: P
Range	0 . . . 10,000
Default	60
Units	-
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	128

[Pr - 1.29]	2nd Velocity Regulator I Gain
Ultraparameter Name	2nd Regulator Gain: Integrator Gain
Range	0 . . . 60,000
Default	26
Units	-
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	129

[Pr - 1.30]	2nd Position Regulator Kp Gain
Ultraware Name	2nd Regulator Gain: Kp
Range	0...700
Default	20
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	Position
Modbus Address	130

[Pr - 1.31]	2nd Current Command Lowpass Filter Bandwidth
Ultraware Name	2nd Regulator Gain: Low Pass Bandwidth (IReg)
Range	0...10,000
Default	300
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	131

[Pr - 1.32]	2nd Velocity Command Lowpass Filter Bandwidth
Ultraware Name	2nd Regulator Gain: Low Pass Bandwidth (VReg)
Range	0...10,000
Default	1000
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	132

[Pr - 1.33]	3rd Velocity Regulator P Gain
Ultraware Name	3rd Regulator Gain: P Gain
Range	0...10,000
Default	60
Units	-
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	133

[Pr - 1.34]	3rd Velocity Regulator I Gain
Ultraware Name	3rd Regulator Gain: Integrator Gain
Range	0 . . . 60,000
Default	26
Units	-
When Enabled Immediately	Immediately
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	134

[Pr - 1.35]	3rd Position Regulator Kp Gain
Ultraware Name	3rd Regulator Gain: Kp
Range	0 . . . 700
Default	20
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	Position
Modbus Address	135

[Pr - 1.36]	3rd Current Command Lowpass Filter Bandwidth
Ultraware Name	3rd Regulator Gain: Low Pass Bandwidth (IReg)
Range	0 . . . 10,000
Default	300
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	136

[Pr - 1.37]	3rd Velocity Command Lowpass Filter Bandwidth
Ultraware Name	3rd Regulator Gain: Low Pass Bandwidth (VReg)
Range	0 . . . 10,000
Default	1000
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	137

[Pr - 1.38]	4th Velocity Regulator P Gain
Ultraware Name	4th Regulator Gain: P
Range	0...10,000
Default	60
Units	-
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	138

[Pr - 1.39]	4th Velocity Regulator I Gain
Ultraware Name	4th Regulator Gain: Integrator Gain
Range	0...60,000
Default	26
Units	
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	139

[Pr - 1.40]	4th Position Regulator Kp Gain
Ultraware Name	4th Regulator Gain: Kp
Range	0...700
Default	20
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	Position
Modbus Address	140

[Pr - 1.41]	4th Current Command Lowpass Filter Bandwidth
Ultraware Name	4th Regulator Gain: Low Pass Bandwidth (IReg)
Range	0...10,000
Default	300
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	141

[Pr - 1.42]	4th Velocity Command Lowpass Filter Bandwidth
Ultraware Name	4th Regulator Gain: Low Pass Bandwidth (VReg)
Range	0 . . . 10,000
Default	1000
Units	Hz
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	142

Group 2 - Speed Control

[Pr - 2.00]	Velocity Scale	
Ultraware Name	Velocity Scale	
	Internal Value ⁽¹⁾	Display Value
Range	100...20,000	10.0...2000.0
Default	5000	500.0
Units	Rotary motors: 0.1 rpm/V Linear motors: 0.1 mm/s/V	Rotary motors: rpm/V Linear motors: mm/s/V
When Enabled	Servo-Off -> Setting	
Applicable Operating Mode	Analog Velocity	
Modbus Address	200	

(1) Internal Value used for Modbus reading and writing functions

[Pr - 2.01]	Jog Velocity Command
Ultraware Name	Velocity Control Panel: Velocity Command
Range	0...6000
Default	50
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	201

[Pr - 2.02]	Acceleration
Ultraware Name	Acceleration Limits: Acceleration
Range	1...2,147,483,647
Default	41,667
Units	Rotary motors: 10 ⁻² *rev/s ² ; Linear motors: mm/s ²
When Enabled	Immediately
Applicable Operating Mode	Analog Velocity Input, Preset Velocity
Modbus Address	Pr-2.02[Lo] = 202, Pr-2.02[Hi] = 203

[Pr - 2.03]	Deceleration
Ultraware Name	Acceleration Limits: Deceleration
Range	1 . . . 2,147,483,647
Default	41667
Units	Rotary motors: 10 ⁻² *rev/s ² ; Linear motors: mm/s ²
When Enabled	Immediately
Applicable Operating Mode	Analog Velocity Input, Preset Velocity
Modbus Address	Pr-2.03[Lo] = 204, Pr-2.03[Hi] = 205

[Pr - 2.04]	S-Curve Time
Ultraware Name	Acceleration Limits: S-Curve Time
Range	0 . . . 5000
Default	0
Units	Milliseconds
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	206

[Pr - 2.05]	Preset Velocity 1
Ultraware Name	Preset Velocity 1
Range	-6000 . . . 6000
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	Preset
Modbus Address	207

Pr - 2.06]	Preset Velocity 2
Ultraware Name	Preset Velocity 2
Range	-6000 . . . 6000
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	Preset
Modbus Address	208

Pr - 2.07]	Preset Velocity 3
Ultraware Name	Preset Velocity 3
Range	-6000 . . . 6000
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	Preset
Modbus Address	209

[Pr - 2.08]	Preset Velocity 4
Ultraware Name	Preset Velocity 4
Range	-6000 . . . 6000
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	Preset
Modbus Address	210

[Pr - 2.09]	Preset Velocity 5
Ultraware Name	Preset Velocity 5
Range	-6000 . . . 6000
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	Preset
Modbus Address	211

[Pr - 2.10]	Preset Velocity 6
Ultraware Name	Preset Velocity 6
Control Index	6
Range	-6000 . . . 6000
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	Preset
Modbus Address	212

[Pr - 2.11]	Preset Velocity 7
Ultraware Name	Preset Velocity 7
Range	-6000...6000
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	Preset
Modbus Address	213

[Pr - 2.12]	Manual Velocity Limit
Ultraware Name	Manual Velocity limit
Range	1...6000
Default	5000
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Servo-Off -> Setting
Applicable Operating Mode	Follower, Analog Velocity, Preset
Modbus Address	214

[Pr - 2.13]	Velocity Limit Mode	
Ultraware Name	Velocity Limits: Velocity Limit Mode	
Range	Value	Description
	0x0	Disabled
	0x1	Limited by [Pr - 2.12] .
	0x2	Limited by Analog Speed Command Value (except Analog Speed Mode).
	0x3	Limited by lesser one between [Pr - 2.12] and Analog Speed Command.
Default	0	
When Enabled	Servo-Off -> Setting	
Applicable Operating Mode	All	
Modbus Address	215	

Group 3 - Position Control

[Pr - 3.00]	Follower	
Data Size	4 digits	
Digit 0	Command Type	
Ultraware Name	Command Type	
Range	Value	Description
	0x0	Step Up/Step Down, Positive logic
	0x1	Step Up/Step Down, Negative logic
	0x2	Step/Direction, Positive Logic
	0x3	Step/Direction, Negative Logic
	0x4	Auxiliary Encoder, x1
	0x5	Auxiliary Encoder, x2
	0x6	Auxiliary Encoder, x4
Default	0x0	
Note	For Command types 0x4, 0x5, and 0x6: Motor Counts = Master Lines * MULT * (4 * Para3.01) / Para3.02 where MULT is 1, 2 or 4 for command types 0x4, 0x5 and 0x6 respectively.	
Applicable Operating Mode	Follower	
Digit 1	Controller Output Type	
Ultraware Name	Controller Output Type	
Range	Value	Description
	0x0	Use Low speed Line Drive Output in Host Controller for isolated electrical connection.
	0x1	Use Open Collector in Host Controller.
0x2	Use High Frequency Line Drive Output in Host Controller.	
Default	0x0	
Applicable Operating Mode	Follower	
Digit 2	Encoder Output Forward Direction	
Ultraware Name	Encoder Output Forward Direction	
Range	Value	Description
	0x0	During Forward Rotation, Encoder Output Phase A have a lead of 90° over Phase B.
	0x1	During Forward Rotation, Encoder Output Phase B have a lead of 90° over Phase A.

[Pr - 3.00] (continued)	Follower	
Default	0x0	
Applicable Operating Mode	All	
Digit 3	1st Gear ratio change	
Ultraware Name	1st Gear ratio change	
Range	Value	Description
	0x0	Enable Only on Drive Disabled
	0x1	Always Enable
Default	0x0	
When Enabled	Servo-Off -> Setting	
Applicable Operating Mode	Follower	
Modbus Address	300	

[Pr - 3.01]	1st Gear Ratio, Follower Counts	
Ultraware Name	1st Gear Ratio Numerator	
Range	1...65,535	
Default	4	
Units		
When Enabled	Servo-Off -> Setting	
Applicable Operating Mode	Follower	
Modbus Address	301	

[Pr - 3.02]	1st Gear Ratio, Master Counts
Ultraware Name	1st Gear Ratio Denominator
Range	1...65,535
Default	1
Units	
When Enabled	Servo-Off -> Setting
Applicable Operating Mode	Follower
Modbus Address	302

[Pr - 3.03]	Encoder Output Ratio, Output Counts
Ultraware Name	Output Ratio Numerator
Range	1...32,768
Default	1
Units	
When Enabled	Servo-Off -> Setting
Applicable Operating Mode	All
Modbus Address	303

[Pr - 3.04]	Encoder Output Ratio, Motor Counts
Ultraware Name	Output Ratio Numerator
Range	1...32,768
Default	1
Units	
When Enabled	Servo-Off -> Setting
Applicable Operating Mode	All
Modbus Address	304

[Pr - 3.05]	2nd Gear Ratio, Follower Counts
Ultraware Name	2nd Gear Ratio Numerator
Range	1...65,535
Default	4
Units	
When Enabled	Servo-Off -> Setting
Applicable Operating Mode	Follower
Modbus Address	305

[Pr - 3.06]	2nd Gear Ratio, Master Counts
Ultraware Name	2nd Gear Ratio Denominator
Range	1 . . . 65,535
Default	1
Units	
When Enabled	Servo-Off -> Setting
Applicable Operating Mode	Follower
Modbus Address	306

[Pr - 3.07]	Reserved
When Enabled	Reserved for future use.

[Pr - 3.08]	Digital Filter Cut-off Frequency	
Data Size	3 digits	
Digit 0	Low drive input	
	Value	Description
	0x0 ... 0x7	0: 3 MHz
		1: 1.75 MHz
		2: 1.5 MHz
		3: 1 MHz
		4: 0.75 MHz
		5: 0.625 MHz
		6: 0.562 MHz
		7: 0.525 MHz
Default = 1		
Digit 1	Open collector input	
	Value	Description
	0x0 ... 0x7	0: 3 MHz
		1: 1.75 MHz
		2: 1.5 MHz
		3: 1 MHz
		4: 0.75 MHz
		5: 0.625 MHz
		6: 0.562 MHz
		7: 0.525 MHz
Default = 5		
Digit 2	High frequency line drive input	
	Value	Description
	0x0 ... 0x7	0: 3 MHz
		1: 1.75 MHz
		2: 1.5 MHz
		3: 1 MHz
		4: 0.75 MHz
		5: 0.625 MHz
		6: 0.562 MHz
		7: 0.525 MHz
Default = 0		
When Enabled	Servo-Off -> Setting	
Applicable Operating Mode	All	
Modbus Address	308	

Group 4 - Torque Controls

[Pr - 4.00]	Current Scale	
Ultraware Name	Current Scale	
	Internal Value ⁽¹⁾	Display Value
Range	0...1000	0...100.0
Default	333	33.3
Units	0.1% of rated continuous current/V	% of rated continuous current/V
When Enabled	Servo-Off -> Setting	
Applicable Operating Mode	Analog Current command, Dual current Command	
Modbus Address	400	

(1) Internal Value used for Modbus reading/writing functions

[Pr - 4.01]	Positive Internal Current Limit
Ultraware Name	Current Limits: Positive Internal
Range	0...500
Default	300
Units	% of motor rated continuous current
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	401

[Pr - 4.02]	Negative Internal Current Limit
Ultraware Name	Current Limits: Negative Internal
Range	0...500
Default	300
Units	% of motor rated continuous current
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	402

[Pr - 4.03]	Positive External Current Limit
Ultraware Name	Current Limits: Positive External
Range	0...500
Default	100
Units	% of motor rated continuous current
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	403

Pr - 4.04]	Negative External Current Limit
Ultraware Name	Current Limits: Negative External
Range	0 . . . 500
Default	100
Units	% of motor rated continuous current
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	404

[Pr - 4.05]	Overtravel Current Limit
Ultraware Name	Stopping Functions: Maximum Stopping Current
Range	0 . . . 500
Default	300
Units	% of motor rated continuous current
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	405

[Pr - 4.06]	Initial Current Bias
Ultraware Name	Initial Current Bias
Description	Constant current applied when the drive enables. Meant to hold vertical loads.
Range	-100 . . . 100
Default	0
Units	% of motor rated continuous current
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	406

Group 5 - Supplemental Drive Controls

[Pr - 5.00]	In Position Size
Ultraware Name	Position Functions: In Position Size
Description	If position error < In Position Size for 1 ms and the In Position Size output signal is assigned, the In Position output is turned ON.
Range	0 . . . 2500
Default	10
Units	Counts
When Enabled	Immediately
Applicable Operating Mode	Follower
Modbus Address	500

[Pr - 5.01]	Reserved
When Enabled	Reserved for future use.

[Pr - 5.02]	Near Position Size
Ultraware Name	Position Functions: Near Position Size
Description	If position error < Near Position Size and the Near Position output signal is assigned, the Near Position output is turned ON
Range	0 . . . 2500
Default	20
Units	Counts
When Enabled	Immediately
Applicable Operating Mode	Follower
Modbus Address	502

[Pr - 5.03]	Speed Window
Ultraware Name	Speed Functions: Speed Window
Description	If the speed error < Speed Window for 10 ms and the Within Speed Window output signal is assigned, then the Within Speed Window output is turned ON
Range	0...1000
Default	10
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	Follower, Analog Velocity Input, Preset
Modbus Address	503

[Pr - 5.04]	Up to Speed
Ultraware Name	Speed Functions: Up to Speed
Description	If the motor speed > Up to Speed and the Up to Speed output signal is assigned, then the Up to Speed output is turned ON.
Range	1...5000
Default	20
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	504

[Pr - 5.05]	Zero Clamp
Ultraware Name	Speed Functions: Zero Clamp
Description	If the Analog Speed command < Zero Clamp, then the Analog Speed command is ignored and the Motor Speed command is set to zero.
Range	0...5000
Default	0
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	505

[Pr - 5.06]	Brake Inactive Delay
Ultraware Name	Digital Outputs: Brake Inactive Delay
Description	Brake Inactive delay is the time from when the drive is enabled to when the brake is released.
Range	0 . . . 10,000
Default	0
Units	ms
When Enabled	Immediately
Applicable Operating Mode	Servo-Off -> Setting
Modbus Address	506

[Pr - 5.07]	Disable Delay
Ultraware Name	Stopping Functions: Disable Delay
Description	Disable Delay is the time from when the Drive Disable command is received to when the Drive Disable command is actually executed.
Range	0 . . . 10,000
Default	0
Units	ms
When Enabled	All
Applicable Operating Mode	Servo-Off -> Setting
Modbus Address	507

[Pr - 5.08]	Brake Active Delay
Ultraware Name	Digital Outputs: Brake Active Delay
Description	Brake Active Delay is the time from when the drive is disabled to when the break starts operating.
Range	0 . . . 10,000
Default	500
Units	ms
When Enabled	All
Applicable Operating Mode	Servo-Off -> Setting
Modbus Address	508

[Pr - 5.09]	Disabled Braking Speed
Ultraware Name	Stopping Functions: Braking Application Speed
Description	The Disabled Braking Speed is the feedback speed below which the motor break is engaged, after disabling the drive.
Range	0 . . . 1000
Default	100
Units	Rotary motors: rpm; Linear motors: mm/s
When Enabled	All
Applicable Operating Mode	Servo-Off -> Setting
Modbus Address	509

[Pr - 5.10]	Following Error Limit
Ultraware Name	Following Error Limit
Description	A following error fault occurs when the difference between position command and actual position is greater than this parameter.
Range	0 . . . 2,147,483,647
Default	99,999
Units	Counts
When Enabled	Immediately
Applicable Operating Mode	Follower
Modbus Address	Pr5-10[Lo] = 510, Pr5-10[Hi] = 511

[Pr - 5.11]	Reserved
When Enabled	Reserved for future use.

[Pr - 5.12]	AC line loss fault delay
Ultraware Name	AC Line Loss Fault Delay
Description	The AC Line Loss Fault is inhibited for this amount of time, when a loss of AC power is detected.
Range	20 . . . 1000
Default	20
Units	ms
When Enabled	Servo-Off -> Setting
Applicable Operating Mode	All
Modbus Address	513

[Pr - 5.13]	Analog Output CH1 Selection
Ultraware Name	Analog Output 1: Signal
Range	0...28 (except 15,23,25,26)
Default	0
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	514

[Pr - 5.14]	Analog Output CH2 Selection
Ultraware Name	Analog Output 2: Signal
Range	0...28 (except 15,23,25,26)
Default	1
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	515

[Pr - 5.15]	Analog Output CH1 Scale
Ultraware Name	Analog Output 1: Scale
Range	1...99,999
Units	Units depend on the channel selected in [Pr - 5.13]
Default	500
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	Pr5-15[Lo] = 516, Pr5-15[Hi] = 517

[Pr - 5.16]	Analog Output CH2 Scale
Ultraware Name	Analog Output 2: Scale
Range	1...99,999
Units	Units depends on the channel selected in [Pr - 5.14]
Default	500
When Enabled	Immediately
Applicable Operating Mode	All
Modbus Address	Pr5-16[Lo] = 518, Pr5-16[Hi] = 519

Group 6 - Supplemental Gain and Report Settings

[Pr - 6.00]	Analog Velocity Command Offset
Ultraware Name	Velocity Command Offset
Range	-10,000 . . . 10,000
Default	0
Units	0.1 mV
When Enabled	Servo-Off -> Setting (ENG Mode)
Applicable Operating Mode	Analog Velocity Command

[Pr - 6.01]	Analog Current Command Offset
Ultraware Name	Current Command Offset
Range	-10,000 . . . 10,000
Default	0
Units	0.1 mV
When Enabled	Servo-Off -> Setting (ENG Mode)
Applicable Operating Mode	Analog Current Command

[Pr - 6.02]	U Phase Current Sensing Offset
Ultraware Name	Calibration: U Phase Current Offset
Range	-60,000 . . . 60,000
Default	0
Units	0.01 mA
When Enabled	Servo-Off -> Setting (ENG Mode)
Applicable Operating Mode	All

[Pr - 6.03]	W Phase Current Sensing Offset
Ultraware Name	Calibration: W Phase Current Offset
Range	-60,000 . . . 60,000
Default	0
Units	0.01 mA
When Enabled	Servo-Off -> Setting (ENG Mode)
Applicable Operating Mode	All

[Pr - 6.04]	A lead B Swap
Ultraware Name	A lead B Swap
Description	Select A-lead-B, or B-lead-A
Data Size	1 digit

[Pr - 6.04]	A lead B Swap	
Range	Value	Description
	0	Disable
	1	Enable
Default	0	
Unit	-	
When Enabled	Servo-Off -> Setting -> After power cycle (ENG Mode)	
Applicable Operating Mode	All	

[Pr - 6.05]	Dynamic Brake Circuit Protection	
Ultraware Name	Dynamic Brake Circuit Protection	
Description	The Dynamic Brake Circuit Protection is inhibited that the motor DB braking current is too large for the drive	
Data Size	1 digit	
Range	Value	Description
	0	Disable
	1	Enable
Default	1	
Units	-	
When Enabled	Servo-Off -> Setting (ENG Mode)	
Applicable Operating Mode	All	

[Pr - 6.06]	Fault Detail Sampling Period
Ultraware Name	Fault Detail Setup: Sample Period
Range	1...100
Default	5
Units	0.2 ms
When Enabled	Immediately (ENG Mode)

[Pr - 6.07]	Fault Detail Data Selection 1
Ultraware Name	Fault Detail Setup: Channel A
Description	Refer to Monitor Variables on page 131 for more information on the range options.
Range	0...28 (except 15, 23, 25, and 26)
Default	0
When Enabled	Immediately (ENG Mode)

[Pr - 6.08]	Fault Detail Data Selection 2
Ultraware Name	Fault Detail Setup: Channel B
Description	Refer to Monitor Variables on page 131 for more information on the range options.
Range	0...28 (except 15, 23, 25, and 26)
Default	3
When Enabled	Immediately (ENG Mode)

[Pr - 6.09]	Fault Detail Data Selection 3
Ultraware Name	Fault Detail Setup: Channel C
Description	Refer to Monitor Variables on page 131 for more information on the range options.
Range	0...28 (except 15, 23, 25, and 26)
Default	11
When Enabled	Immediately (ENG Mode)

[Pr - 6.10]	Fault Detail Data Selection 4
Ultraware Name	Fault Detail Setup: Channel D
Description	Refer to Monitor Variables on page 131 for more information on the range options.
Range	0...28 (except 15, 23, 25, and 26)
Default	16
When Enabled	Immediately (ENG Mode)

[Pr - 6.11]	1st Resonant Frequency Suppression Filter
Ultraware Name	Main Current Regulator Gains: 1st Resonant Frequency Suppression Filter
Description	Suppresses Vibration by cutting off Current Command in assigned frequency band
Range	0...10,000
Default	10,000
Units	Hz
When Enabled	Immediately (Read Parameter for ENG)
Applicable Operating Mode	All

[Pr - 6.12]	2nd Resonant Frequency Suppression Filter
Ultraware Name	Main Current Regulator Gains: 1st Resonant Frequency Suppression Filter
Description	Suppresses Vibration by cutting off Current Command in assigned frequency band
Range	0 . . . 10,000
Default	10,000
Units	Hz
When Enabled	Immediately (Read Parameter for ENG)
Applicable Operating Mode	All

Group 7 - Manufacturing Settings

This parameter group includes product settings that are programmed during the manufacturing process.

IMPORTANT Group 7 - Manufacturing Settings are programmed at the factory. Do not modify these settings, as they provide a common drive setup that is useful when you do either of the following:

- Develop a drive system or troubleshooting a drive.
- Seek assistance through Rockwell Automation Technical Support.

[Pr - 7.00]	Drive Capacity
Ultraware Name	Drive Model
Range	50...1500
Default	Factory settings determine default.
Units	W
When Enabled	Servo-Off -> Setting -> After power cycle (ENG mode)
Applicable Operating Mode	All

[Pr - 7.01]	DC Bus Voltage Offset
Ultraware Name	Calibration: DC Bus Voltage Offset
Range	-100...100
Default	0
Units	V
When Enabled	Servo-Off -> Setting -> After power cycle (ENG mode)
Applicable Operating Mode	All

[Pr - 7.02]	Reserved
When Enabled	Reserved for future use.

[Pr - 7.03]	Analog Monitor Output CH1 Offset
Ultraware Name	Calibration: Analog Output CH1 Offset
Range	-1000...1000
Default	0
Units	mV
When Enabled	Servo-Off -> Setting -> After power cycle, (ENG mode)
Applicable Operating Mode	All

[Pr - 7.04]	Analog Monitor Output CH1 Scaling
Ultraware Name	Calibration: Analog Output CH1 Scale
Range	-1000...1000
Default	0
Units	-
When Enabled	Servo-Off -> Setting -> After power cycle (ENG mode)
Applicable Operating Mode	All

[Pr - 7.05]	Analog Monitor Output CH2 Offset
Ultraware Name	Calibration: Analog Output CH2 Offset
Range	-1000...1000
Default	0
Units	mV
When Enabled	Servo-Off -> Setting -> After power cycle (ENG mode)
Applicable Operating Mode	All

[Pr - 7.06]	Analog Monitor Output CH2 Scaling
Ultraware Name	Calibration: Analog Output CH2 Scale
Range	-1000...1000
Default	0
Units	-
When Enabled	Servo-Off -> Setting -> After power cycle (ENG mode)
Applicable Operating Mode	All

[Pr - 7.07]	DC Bus Measurement Scaling Calibration
Ultraware Name	Calibration: DC Bus ADC Calibration
Description	This parameter is a calibration adjustment to the ideal ADC scaling. The scaling adjustment range is -100% to +100%, so the ADC scaling can be adjusted from 2* the ideal scaling to zero.
Range	-1000...1000
Default	0 (no adjustment)
Units	0.001
When Enabled	Servo-Off -> Setting -> After power cycle (ENG mode)
Applicable Operating Mode	All

Group 8 - Reserved Parameters

Group 8 parameters are reserved.

Group 9 - Motor Controls

[Pr - 9.00]	Standard Motor Flag	
Ultraware Name	General: Motor Flag	
Range	Value	Description
	0	Custom
	1	Standard
Default	1	
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	

[Pr - 9.01]	Motor Type	
Ultraware Name	General: Motor Type	
Range	Value	Description
	0	Rotary
	1	Linear
	2	Reserved
	3	Reserved
Default	0	
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	

[Pr - 9.02]	Motor Resistance	
Ultraware Name	Electrical: Resistance	
Range	1...65,535	
Units	Ohms * 256	
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	

[Pr - 9.03]	Motor Inductance	
Ultraware Name	Electrical: Inductance	
Range	1...65,535	
Units	mH *256	
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	

[Pr - 9.04]	Motor Intermittent Current	
Ultraware Name	Ratings: Intermittent Current	
Range	1...32,767	

[Pr - 9.04]	Motor Intermittent Current
Units	A * 128
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.05]	Motor Continuous Current
Ulaware Name	Ratings: Continuous Current
Range	1...32,767
Units	A * 128
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.06]	Motor Rated Voltage
Ulaware Name	Electrical: Rated Voltage
Range	10...1000
Units	V
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.07]	Encoder Type	
Ulaware Name	Feedback: Encoder	
Range	Value	Description
	1	Incremental
	4	Serial Incremental
	5	Serial Absolute
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	

[Pr - 9.08]	Hall Offset
Ulaware Name	Feedback: Hall Input Offset
Range	0...359
Units	Electrical degree
When Enabled	Servo-Off -> Setting -> After power cycle

[Pr - 9.09]	Current Constant
Ulaware Name	General: Torque Constant
Range	1...65,535

[Pr - 9.09]	Current Constant
Units	N * m / A * 4096
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.10]	Motor Inertia
Ultraware Name	General: Inertia
Range	1...2,147,483,647
Units	Kg*cm ² * 65,536
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.11]	Poles/Revolution
Ultraware Name	General: Poles/Revolution
Range	2...100
Units	Poles
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.12]	Encoder Lines / Revolution
Ultraware Name	General: Lines/Revolution
Range	100...1,000,000
Units	Poles
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.13]	Maximum Rotary Speed
Ultraware Name	Ratings: Maximum Speed
Range	10...32,767
Units	rpm
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.14]	Force Constant
Ultraware Name	General: Force Constant
Range	1...32,767
Units	16
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.15]	Motor Mass
Ultraware Name	General: Mass
Range	1 ... 2,147,483,647
Units	Kg * 65,536
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.16]	Electrical Cycle Length
Ultraware Name	General: Electrical Cycle
Range	100 ... 10,000
Units	mm * 10
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.17]	Encoder Lines / Meter
Ultraware Name	Feedback: Lines/Meter
Range	4000 ... 10,000,000
Units	Lines
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.18]	Maximum Linear Speed
Ultraware Name	Ratings: Maximum Speed
Range	32 ... 32767
Units	m / s * 256
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.19]	Motor Thermal Protection Enable
Ultraware Name	Thermal: Software Protection
Range	0 = Disabled 1 = Enabled
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.20]	Motor Thermostat
Ultraware Name	Thermal: Integral Thermostat

[Pr - 9.20]	Motor Thermostat
Range	0 = Disabled 1 = Enabled
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.21]	Motor Thermal Resistance, Winding to Encoder
Ultraware Name	Thermal: Rth (w-e)
Range	1...2,147,483,647
Units	°C/Watt * 65,536
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.22]	Motor Thermal Capacitance, Winding to Encoder
Ultraware Name	Thermal: Cth (w-e)
Range	1...2,147,483,647
Units	J/°C * 256
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.23]	Motor Thermal Resistance, Winding to Ambient
Ultraware Name	Thermal: Rth (w-a)
Range	1...2,147,483,647
Units	°C/Watt * 65,536
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.24]	Motor Thermal Capacitance, Winding to Ambient
Ultraware Name	Thermal: Cth (w-a)
Range	1...2,147,483,647
Units	J/°C * 256
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.25]	Commutation Type
Ultraware Name	Feedback: Commutation

[Pr - 9.25]	Commutation Type	
Range	Value	Description
	0	Brush
	1	Trapezoidal
	2	Sinusoidal
Applicable Operating Mode	All	

[Pr - 9.26]	Start-up Commutation	
Ultraware Name	Feedback: Sinusoidal Startup	
Range	Value	Description
	0	Self Sensing
	1	Hall Inputs
	2	Serial
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	

[Pr - 9.27]	Integral Limits
Ultraware Name	General: Integral Limits
Range	0...1
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.29 ... Pr - 9.49]	Reserved
When Enabled	Reserved for future use.

[Pr - 9.50]	Motor Model
Ultraware Name	Motor Model
Range	32-bytes character string
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.51]	Drive Name
Ultraware Name	Name
Range	32-bytes character string
Applicable Operating Mode	All

[Pr - 9.52]	Position Scaling Data
Ultraware Name	Motor Encoder Units Position Scale
Range	8-bytes character string
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.53]	Position Scaling Label
Ultraware Name	Motor Encoder Units Position Label
Range	16-bytes character string
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

Pr - 9.54]	Velocity Scaling Data
Ultraware Name	Motor Encoder Units Velocity Scale
Range	8-bytes character string
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.55]	Velocity Scaling Label
Ultraware Name	Motor Encoder Units Velocity Label
Range	16-bytes character string
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.56]	Acceleration Scaling Data
Ultraware Name	Motor Encoder Units Acceleration Scale
Range	8-bytes character string
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.57]	Acceleration Scaling Label
Ultraware Name	Motor Encoder Units Acceleration Label
Range	16-bytes character string
When Enabled	Servo-Off -> Setting -> After power cycle
Applicable Operating Mode	All

[Pr - 9.58]	Scope Config	
Range	32-bytes character string	
Data Size	21 digits	
Applicable Operating Mode	All	
Digits	Digits	Description
	0...1	Channel A Signal See Monitor Variables
	2...3	Channel B Signal See Monitor Variables
	4	Channel A Scale Type
	0...1	0 - Auto (Default), 1 - Manual
	5	Channel B Scale Type
	0...1	0 - Auto (Default), 1 - Manual
	6...7	Sample Period
	8...9	Samples per division
	10...12	Trigger Signal See Monitor Variables
	13	Trigger Mode
		0 - Immediate
		1 - Falling Edge 2 -Rising Edge
	14	Pretrigger Percentage (%/ 10)
15...22	Trigger Threshold	
Default	0x00000000000000100510011E05000100	
When Enabled	Servo-Off -> Setting -> After power cycle	

[Pr - 9.59]	Scope Scaling	
Range	32-bytes character string	
Data Size	32 digits	
Digits	Digits	Description
	0...7	Channel A Scale
	8...15	Channel A Offset
	16...23	Channel B Scale
	24...31	Channel B Offset
Default	0x00000000000000000000000000000000	
Ultraware Name	Displayed Units	
Range	1-byte character string	
	0 = Metric	
	1 = English	
	2 = User units	
Default	0	
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	

[Pr - 9.60]	Displayed Units	
Ultraware Name	Displayed Units	
Range	1-byte character string	
	0 = Metric	
	1 = English	
	2 = User units	
Default	0	
When Enabled	Servo-Off -> Setting -> After power cycle	
Applicable Operating Mode	All	

Notes:

Indexing Drive Parameters

Parameters control Kinetix 3 drive operations. They are grouped by the type of drive, Indexing or Standard, and the drive settings they define.

Descriptions of Standard Drive Parameters begin on [page 47](#).

Parameter Groupings

Indexing drive parameters are grouped into these drive settings:

- Group 0 - Indexing drive system and I/O settings
- Group 1 - Homing controls
- Group 2 - Indexing operations
- Group 3 - Indexing move profiling
- Group 4 - Indexing position and distance setting
- Group 5 - Registration settings
- Group 6 - Batch count operations
- Group 7 - Dwell settings
- Group 8 - Velocity settings
- Group 9 - Move profile settings
- Group 10 - Acceleration settings
- Group 11 - Deceleration settings
- Group 12 - Next Index settings

Parameter Descriptions

Parameter descriptions list the size of each parameter and the data options within the parameter.

Descriptions for Standard Drive Parameters begin on [page 47](#).

Group 0 - Indexing System

[IN00.00]		Auto Start Indexing	
Ultraware Name	Auto Start Indexing		
Description	When this field is set to ON, the drive begins executing the selected index whenever the drive enables.		
Range	Value	Description	
	0	OFF	
	1	ON	
Default	0		
Units	N/A		
Access	Set		
Changeable Status	Always		
When Enabled	Power Cycling		
Applicable Operating Mode	Indexing		
Modbus Address	5000		

[IN00.01]		Abort Index Deceleration	
Ultraware Name	Abort Index Decel		
Description	The deceleration used to stop motion when the Stop Index input terminates an index move.		
Range	Value	Description	
	1 ... 2,147,483,647	10 ⁻² * rev/s ² for rotary, mm/s ² for linear	
Default	6250		
Access	Set		
Changeable Status	Always		
When Enabled	Power Cycling		
Applicable Operating Mode	Indexing		
Modbus Address	5001...5002		

[IN00.02]		Positive Deceleration Distance	
Ultraware Name	Positive Deceleration Distance		
Range	Value	Description	
	0 ... 2,147,483,647	The stopping distance used when the drive encounters a positive overtravel limit.	
Default	0		

[IN00.02]	Positive Deceleration Distance (continued)	
Units	Counts	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Modbus Address	5003...5004	

[IN00.03]	Negative Deceleration Distance	
Ultraware Name	Negative Deceleration Distance	
Range	Value	Description
	0 . . . 2,147,483,647	The stopping distance used when the drive encounters a negative overtravel limit.
Default	0	
Units	Counts	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Ultraware Name	Positive Deceleration Distance	
Modbus Address	5005...5006	

[IN00.04]	Enable Software Limits	
Ultraware Name	Enable Software Limits	
Description	Controls software overtravel limits of the axis.	
Range	Value	Description
	0	Off: Turns off software overtravel limit checking.
	1	On: Causes the drive to compare the motor feedback position to the Positive and Negative Software Limits, below, to determine if the drive has exceeded an overtravel limit.
Default	0	
Units	N/A	
Access	Set	
Changeable Status	Disable Drive	
When Enabled	Disable Drive	
Applicable Operating Mode	Indexing	
Modbus Address	5007	

[IN00.05]		Positive Software Limit	
Ultraware Name	Positive Software Limit		
Description	If the motor feedback position is greater than this value, the drive has exceeded the software overtravel limit.		
Range	Value	Description	
	-2,147,483,647 ...2,147,483,647	Positive software overtravel limit	
Default	2,147,483,647		
Units	Counts		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5008...5009		

[IN00.06]		Negative Software Limit	
Ultraware Name	Negative Software Limit		
Description	If the motor feedback position is greater than this value, the drive has exceeded the software overtravel limit.		
Range	Value	Description	
	-2,147,483,647 ...2,147,483,647	Negative software overtravel limit	
Default	-2,147,483,647		
Units	Counts		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5010...5011		

Group 1 - Homing

[IN01.00]	Homing Type	
Ultraware Name	Homing Type	
Description	Select the type of homing operation the drive performs.	
Range	Value	Description
	0	Home to Present Position
	1	To Home sensor/Back to Marker (default)
	2	To Limit/Back to Marker
	3	To Home sensor/Fwd to Marker
	4	To Limit/Fwd to Marker
	5	Home to Current Value
	6	Home to Current Value/ Back to Marker
	7	To Home Sensor / Move / Fwd to Marker
8	Home to Marker	
Default	1	
Units	N/A	
Access	Set	
Changeable Status	Disable Drive	
When Enabled	Disable Drive	
Applicable Operating Mode	Indexing	
Modbus Address	5200	

[IN01.01]		Auto Start Homing on Enable	
Ultraware Name	Auto Start Homing on Enable		
Description	Causes the drive to begin the homing procedure automatically when the drive is enabled.		
Range	Value	Description	
	0	Active: Automatically starts homing every time the drive is enabled.	
	1	Active After Reset Only: automatically starts homing when a drive is enabled, if the drive has not already been homed.	
	2	Inactive	
Default	2		
Units	N/A		
Access	Set		
Changeable Status	Always		
When Enabled	Power cycling		
Applicable Operating Mode	Indexing		
Modbus Address	5201		

[IN01.02]		Homing Velocity	
Ultraware Name	Homing Velocity		
Description	The commanded velocity used during homing. The sign of the this value (+/-) indicates the direction of motion during homing.		
Range	Value	Description	
	-6000 . . . 6000	Rotary motors: rpm; Linear motors: mm/s	
Default	100		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5202		

[IN01.03]		Creep Velocity	
Ultraware Name	Creep Velocity		
Description	For the To Sensor, then Back to Marker Homing Type, the velocity used for all remaining homing motion after the motor decelerates to a stop when it finds the sensor edge.		
Range	Value	Description	
	0 ... 6000	The velocity used for all homing motion after the motor decelerates to a stop at the sensor edge.	
Default	20		
Units	Rotary motors: rpm; Linear motors: mm/s		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5203		

[IN01.04]		Homing Acceleration/Deceleration	
Ultraware Name	Homing Acceleration/Deceleration		
Description	The rate of acceleration and deceleration used during homing.		
Range	Value	Description	
	1 ... 2,147,483,647	The velocity used for all homing motion after the motor decelerates to a stop at the sensor edge.	
Default	6250		
Units	$10^{-2} * \text{rev/s}^2$ for rotary, mm/s^2 for linear		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5204 ... 5205		

[IN01.05]		Offset Move Distance	
Ultraware Name	Offset Move Distance		
Description	The distance the motor position is from the marker edge after the homing sequence is complete. For Sensor Only Homing, the distance the motor position is from the sensor edge after the homing sequence is complete.		
Range	Value	Description	
	-2,147,483,647 ... 2,147,483,647	Digital input state communicated to the drive when the Home Sensor input becomes active.	
Default	0		
Units	Counts		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5206 ... 5207		

[IN01.06]		Home Sensor Polarity	
Ultraware Name	Home Sensor Polarity		
Description	Specifies the digital input state communicated to the drive when the Home Sensor input becomes active.		
Range	Value	Description	
	0	Active-Going Transition	
	1	Inactive-Going Transition	
Default	0		
Units	Counts		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5208		

[IN01.07]		Home Position	
Ultraware Name	Home Position		
Description	The home position when a homing procedure is completed.		
Range	Value	Description	
	-2,147,483,647 ...2,147,483,647	Digital input of the home position.	
Default	0		
Units	Counts		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5209 ...5210		

[IN01.08]		Moving Distance After Home Sensor	
Ultraware Name	Moving Distance After Home Sensor		
Description	This value is distance that the drive ignores the marker inputs after the home sensor is detected.		
Range	Value	Description	
	0 ...2,147,483,647	Distance the drive ignores the marker inputs after home is detected.	
Default	0		
Units	Counts		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5211 ...5212		

[IN01.09]		Home Current	
Ultraware Name	Home Current		
Description	Specifies the torque feedback at which the drive stops moving the motor at the Homing Velocity.		
Range	Value	Description	
	1 ...250	Percent of motor torque feedback	
Default	100		
Units	Percentage of a motor rating torque		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5213		

[IN01.10]		Home Current Time	
Ultraware Name	Home Current Time		
Description	Specifies the time interval that the home current must be held.		
Range	Value	Description	
	0 ...1000	ms	
Default	0		
Units	Milliseconds		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5214		

[IN01.11]		Homing Time Limit	
Ultraware Name	Homing Time Limit		
Description	Drive fault when time for homing exceeds the homing time limit.		
Range	Value	Description	
	0 . . .65,535	Homing time limit in seconds	
Default	60		
Units	seconds		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5215		

[IN01.12]		Stop Home Deceleration	
Ultraware Name	Stop Home Decel		
Description	The rate of drive deceleration used when homing is stopped.		
Range	Value	Description	
	1 . . .2,147,483,647	Rate of drive deceleration when homing is stopped.	
Default	6250		
Units	N/A		
Access	Set		
Changeable Status	Disable Drive		
When Enabled	Disable Drive		
Applicable Operating Mode	Indexing		
Modbus Address	5216 . . .5217		

Group 2 - Indexing Options

[IN02.00] ... [IN02.63]	Index 0 ... 63 Type and Action When Complete	
Description	Digit 0 homes the axis, and digit 2 controls execution of the index move command.	
Digit 0	Homes the axis before the drive can execute any index.	
Ultraware Name	Index 0 ... 63 Option: Type	
Range	Value	Description
	0	Absolute: moves from its starting position to the specified Position, below.
	1	Incremental: moves from its starting position the specified Distance, below.
Default	1	
Digit 1	Controls execution of the index move command after homing.	
Ultraware Name	Index 0 ... 63 Action When Complete	
Range	Value	Description
	0	Stop: ends the execution of indexed move commands.
	1	Start next index: commands execution of the Next Index move without additional input, but after the scheduled Dwell.
	2	Wait for Start: commands execution of the Next Index move the next time the Start Index input becomes active.
Default	0	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Modbus Address	5400 ... 5463	

Group 3 - Index Move Profile

These values are reserved for future use.

Group 4 - Index Position/Distance

[IN04.00]...[IN04.63]	Index 0...63 Position/Distance	
Ultraware Name	Index 0...63 Position/Distance	
Description	Position: For Absolute mode moves the motor travels to this fixed position. Distance: For Incremental and Registration modes moves this is the relative distance the motor travels.	
Range	Value	Description
	-2,147,483,647 ...2,147,483,647	Counts
Default	1000	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Modbus Address	5800 ...5927	

Group 5 - Index Registration Distance

These values are reserved for future use.

Group 6 - Index Batch Count

These values are reserved for future use.

Group 7 - Index Dwell

[IN07.00] ... [IN07.63]	Index 0 ... 63 Dwell	
Ultraware Name	Index 0 ... 63 Dwell	
Description	Milliseconds to remain at current position before executing	
Range	Value	Description
	0 ... 65,535	ms
Default	0	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Modbus Address	6400 ... 6463	

Group 8 - Index Velocity

[IN08.00]	Index 0 ... 63 Velocity	
Ultraware Name	Index 0 ... 63 Velocity	
Description	Maximum velocity while in motion	
Range	Value	Description
	0 ... 6000	Rotary motors: rpm; Linear motors: mm/s
Default	750	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Modbus Address	6600 ... 6663	

Group 9 - Index Move Profile

These values are reserved for future use.

Group 10 - Index Acceleration

[IN10.00]...[IN10.63]	Index 0...63 Acceleration	
Ultraware Name	Index 0...63 Acceleration	
Description	Maximum acceleration while in motion	
Range	Value	Description
	1...2,147,483,647	Rotary motor: $10^{-2} \times \text{rev/s}^2$ Linear motors: mm/s^2
Default	6250	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Modbus Address	7000...7127	

Group 11 - Index Deceleration

[IN11.00]...[IN11.63]	Index 0...63 Deceleration	
Ultraware Name	Index 0...63 Deceleration	
Description	Maximum deceleration while in motion.	
Range	Value	Description
	1...2,147,483,647	Rotary motor: $10^{-2} \times \text{rev/s}^2$ Linear motors: mm/s^2
Default	6250	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Modbus Address	7200...7327	

Group 12 - Index Next Index

[IN12.00]...[IN12.63]	Index 0...63 Next Index	
Ultraware Name	Index 0...63 Next Index	
Description	The number (0...63) of the next indexed move to execute when Action When Complete is not set to STOP.	
Range	Value	Description
	0...63	Value of the next indexed move
Default	0	
Access	Set	
Changeable Status	Always	
When Enabled	Always	
Applicable Operating Mode	Indexing	
Modbus Address	7400...7464	

Warnings and Fault Codes

This Appendix lists the Warnings and Fault Codes for Kinetix 3 drives.

Warnings

Warnings are drive abnormalities that allow motor control to continue. A three-digit text message is displayed by using the last segments of the display.

Warning Number	Warning Display	Description
0x01	BAT	Absolute encoder battery warning
0x02	CNT	Absolute encoder counter overflow
0x04	PRE	Power-up overspeed warning
0x08	OCC	Over current command warning
0x10	OSC	Over speed command warning
0x20	PIN	Digital I/O assignment warning
0x40	CAP	Over motor rated output power warning

Fault Codes

Faults are serious abnormalities that cause loss of motor control. The Status indicator alternates between a three-digit error code preceded by the letter E, and a five-digit text message. This error message repeats until the problem is cleared.

Fault Code	Internal Fault Code	Fault Display	Fault Name
E.004	0x22	MTR0T	Motor over temperature
E.005	0x11	IPMFT	IPM
E.009	0x41	UDVTG	Bus under voltage fault
E.010	0x40	OVVTG	Bus over voltage fault
E.012	0x73	HFAIL	Home search failed
E.018	0x50	OVSPD	Motor over speed fault
E.019	0x51	POSER	Excess position error fault
E.022	0x25	CONOL	Motor continuous current overload
E.023	0x27	DRVOL	Drive overload fault
E.025	0x72	SENSR	Sensor unassigned
E.027	0x74	NOTHM	Axis not homed
E.028	0x36	ENCDE	Encoder data range fault
E.030	0x31	ENCOP	Encoder cable open fault
E.031	0x38	ENCPE	Encoder data parameter fault

Fault Code	Internal Fault Code	Fault Display	Fault Name
E.036	0x24	DRVOT	Drive over temperature
E.037	0x42	ACOFF	AC Line Loss Fault
E.053	0x63	PINIT	User parameter initialization fault
E.054	0x13	OFSET	Current feedback offset
E.055	0x61	CHSUM	User parameter checksum fault
E.056	0x53	CPUFT	Watchdog timeout fault
E.057	0x10	HWARE	PWM hardware
E.058	0x62	RANGE	User parameter range fault
E.060	0x70	DINIT	Drive initialization fault
E.075	0x23	SHTOL	Shunt overload protection
E.079	0x12	SHTOC	Shunt circuit over current
E.083	0x33	ABSBE	Absolute encoder battery fault
E.084	0x34	ABSOS	Absolute encoder overspeed
E.085	0x35	ABSCT	Absolute multi-turn count fault
E.086	0x37	ENCCT	Encoder single-turn count fault
E.100	0x71	SETUP	Drive set-up fault
E.101	0x20	CABLE	Motor power cable open
E.102	0x21	INSOL	Motor instantaneous current overload
E.103	0x28	MATCH	Motor mismatch fault
E.104	0x26	PWROL	Continuous power overload
E.105	0x30	ENCTP	Encoder type mismatch fault
E.106	0x32	ENCCE	Encoder communication fault
E.107	0x60	SERCE	Serial communication fault
E.108	0x52	CDFRE	Position command frequency fault
E.112	0x54	ESTOP	Emergency stop
E.113	0x64	IRANG	Indexing position range overflow
E.114	0x14	OVCUR	Motor phase over current

Monitor Variables

Ultraware limits the number of variables that can be monitored to thirty-one (variables 0...30). However, in customer applications additional monitor variables may be used.

For example, monitoring of variable [32, Selected index](#), cannot be performed by Ultraware software because this variable is outside the range of Ultraware. However, a customer program that supports 32 variables or more can monitor this variable.

Variables

The table below lists the variables for monitoring a Kinetix 3 drive.

Variable		Name	Unit
No.	Hex		
0	0x00	Velocity feedback	rpm
1	0x01	Velocity command	rpm
2	0x02	Velocity error	rpm
3	0x03	Current command	%
4	0x04	Follower position	counts
5	0x05	Master position	counts
6	0x06	Position error	counts
7	0x07	Position command count frequency	Kpps
8	0x08	Commutation angle	° (degrees)
9	0x09	Mechanical angle	° (degrees)
10	0x0A	Shunt power limit ratio	%
11	0x0B	Bus voltage	V
12	0x0C	Absolute rotations	rev
13	0x0D	Velocity command offset	mV
14	0x0E	Current command offset	mV
15	0x0F	Input and Output state Refer to Variable 15 - Digital Inputs and Outputs on page 133 for more information.	
16	0x10	U phase current	0.001 A
17	0x11	V phase current	0.001 A
18	0x12	W phase current	0.001 A
19	0x13	Motor temperature	%
20	0x14	Analog command - velocity	0.01V

Variable (continued)		Name	Unit
No.	Hex		
21	0x15	Analog command - current	0.01V
22	0x16	Current feedback	0.001A
23	0x17	Hall states (wvu)	Digital
24	0x18	Motor feedback position	Counts
25	0x19	Digital input function state Refer to Variable 25 - Digital Inputs on page 133 for more information.	Digital
26	0x1A	Digital output function state Refer to Variable 26 - Digital Outputs on page 134 for more information.	Digital
27	0x1B	Instantaneous shunt power	Watts
28	0x1C	Drive utilization	%
29	0x1D	Indexing input function state Refer to Variable 29 - Indexing Inputs on page 134 for more information.	Digital
30	0x1E	Indexing output function state Refer to Variable 30 - Indexing Outputs on page 135 for more information.	Digital
31	0x1F	CPLD version	
32	0x20	Selected index	Digital
33	0x21	Periodic counter. Range 0 . . . 512. Units: counts	1 count = 2 ms

Compiled Variables

The tables below list variables that compile data to more effectively monitor specific aspects of a Kinetix 3 drive

Variable 15 - Digital Inputs and Outputs

Monitoring of I/O status is provided by [Variable 15 - Digital Inputs and Outputs](#). Digital inputs [\[Pr - 0.17\]](#) ...[\[Pr - 0.18\]](#), and digital outputs [\[Pr - 0.22\]](#) ...[\[Pr - 0.27\]](#) are compiled for this variable.

The table below lists the data bits in this variable.

	Digital Outputs							EMG	Digital Inputs									
Bit No.	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Data	D06	D05	D04	SALM	D03	D02	D01	EMG	DI10	DI9	DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1

Variable 25 - Digital Inputs

Digital input status is provided by [Variable 25 - Digital Inputs](#). Digital inputs [\[Pr - 0.10\]](#) ...[\[Pr - 0.14\]](#) are compiled for this variable.

The table below lists the data bits in this variable.

Bit	Digital Input Function	Bit	Digital Input Function
0	Current Limit- Negative	10	Fault Reset
1	Current Limit- Positive	11	Integrator Inhibit
2	Alternate Gain Select	12	Negative Overtravel
3	Preset Direction	13	Operation Mode Override
4	Reset Multiturn Data	14	Position Strobe
5	Zero Speed Clamp	15	Positive Overtravel
6	Position Clear	16	Preset Select 0
7	Analog Speed Command Enable in Preset	17	Preset Select 1
8	Motor Moving Enable in Velocity Mode	18	Preset Select 2
9	2nd Electronic Gear Bank Selection		

Variable 26 - Digital Outputs

Digital output status is provided by [Variable 26 - Digital Outputs](#). Digital inputs and outputs [\[Pr - 0.02\]](#), and [\[Pr - 0.22\]](#) ... [\[Pr - 0.24\]](#) are compiled for this variable.

The table below lists the data bits in this variable.

Bit	Digital Output Function
0	Brake
1	Absolute Position Valid
2	Current Limited
3	Velocity Limited
4	Within Near Window
5	Warning: Absolute Encoder Battery
6	Warning: Absolute Encoder Count Overflow
7	Warning: Power Up Overspeed
8	Warning: Over Current Command
9	Warning: Over Speed Command
10	Warning: Digital IO Assignment
11	Warning: Over Motor Rated Power

Variable 29 - Indexing Inputs

Indexing input function status is provided by [Variable 29 - Indexing Inputs](#). Digital inputs [\[Pr - 0.16\]](#) ... [\[Pr - 0.18\]](#) are compiled for this variable.

The table below lists the data bits in this variable.

Bit	Indexing Input function
0	Home Sensor
1	Start Homing
2	Start Indexing
3	Stop Indexing
4	Pause Index
5	Index Select 0 Input
6	Index Select 1 Input
7	Index Select 2 Input
8	Index Select 3 Input
9	Index Select 4 Input
10	Index Select 5 Input
11	Stop Homing

Variable 30 - Indexing Outputs

Indexing output function status is provided by [Variable 30 - Indexing Outputs](#). Digital outputs [\[Pr - 0.25\]](#) ... [\[Pr - 0.27\]](#) are compiled for this variable.

The table below lists the data bits in this variable.

Bit	Indexing Output function	Indexing Output function
0	In Motion	Index Select 1 Output
1	In Dwell	Index Select 2 Output
2	Axis Homed	Index Select 3 Output
3	End of Sequence	Index Select 4 Output
4	Index Select 0 Output	Index Select 5 Output

Notes:

Symbols

- (IN00.00) auto start indexing 114
- (IN00.01) abort index deceleration 114
- (IN00.02) positive deceleration distance 114
- (IN00.03) negative deceleration distance 115
- (IN00.04) enable software limits 115
- (IN00.05) positive software limit 116
- (IN00.06) negative software limit 116
- (IN01.00) homing type 117
- (IN01.01) auto start homing on enable 118
- (IN01.02) homing velocity 118
- (IN01.03) creep velocity 119
- (IN03.xx) index move profile 125
- (IN04.00...IN04.63) index position/distance 125
- (IN05.xx) index registration distance 125
- (IN06.xx) index batch count 125
- (IN07.00...IN07.63) index dwell 126
- (IN08.00...IN08.63) index velocity 126
- (IN09.xx) index move profile 126
- (IN10.00...IN10.63) index acceleration 127
- (IN11.00...IN11.63) index deceleration 127
- (IN12.00...IN12.63) next index 128
- (IN2.00...IN2.63) index type, digit 0 124
- (Pr-0.00) operations mode 48
- (Pr-0.02) motor basic modes 49
- (Pr-0.03) auto tuning functions 50
- (Pr-0.04) inertia ratio 51
- (Pr-0.05) auxiliary function selection 1 52
- (Pr-0.06) auxiliary function selection 2 53
- (Pr-0.07) drive address 55
- (Pr-0.08) password 55
- (Pr-0.09) serial port configuration 55
- (Pr-0.10...Pr-0.21) parameter setting values 61
- (Pr-0.10) allocation of input signals 1 56
- (Pr-0.11) allocation of input signals 2 57
- (Pr-0.12) allocation of input signals 3 57
- (Pr-0.13) allocation of input signals 4 58
- (Pr-0.14) allocation of input signals 5 58
- (Pr-0.15) allocation of input signals 6 59
- (Pr-0.16) allocation of input signals 7 59
- (Pr-0.17) allocation of input signals 8 59
- (Pr-0.18) allocation of input signals 9 60
- (Pr-0.19) allocation of input signals 10 60
- (Pr-0.20) allocation of input signals 11 60
- (Pr-0.21) allocation of input signals 12 61
- (Pr-0.22...Pr-0.32) parameter setting values 66
- (Pr-0.22) allocation of output signals 1 61
- (Pr-0.23) allocation of output signals 2 62
- (Pr-0.24) allocation of output signals 3 62
- (Pr-0.25) allocation of output signals 4 63
- (Pr-0.26) allocation of output signals 5 64
- (Pr-0.27) allocation of output signals 6 64
- (Pr-0.28) allocation of output signals 7 64
- (Pr-0.29) allocation of output signals 8 65
- (Pr-0.30) allocation of output signals 9 65
- (Pr-0.31) allocation of output signals 10 66
- (Pr-0.32) I/O control authority 66
- (Pr-1.00) velocity regulator response level 67
- (Pr-1.01) system gain 67
- (Pr-1.02) velocity regulator P gain 67
- (Pr-1.03) velocity regulator I gain 67
- (Pr-1.04) velocity regulator D gain 68
- (Pr-1.05) velocity error filter 68
- (Pr-1.06) position regulator Kp gain 68
- (Pr-1.07) current command lowpass filter bandwidth 69
- (Pr-1.08) velocity command lowpass filter bandwidth 69
- (Pr-1.09) position command lowpass filter bandwidth 69
- (Pr-1.10) 1st resonant frequency suppression filter 69
- (Pr-1.11) 1st resonant frequency suppression width 70
- (Pr-1.12) 2nd resonant frequency suppression filter 70
- (Pr-1.13) 2nd resonant frequency suppression filter width 70
- (Pr-1.14) 2nd resonant frequency suppression filter depth 71
- (Pr-1.15) position regulator Kff gain 71
- (Pr-1.16) position regulator Kff bandwidth 71
- (Pr-1.17) velocity regulator I gain mode 72
- (Pr-1.18) velocity regulator I gain disable threshold 73
- (Pr-1.19) position regulator high error output offset 73
- (Pr-1.20) position regulator high error output threshold 73
- (Pr-1.21) current regulator bandwidth reduction scale 74
- (Pr-1.22) on-line vibration mode 74
- (Pr-1.23) velocity regulator configuration 75
- (Pr-1.24) delay time of gain switching 75
- (Pr-1.25) level of gain switching 75
- (Pr-1.26) hysteresis of gain switching 76
- (Pr-1.27) position gain switching time 76
- (Pr-1.28) 2nd velocity regulator P gain 76
- (Pr-1.29) 2nd velocity regulator i gain 76
- (Pr-1.30) 2nd position regulator Kp gain 77
- (Pr-1.31) 2nd current command low pass filter bandwidth 77
- (Pr-1.32) 2nd velocity command low pass filter bandwidth 77

- (Pr-1.33) 3rd velocity regulator P gain 77
- (Pr-1.34) 3rd velocity regulator I gain 78
- (Pr-1.35) 3rd position regulator Kp gain 78
- (Pr-1.36) 3rd current command low pass filter bandwidth 78
- (Pr-1.37) 3rd velocitycommand low pass filter bandwidth 78
- (Pr-1.38) 4th velocity regulator P gain 79
- (Pr-1.39) 4th velocity regulator I gain 79
- (Pr-1.40) 4th position regulator Kp gain 79
- (Pr-1.41) 4th current command low pass filter bandwidth 79
- (Pr-1.42) 4th velocitycommand low pass filter bandwidth 80
- (Pr-2.00) velocity scale 81
- (Pr-2.01) jog velocity command 81
- (Pr-2.02) acceleration 81
- (Pr-2.03) deceleration 82
- (Pr-2.04) S-curve time 82
- (Pr-2.05) preset velocity 1 82
- (Pr-2.06) preset velocity 2 82
- (Pr-2.07) preset velocity 3 83
- (Pr-2.08) preset velocity 4 83
- (Pr-2.09) preset velocity 5 83
- (Pr-2.10) preset velocity 6 83
- (Pr-2.11) preset velocity 7 84
- (Pr-2.12) manual velocity limit 84
- (Pr-2.13) velocity limit mode 84
- (Pr-3.00) follower 85
- (Pr-3.01) 1st gear ratio, follower counts 86
- (Pr-3.02) 1st gear ratio, mastercounts 87
- (Pr-3.03) encoder output ratio, output counts 87
- (Pr-3.04) encoder output ratio, motor counts 87
- (Pr-3.05) 2nd gear ratio, follower counts 87
- (Pr-3.06) 2nd gear ratio, master counts 88
- (Pr-3.07) reserved 88
- (Pr-3.08) digital filter cut-off frequency 89
- (Pr-4.00) current scale 90
- (Pr-4.01) positive internal current limit 90
- (Pr-4.02) negative internal current limit 90
- (Pr-4.03) positive external current limit 90
- (Pr-4.04) negative external current limit 91
- (Pr-4.05) overtravel current limit 91
- (Pr-4.06) initial current bias 91
- (Pr-5.00) in position size 92
- (Pr-5.01) reserved 48, 92
- (Pr-5.02) near position size 92
- (Pr-5.03) speed window 93
- (Pr-5.04) up to speed 93
- (Pr-5.05) zero clamp 93
- (Pr-5.06) brake inactive delay 94
- (Pr-5.07) disable delay 94
- (Pr-5.08) brake active delay 94
- (Pr-5.09) disabled braking speed 95
- (Pr-5.10) following error limit 95
- (Pr-5.11) reserved 95
- (Pr-5.12) ac line loss fault delay 95
- (Pr-5.13) analog output ch1 selection 96
- (Pr-5.14) analog output ch2 selection 96
- (Pr-5.15) analog output ch1 scale 96
- (Pr-5.16) analog output ch2 scale 96
- (Pr-6.00) analog velocity command offset 97
- (Pr-6.01) analog current command offset 97
- (Pr-6.02) u phase current sensing offset 97
- (Pr-6.03) w phase current sensing offset 97
- (Pr-6.04) A-lead-B swap 97
- (Pr-6.05) dynamic brake circuit protection 98
- (Pr-6.06) fault detail sampling period 98
- (Pr-6.07) fault detail data selection 1 98
- (Pr-6.08) fault detail data selection 2 99
- (Pr-6.09) fault detail data selection 3 99
- (Pr-6.10) fault detail data selection 4 99
- (Pr-6.11) 1st resonant frequency suppression filter 99
- (Pr-6.12) 2nd resonant frequency suppression filter 100
- (Pr-7.00) drive capacity 101
- (Pr-7.01) dc bus voltage offset 101
- (Pr-7.02) reserved 101
- (Pr-7.03) analog monitor output ch1 offset 101
- (Pr-7.04) analog monitor output ch1 scaling 102
- (Pr-7.05) analog monitor output ch2 offset 102
- (Pr-7.06) analog monitor output ch2 scaling 102
- (Pr-7.07) dc bus measurement scaling calibration 102
- (Pr-9.00) standard motor flag 103
- (Pr-9.01) motor type 103
- (Pr-9.02) motor resistance 103
- (Pr-9.03) motor inductance 103
- (Pr-9.04) motor intermittent current 103
- (Pr-9.05) motor continuous current 104
- (Pr-9.06) motor rated voltage 104
- (Pr-9.07) encoder type 104
- (Pr-9.08) hall offset 104
- (Pr-9.09) current constant 104
- (Pr-9.10) motor inertia 105
- (Pr-9.11) poles/revolution 105
- (Pr-9.12) encoder lines/revolution 105
- (Pr-9.13) maximum rotary speed 105
- (Pr-9.14) force constant 105
- (Pr-9.15) motor mass 106
- (Pr-9.16) electrical cycle length 106
- (Pr-9.17) encoder lines/meter 106
- (Pr-9.18) maximum linear speed 106

(Pr-9.19) motor thermal protection enable 106
 (Pr-9.20) motor thermostat 106
 (Pr-9.21) motor thermal resistance, winding to encoder 107
 (Pr-9.22) motor thermal capacitance, winding to encoder 107
 (Pr-9.23) motor thermal resistance, winding to ambient 107
 (Pr-9.24) motor thermal capacitance, winding to ambient 107
 (Pr-9.25) commutation type 107
 (Pr-9.27) integral limits 108
 (Pr-9.27) startup commutation 108
 (Pr-9.28...Pr 9.49) reserved 108
 (Pr-9.50) motor model 108
 (Pr-9.51) drive name 108
 (Pr-9.52) position scaling data 109
 (Pr-9.53) position scaling label 109
 (Pr-9.54) velocity scaling data 109
 (Pr-9.55) velocity scaling label 109
 (Pr-9.56) acceleration scaling data 109
 (Pr-9.57) acceleration scaling label 109
 (Pr-9.58) scope config 110
 (Pr-9.59) scope scaling 111
 (Pr-9.60) displayed units 111

Numerics

1st gear ratio, follower counts (Pr-3.01) 86
 1st gear ratio, master counts (Pr-3.02) 87
 1st resonant frequency suppression filter (Pr-1.10) 69
 1st resonant frequency suppression filter (Pr-6.11) 99
 1st resonant frequency suppression width (Pr-1.11) 70
 2nd current command low pass filter bandwidth (Pr-1.31) 77
 2nd gear ratio, follower counts (Pr-3.05) 87
 2nd gear ratio, master counts (Pr-3.06) 88
 2nd position regulator Kp gain (Pr-1.30) 77
 2nd resonant frequency suppression filter (Pr-1.12) 70
 2nd resonant frequency suppression filter (Pr-6.12) 100
 2nd resonant frequency suppression filter depth (Pr-1.14) 71
 2nd resonant frequency suppression filter width (Pr-1.13) 70
 2nd velocity command low pass filter bandwidth (Pr-1.32) 77
 2nd velocity regulator I gain (Pr-1.29) 76
 2nd velocity regulator P gain (Pr-1.28) 76

3rd current command low pass filter bandwidth (Pr-1.36) 78
 3rd position regulator Kp gain (Pr-1.35) 78
 3rd velocity command low pass filter bandwidth (Pr-1.37) 78
 3rd velocity regulator I gain (Pr-1.34) 78
 3rd velocity regulator P gain (Pr-1.33) 77
 4th current command low pass filter bandwidth (Pr-1.41) 79
 4th position regulator Kp gain (Pr-1.40) 79
 4th velocity command low pass filter bandwidth (Pr-1.42) 80
 4th velocity regulator I gain (Pr-1.39) 79
 4th velocity regulator P gain (Pr-1.38) 79

A

abort index 114
 abort index deceleration (IN00.01) 114
 ac line loss 49
 ac line loss fault delay (Pr-5.12) 95
 acceleration (Pr-2.02) 81
 acceleration scaling data (Pr-9.56) 109
 acceleration scaling label (Pr-9.57) 109
 ACK 29
 additional resources 9
 address map
 flash saving parameter 23
 index function parameter 26
 modbus 13
 monitoring parameters 24
 output function status parameter 25
 running parameter 26
 special indexing parameters 15
 standard parameters 13
 A-lead-B swap (Pr-6.04) 97
 allocation of input signals 1 (Pr-0.10) 56
 allocation of input signals 10 (Pr-0.19) 60
 allocation of input signals 11 (Pr-0.20) 60
 allocation of input signals 12 (Pr-0.21) 61
 allocation of input signals 2 (Pr-0.11) 57
 allocation of input signals 3 (Pr-0.12) 57
 allocation of input signals 4 (Pr-0.13) 58
 allocation of input signals 5 (Pr-0.14) 58
 allocation of input signals 6 (Pr-0.15) 59
 allocation of input signals 7 (Pr-0.16) 59
 allocation of input signals 8 (Pr-0.17) 59
 allocation of input signals 9 (Pr-0.18) 60
 allocation of output signals 1 (Pr-0.22) 61
 allocation of output signals 10 (Pr-0.31) 66
 allocation of output signals 2 (Pr-0.23) 62
 allocation of output signals 3 (Pr-0.24) 62
 allocation of output signals 4 (Pr-0.25) 63
 allocation of output signals 5 (Pr-0.26) 64
 allocation of output signals 6 (Pr-0.27) 64
 allocation of output signals 7 (Pr-0.28) 64
 allocation of output signals 8 (Pr-0.29) 65

- allocation of output signals 9 (Pr-0.30)** 65
- alternate gain (G-SEL)** 58
- alternative gain enable** 52
- analog current command offset (Pr-6.01)** 97
- analog current inputs** 48
- analog monitor output ch1 offset (Pr-7.03)** 101
- analog monitor output ch1 scaling (Pr-7.04)** 102
- analog monitor output ch2 offset (Pr-7.05)** 102
- analog monitor output ch2 scaling (Pr-7.06)** 102
- analog offset** 101, 102
- analog output ch1 scale (Pr-5.15)** 96
- analog output ch1 selection (Pr-5.13)** 96
- analog output ch2 scale (Pr-5.16)** 96
- analog output ch2 selection (Pr-5.14)** 96
- analog scaling** 102
- analog speed command (C-SP4)** 58
- analog velocity command offset (Pr-6.00)** 97
- analog velocity inputs** 48
- ASCII commands** 31
- auto motor identification** 53
- auto start homing on enable (IN01.01)** 118
- auto start indexing (IN00.00)** 114
- auto tuning functions (Pr-0.03)** 50
- automatic (TAT)** 39
- autotuning speed** 50
- auxiliary function selection 1 (Pr-0.05)** 52
- auxiliary function selection 2 (Pr-0.06)** 53
- axis homed (HOMC)** 63

- B**
- backup battery** 52
- baud rate** 55
- BEL** 29
- brake active delay (Pr-5.08)** 94
- brake delay** 94
- brake dynamic** 98
- brake inactive delay (Pr-5.06)** 94
- brake speed** 95
- bus calibration** 102
- bus voltage** 101

- C**
- CAN** 29
- checksum** 30
- CHP command** 32

- command**
 - automatic task (TAT) 39
 - disable drive (SVROF) 45
 - enable drive (SVRON) 45
 - fault reset (RST) 35
 - jog (JOG) 41
 - monitor variable (MDM) 35
 - other functions (ETC) 43
 - perform manual task (TMN) 40
 - read drive status (STS) 42
 - read fault contents (EHY) 41
 - read fault detailed data (DIE) 44
 - read indexing parameter (XET) 33
 - read parameter (SET) 31
 - reset drive (HWR) 45
 - triggered data collection (MOT) 36
 - variable roll monitoring (MOR) 38
 - verify servo connection (LIV) 44
 - verify software version (VER) 44
 - write indexing parameter (XHP) 34
 - write indexing parameter (XTR) 34
 - write parameter (CHP) 32
 - write parameter (STR) 32
- command polarity** 49
- command type** 85
- communication method**
 - RS232 55
 - RS485 55
- communication protocol**
 - ASCII 55
 - MODBUS-RTU 55
- commutation** 108
- commutation type (Pr-9.25)** 107
- compiled variable** 133
 - 15 - digital inputs and outputs 133
 - 25 - digital inputs 133
 - 26 - digital outputs 134
 - 29 - indexing inputs 134
 - 30 - indexing outputs 135
- controller output type** 85
- conventions used** 9
- counts**
 - follower 86, 87
 - master 87, 88
 - motor 87
 - output 87
- creep velocity (IN01.03)** 119
- current bias** 91
- current command lowpass filter bandwidth (Pr-1.07)** 69
- current constant (Pr-9.09)** 104
- current limit** 90, 91
- current limit (T_LMT)** 62
- current offset** 97
- current regulator bandwidth reduction scale (Pr-1.21)** 74
- current scale (Pr-4.00)** 90
- cut-off frequency** 89
- cycle length** 106

D

D gain regulator 68
data bit 55
dc bus measurement scaling calibration (Pr-7.07) 102
dc bus voltage offset (Pr-7.01) 101
deceleration (Pr-2.03) 82
delay gain 75
delay time of gain switching (Pr-1.24) 75
digital filter cut-off frequency (Pr-3.08) 89
disable brake 49
disable delay (Pr-5.07) 94
disable drive (SVROF) 45
disabled braking speed (Pr-5.09) 95
display parameter - input register address map 24
displayed units (Pr-9.60) 111
drive address (Pr-0.07) 55
drive capacity (Pr-7.00) 101
drive enable (SV-ON) 56
drive name (Pr-9.51) 108
drive password 55
drive reset 45
dynamic brake circuit protection (Pr-6.05) 98
dynamic tuning 50
dynamic tuning response speed 50

E

EHY command 41
electrical cycle length (Pr-9.16) 106
electronic gear select (GEAR) 58
emergency stop inputs 52
enable drive (SVRON) 45
enable software limits (IN00.04) 115
encoder back-up battery 52
encoder detect 53
encoder lines/meter (Pr-9.17) 106
encoder lines/revolution (Pr-9.12) 105
encoder output 85
encoder output ratio, motor counts (Pr-3.04) 87
encoder output ratio, output counts (Pr-3.03) 87
encoder type (Pr-9.07) 104
end of sequence (E_SEQU) 64
error output offset 73
error output threshold 73
ETB 29
ETC command 43
ETX 29
exception code modbus 12

F

fault reset (A-RST) 57
fault codes 129
fault detail data selection 1 (Pr-6.07) 98
fault detail data selection 2 (Pr-6.08) 99
fault detail data selection 3 (PrR-6.09) 99
fault detail data selection 4 (Pr-6.10) 99
fault detail sampling period (Pr-6.06) 98
fault reset (RST) 35
fault selection 98, 99
fault/warning registers address map 24
feedback lines/meter 106
flash memory update 32, 34, 40
flash saving parameter address map 23
follower (Pr-3.00) 85
follower counts 86
follower mode 48
following error limit (Pr-5.10) 95
force constant (Pr-9.14) 105
frequency suppression 69
function code
 modbus 11

G

gain bank select (BANK_SEL) 59
gain delay 75
gain hysteresis 76
gain level 75
gain switch 75
gain switching 53
gain timing 76
gear ratio 85
general commands (ASCII) 31
group 0 - indexing system address map 15
group 0 - special index address map 15
group 0 - system level address map 13
group 1 - gain control address map 13
group 1 - index homing address map 16
group 10 - index acceleration address map 21
group 11 - index deceleration address map 21
group 12 - next index address map 22
group 2 - index option address map 16
group 2 - speed control address map 14
group 3 - position control address maps 14
group 3 - reserved 16
group 4 - index position/distance address map 17
group 4 - torque control address maps 14
group 5 - reserved 18
group 5 - supplemental drive control address maps 14
group 6 - reserved 18
group 7 - index dwell address map 18
group 8 - index velocity address map 19

group 9 - reserved 19
GS 29

H

hall offset (Pr-9.08) 104
home sensor (H_SENS) 59
homing (H_SENS and SHOME) 59
homing type (IN01.00) 117
homing velocity (IN01.02) 118
host command
 fault codes 129
 indexing command extended (XCE) 33
 warnings 129
hysteresis of gain switching (Pr-1.26) 76

I

I gain 72
I gain disable 73
I gain regulation 78, 79
I gain regulator 67
I/O control authority (Pr-0.32) 66
In Dwell (I_DW) 63
in motion (IMO) 63
in position size (Pr-5.00) 92
incremental feedback loss 53
index abort 114
index acceleration 0...63
 (IN10.00...IN10.63) 127
index batch count (IN06.xx) 125
index deceleration 0...63
 (IN11.00...IN11.63) 127
index dwell 0...63 (IN07.00...IN07.63) 126
index move 124
index move profile (IN03.xx) 125
index move profile (IN09.xx) 126
index position/distance 0...63
 (IN04.00...IN04.63) 125
index registration distance (IN05.xx) 125
index select (I_SELO...I_SEL3) 59
index select (I_SEL4...I_SEL5) 60
index select 0 out (O_ISEL0) 63
index select 1...4 out (O_ISEL0...O_ISEL4) 64
index select 5 out (O_ISEL5) 64
index start 114
index type 0...63, digit 0 (IN1.00...IN1.63)
 124
index velocity 0...63 (IN08.00...IN08.63) 126
indexing command extended (XCE) 33
inertia ratio (Pr-0.04) 51
inhibit delay 95
initial current bias (Pr-4.06) 91
input function parameter address map 26
integral limits (Pr-9.27) 108
integrator inhibit (CON) 56

J

jog (JOG) 41
JOG command 41
jog velocity command (Pr-2.01) 81

K

Kff gain 71
Kp gain position regulator 68
Kp gain regulation 78, 79

L

level of gain switching (Pr-1.25) 75
line break detect 53
line loss check 49
LIV command 44
load inertia 51
low pass filter (IReg) 77, 78, 79
low pass filter (VReg) 77, 78, 80
lowpass filter
 current 69
 position 69
 velocity 69

M

manual task (TMN) 40
manual velocity limit (Pr-2.12) 84
master counts 87
maximum linear speed (Pr-9.18) 106
maximum rotary speed (Pr-9.13) 105
maximum speed 105, 106
MDM command 35
mnemonic commands
 DIE 44
 HWR 45
 SVROF 45
 SVRON 45
modbus address map 13
 display parameter - input register 24
 fault/warning registers 24
 indexing parameter
 group 0 - indexing system 15
 group 0 - special index 15
 group 1 - index homing 16
 group 10 - index acceleration 20
 group 11 - index deceleration 21
 group 12 - next index 22
 group 2 - index option 16
 group 3 - reserved 16
 group 4 - indexing position/distance 17
 group 5 - reserved 18
 group 6 - reserved 18
 group 7 - index dwell 18
 group 8 - index velocity 19
 group 9 - reserved 19
 standard parameters
 group 0 - system level 13
 group 1 - gain control 13

- group 2 - speed control 14
- group 3 - position control 14
- group 4 - torque control 14
- group 5 - supplemental drive control 14
- modbus exception codes** 12
- modbus function codes** 11
- MODBUS input function control** 66
- MODBUS run function control** 66
- monitor offset** 101, 102
- monitor scaling** 102
- monitor variable** 131
- monitor variable (MDM)** 35
- monitoring parameters address map** 24
- MOR command** 38
- MOT command** 36
- motor basic modes (Pr-0.02)** 49
- motor continuous current (Pr-9.05)** 104
- motor enable (START)** 58
- motor flag** 103
- motor forward direction** 49
- motor identification** 53
- motor inductance (Pr-9.03)** 103
- motor inertia** 51
- motor inertia (Pr-9.10)** 105
- motor intermittent current (Pr-9.04)** 103
- motor mass (Pr-9.15)** 106
- motor model (Pr-9.50)** 108
- motor rated voltage (Pr-9.06)** 104
- motor resistance (Pr-9.02)** 103
- motor thermal capacitance, winding to ambient (Pr-9.24)** 107
- motor thermal capacitance, winding to encoder (Pr-9.22)** 107
- motor thermal protection enable (Pr-9.19)** 106
- motor thermal resistance, winding to ambient (Pr-9.23)** 107
- motor thermal resistance, winding to encoder (Pr-9.21)** 107
- motor thermostat (Pr-9.20)** 106
- motor type (Pr-9.01)** 103

N

- near position (NEAR)** 62
- near position size (Pr-5.02)** 92
- negative current limit (N-TL), positive current limit (P-TL)** 57
- negative deceleration distance (IN00.03)** 115
- negative external current limit (Pr-4.04)** 91
- negative internal current limit (Pr-4.02)** 90
- negative overtravel (N-OT)** 56
- negative software limit (IN00.06)** 116
- next index 0...63 (IN12.00...IN12.63)** 128

notch filter

- 1st resonance 70
- 2nd resonance 70
- 2nd resonance depth 71

O

- off-line tuning** 50
- on-line vibration mode (Pr-1.22)** 74
- on-line vibration suppression** 74
- operation mode override (C_SEL)** 57
- operations mode (Pr-0.00)** 48
- oscilloscope** 110
- oscilloscope scaling** 111
- other functions(ETC)** 43
- output function status address map** 25
- overtravel current limit (Pr-4.05)** 91
- overtravel settings (P-ot) and N-OT)** 56
- overtravel stop** 49
- overtravel stop method** 49

P

- P gain regulation** 77, 79
- P gain regulator** 67
- packet structure** 29
- parameter setting values (Pr-0.10...Pr-0.21)** 61
- parameter setting values (Pr-0.22...Pr-0.32)** 66
- parity bit** 55
- password (Pr-0.08)** 55
- pause indexing (PAUSE)** 59
- poles/revolution (Pr-9.11)** 105
- position clear (PCLR)** 58
- position command lowpass filter bandwidth (Pr-1.09)** 69
- position gain switching time (Pr-1.27)** 76
- position regulator high error output offset (Pr-1.19)** 73
- position regulator high error output threshold (Pr-1.20)** 73
- position regulator Kff bandwidth (Pr-1.16)** 71
- position regulator Kff gain (Pr-1.15)** 71
- position regulator Kp gain (Pr-1.06)** 68
- position scaling data(Pr-9.52)** 109
- position scaling label (Pr-9.53)** 109
- position strobe (ABS-DT)** 58
- position window (P-COM)** 61
- positive deceleration distance (IN00.02)** 114
- positive external current limit (Pr-4.03)** 90
- positive internal current limit (Pr-4.01)** 90
- positive overtravel (P-OT)** 56
- positive software limit (IN00.05)** 116
- power input** 49
- preset direction (C-DIR)** 57

preset select (C-SP1, C-SP2, C-SP3) 57
preset velocity 48
preset velocity 1 (Pr-2.05) 82
preset velocity 2 (Pr-2.06) 82
preset velocity 3 (Pr-2.07) 83
preset velocity 4 (Pr-2.08) 83
preset velocity 5 (Pr-2.09) 83
preset velocity 6 (Pr-2.10) 83
preset velocity 7 (Pr-2.11) 84
proportional gain 72

R

read drive status (STS) 42
read fault contents (EHY) 41
read fault detailed data (DIE) 44
read indexing parameter (XET) 33
read parameter (SET) 31
reboot drive 45
reserved (Pr-3.07) 88
reserved (Pr-5.01) 48, 92
reserved (Pr-5.11) 95
reserved (Pr-7.02) 101
reserved (Pr-9.28... Pr 9.49) 108
reset absolute encoder data (R_ABS) 59
reset drive (HWR) 45
RS 29
RST command 35
run control 66
running parameter 26

S

sampling period 98
scaling
 acceleration data 109
 acceleration label 109
 position data 109
 position label 109
 velocity data 109
 velocity label 109
scope config (Pr-9.58) 110
scope scaling (Pr-9.59) 111
S-curve time (Pr-2.04) 82
serial port configuration (Pr-0.09) 55
SET command 31
special indexing parameter
 address map 15
speed clamp (Z-CLP) 58
speed window (Pr-5.03) 93
speed window (V-COM) 61
standard motor flag (Pr-9.00) 103
standard parameters address map 13
start homing (SHOME) 59
start index (START_I) 60
start indexing 114
startup commutation (Pr-9.27) 108

stop bit 55
stop homing (H_STOP) 60
stop indexing (STOP) 59
STR command 32
STS command 42
STX 29
suppression filter 99, 100
symbols 29
system gain (Pr-1.01) 67

T

TAT command 39
thermal capacitance 107
thermal protection 106
thermal resistance 107
thermostat 106
TMN command 40
**training, See <emph>\$default font
triggered data collection (MOT) 36**

U

u phase current sensing offset (Pr-6.02) 97
up to speed (Pr-5.04) 93
up to speed (TG-ON) 61
US 29

V

variable 131, 133
 15 - digital inputs and outputs 133
 25 - digital inputs 133
 26 - digital outputs 134
 29 - indexing inputs 134
 30 - indexing outputs 135
variable roll monitoring (MOR) 38
velocity error filter (Pr-1.05) 68
velocity limit 84
velocity limit (V-LMT) 62
velocity limit mode (Pr-2.13) 84
velocity observer 52
velocity offset 97
velocity presets 48
velocity regulator configuration (Pr1.23) 75
velocity regulator D gain (Pr-1.04) 68
velocity regulator I gain (Pr-1.03) 67
velocity regulator I gain disable threshold (Pr-1.18) 73
velocity regulator I gain mode (Pr-1.17) 72
velocity regulator P gain (Pr-1.02) 67
velocity regulator response level (Pr-1.00) 67
velocity scaling data (Pr-9.54) 109
velocity scaling label (Pr-9.55) 109
velocitycommand lowpass filter bandwidth (Pr-1.08) 69
velocityscale (Pr-2.00) 81

VER command 44
verify servo connection (LIV) 44
verify software version (VER) 44
vibration suppression 69, 74

W

w phase current sensing offset (Pr-6.03) 97
warning (WARN) 62
warnings 129
watchdog timer 45, 130
within position window (P-COM) 61
within speed window (V-COM) 61
write indexing parameter (XHP) 34
write indexing parameter (XTR) 34
write parameter (CHP) 32
write parameter (STR) 32

X

XCE command 33
XET command 33
XHP command 34
XTR command 34

Z

zero clamp (Pr-5.05) 93
zero speed (Z-CLP) 58

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support>, you can find technical manuals, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools. You can also visit our Knowledgebase at <http://www.rockwellautomation.com/knowledgebase> for FAQs, technical information, support chat and forums, software updates, and to sign up for product notification updates.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnectSM support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/support/>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Publication 2071-RM001B-EN-P - April 2013

Supersedes Publication 2071-RM001A-EN-P - September 2010

Copyright © 2013 Rockwell Automation, Inc. All rights reserved. Printed in the U.S.A.