.K Parameters vV3.3

Export to PDF

Version: 1.0.0

Introduction

K parameters are setup parameters. They are used to setup a number of functions such as inputs, outputs, motor resolution, s-curve, baud rate and alarm tolerances.

Saving of K Parameters

K parameters are automatically saved to non volatile memory when they are changed. Typically K parameters are only used during setup but occasionally are changed during runtime by an application. If K parameters are repeatedly changed the lifetime of non-volatile memory will be reduced. The _SKH command can be used to switch off automatic saving of K parameters. This command is only available in the command line and is reset on a power cycle.

_SKH Value	Description
_SKH=0	K parameters are not saved automatically
_SKH=1	K parameters are saved automatically • Default value

The value can be queried by sending _SKH.

Note: All commands use a carriage return as a terminating character.

K14	Power up Delay	Unit: ms

Set a delay for the power up of the motor. If K14 is set to 0, as soon as power is applied to the motor, the power up sequence begins. If you need to delay this so that the motor powers up after other equipment, you can program up to a 32s delay.

Min: 0

Max: 32000

Default: 0

K20	Baud Rate	Unit: bits/s

Sets the baud rate for the main communications of the motor. There are four available baud rates. Additionally, K20 allows you to set the motor to communicate using Modbus. Values 0-3 are for standard serial communications, values 10-13 set Modbus mode.

Valid Entries:

0:38400

1:9600

2:19200

3:57600

10:38400 Modbus

11:9600 Modbus

12:19200 Modbus

13:57600 Modbus

Default: 0

K21 Semi / Full Closed Loop Operation

Unit: 0.1 degree

Allows you to set an area around the target position in which the motor will revert to an open loop mode. If the current position leaves this area, the motor will resume closed loop operation and attempt to return to the target position. This has the effect of reducing any slight servoing or vibrations as the motor attempts to hold the target position

0 = full closed loop

1 – 36 = angle in 0.1deg

Default: 0

K22 Time Delay for Semi Closed Loop Operation

Unit: ms

Sets the time delay between when the target position is reached, and when the motor goes in to open loop mode, if K21 is set to use semi-open loop mode.

Min: 10

Max: 1000

Default: 0

K22 Time Delay for Semi Closed Loop Operation

Unit: ms

Sets the time delay between when the target position is reached, and when the motor goes in to open loop mode, if K21 is set to use semi-open loop mode.

Min: 10

Max: 1000

Default: 0

K23 Event Status

Unit: -

Allows certain events to be communicated automatically by the motor on the serial port. These options can be combined; for example, setting K23=2 will make the motor communicate only when the input states are changed, but setting K23=6 will communicate both the input and output status.

Valid Entries:

0: No Status

1: All Alarm and Status Codes (*See Motor Status and Error States*)

2: Input Status

4: Output Status

8: Disable Echo

16: Enable Warning and Messages (*See Motor Status and Error States*)

32: Merge Motion Event *(See merge motion)*

Default: 1

K24 Quadrature Output Interval

Unit: pulses

Sets the output interval, or pulse width, of the quadrature encoder output. For more information see *quadrature encoder output*.

Min: 4

Max: 32767

Default: 1000

K25 Time Delay for Slow Signal Response

Unit: 0.1s

Sets the time delay for the slow response input functions for each input. K25 consists of four digits, one for each input in the following format:

$K25 = N_4N_3N_2N_1$

N_4= Input 4 Time

N_3= Input 3 Time

N_2= Input 2 Time

N_1= Input 1 Time

For example, a value of 3333 will provide a 0.3s delay for the slow signal activation on each input.

For more information, see *Input Activation*.

Min: 1

Max: 9

Default: 3333

K26 Invert Input Signal

Unit: -

Invert the operation of the input operation.

The format is the same as K25.

0 = Normal Operation

1 = Inverted

Default: 0000

K27 Input Function at Quick Response Logical High

Unit: -

Sets the function of the input at the quick response logical high function. This function will trigger within 1ms of the input being active. For more information on the individual functions, see *Input Functions*.

Each input is set individually in the following format:

$K27 = N_4N_3N_2N_1$

N_4= Input 4 function

N_3= Input 3 function

N_2= Input 2 function

N_1= Input 1 function

Default: 0000

0: No Action

1: General Use

2: Origin Sensor

3: Manual Feed CW

4: Manual Feed CCW

5: N/A

6: CW Limit/Origin Switch

7: Emergency Stop

8: Full Stop

9: CCW Limit/Origin Switch

K28 Input Function at Quick Response Rising Edge

Unit: -

Sets the function of the input at the quick response rising edge.

The format is the same as K27.

Default: 0000

0: No Action

1: Alarm Reset / Pause

2: Disable Motor

3: Reset Position Counter

4: Execute Next Step

5: Execute Previous Step

6: Run Program Bank 1

7: Begin Origin Search

8: Jog CW or Execute Program Bank 2 (See K36)

9: Jog CCW or Execute Program Bank 3 (See K36)

K29	Input Function at Quick Response Falling Edge	Unit: -

Sets the function of the input at the quick response falling edge.

The format is the same as K27.

Default: 0000

0: No Action

1: Alarm Reset / Pause

2: Enable Motor

3: Reset Counter

4: Execute Next Step

5: Execute Previous Step

6: Run Program Bank 1

7: Begin Origin Search

8: Jog CW or Execute Program Bank 2 (See K36)

9: Jog CCW or Execute Program Bank 3 (See K36)

K30	Input Function at Slow Response Logical High	Unit: -

Sets the function of the input at the slow response logical high.

The format is the same as K27.

Default: 0000

0: No Action

1: General Use

2: Origin Sensor

3: Manual Feed CW

4: Manual Feed CCW

5: N/A

6: CW Limit/Origin Switch

7: Emergency Stop

8: Full Stop

9: CCW Limit/Origin Switch

K31	Input Function at Slow Response Rising Edge	Unit: -

Sets the function of the input at the slow response rising edge.

The format is the same as K27.

Default: 0000

0: No Action

1: Alarm Reset / Pause

2: Disable Motor

3: Reset Counter

4: Execute Next Step

5: Execute Previous Step

6: Run Program Bank 1

7: Begin Origin Search

8: Jog CW or Execute Program Bank 2 (See K36)

9: Jog CCW or Execute Program Bank 3 (See K36)

K32	Input Function at Slow Response Falling Edge	Unit: -

Sets the function of the input at the slow response rising edge.

The format is the same as K27.

Default: 0000

0: No Action

1: Alarm Reset / Pause

2: Enable Motor

3: Reset Counter

4: Execute Next Step

5: Execute Previous Step

6: Run Program Bank 1

7: Begin Origin Search

8: Jog CW or Execute Program Bank 2 (See K36)

9: Jog CCW or Execute Program Bank 3 (See K36)

K33 Output Logic

Unit: -

Sets the function of the output logic. If the output is programmed a 0 it will be active high. This means that the output level will be floating when the output is triggered and pulled to ground when inactive. If the output is programmed as a 1 it will be active low. This means that the output will be pulled to ground when triggered and floating when inactive.

Each output is set individually in the following format:

K33 = N_2N_1

N_2= Output 2

N_1= Output 1

Default: 11

0: Active High

1: Active Low

K34 Output Function

Unit: -

Sets the function of each output. For more information on the output types, see *Output Functions*.

Each output set individually in the following format:

K34 = N_2N_1

N_2= Output 2 function

N_1= Output 1 function

Default: 21

0: AO2

1: In Position

2: Alarm

3: CML O1/F1

4: CML O2/F2

5: Analog Output

6: Merge Motion

7: Quadrature Output (See *quadrature encoder output* for additional information)

8: Motor Free

9: Push Mode Torque Limit Reached

K35	Analog Output Function	Unit: -

Sets the function of any output programmed as *analog output*.

K35 = N_2N_1

N_2= Output 2 function

N_1= Output 1 function

Default: 21

0: Target Position

1: Target Position x8

2: Current Position

3: Current Position x8

4: Position Error

5: Position Error x8

6: Current Velocity /16

7: Current Velocity /2

8: Motor Current

9: Motor Current x8

K36	Pulse Interface	Unit: -

If the CM1 motor is configured as a P type (pulse interface type), this parameter will configure the operation of the motor to be either step and direction type, or a simple clockwise and counter clockwise type.

If the motor is configured as a standard C type motor, this parameter will set whether additional banks can be triggered from an input. See K28.

Default: 0

0: CW/CCW

1: Step/Direction

2: Enables Bank 2 and 3 activation

K37	Resolution and Speed Unit	Unit: Pulses

Sets the resolution of the motor in pulses per rotation, and the speed unit of the motor in pulses per second. For more information on the speed unit see *Speed*.

Default: 3

Speed Unit (pps)	Motor Resolution (ppr)	
100	0:200 1:400 2:500 3:1000 4:2000 5:2500 6:5000 7:10000 8:25000 10:50000	40:300 42:600 43:800 44:1200 45:1500 46:3000 47:4000 48:6000 49:8000 50:12000
10	20:200 21:400 22:500 23:1000 24:2000 25:2500 26:5000 27:10000 28:25000 30:50000	60:300 62:600 63:800 64:1200 65:1500 66:3000 67:4000 68:6000 69:8000 70:12000
1	100: 50000	

K38	Analog Interface	Unit: -

Determines the function of the analog input if it the motor is set to analog control only (K64=9). For more information on the analog input functions, see *Analog Input.*

Default: 1

0: Speed Control

1: Position Control

K39 Voltage Filter Gain

Unit: 5 rad/s

Set the cut off frequency for the analog input. Use this to reduce noise on the analog input.

Default: 128

Min: 0

Max: 1024

K40 Analog Control Speed Limit

Unit: RPM

When using the analog input control (K64=9) set to speed control (K38=0), this sets the maximum speed of the motor when the analog input voltage is at 4.8VDC.

Default: 200

Min: 0

Max: 3000

⚠ *Max speed is dependent on the specifications of your particular motor model.*

K41 Analog Control Travel Limit

Unit: Pulses

When using the analog input control (K64=9) set to position control (K38=1), this sets the maximum travel range of the motor. When the motor powers up, the initial position is 0. The motor will move between position 0 and the maximum position value by increasing the analog input voltage between 0.2VDC and 4.8VDC respectively.

Default: 2000

Min: -32767

Max: 32767

K42 Origin Search Speed

Unit: 100pps

Sets the speed of the motor in 100 pulses per second, any time an origin search is performed.

Default: 10

Min: 1

Max: 5000

K43 Origin Search Acceleration

Unit: $Kpps^2$

Sets the acceleration of the motor in 1000 pulses per second squared, any time an origin search is performed. This acceleration is also used for the manual feed function.

Default: 100

Min: 1

Max: 5000

K44	Deceleration Ratio	Unit: %

Sets the deceleration as a percentage of the acceleration of the current move. This ratio will apply to the deceleration of all moves.

Default: 100

Min: 10

Max: 500

K45	Origin Search Direction	Unit: -

Sets the direction for the origin search. You are also able to change the direction that is considered "positive" by the motor.

Default: 1

0: Clockwise

1: Counterclockwise

2: Clockwise with reverse coordinates

3: Counterclockwise with reverse coordinates

⚠ For example: if K45=0, the motor will run clockwise until it finds the origin. At this point, any positive positions will be clockwise from the origin. If K45=2, the origin search will still run clockwise, but any positive positions will then be counterclockwise of the origin.

K46	Origin Search Method	Unit: -

Sets the method by which the motor will search for the origin. This parameter also allows you to set the motor to power up with the motor disabled, or free.

Default: 0

0: Hard Stop

1: Hard Stop Search Immediately on Power Up

2: Origin Switch

3: Origin Switch Search Immediately on Power Up

16: Hard Stop and Power Up with Motor Disabled

18: Origin Switch and Power up with Motor Disabled

K47	Origin Stopper Torque	Unit: %

Sets the percentage of the total motor torque which is required to detect a hard stop.

Default: 30

Min: 10

Max: 100

K48	Origin Offset Distance	Unit: 100 Pulses

Allows you to set an offset from the mechanical origin for where you want the motors position 0 to be.

Default: 0

Min: -32767

Max: 32767

K49	Manual Feed Speed	Unit: 100 Pulses
Sets the speed for a Manual Feed motion if programmed in K27. *Default: 30* Min: 10 Max: 100		

K50	Manual Jog Travel Distance	Unit: Pulses
Sets the distance in pulses for a Manual Jog move if programmed in K28. *Default: 10* Min: 10 Max: 100		

K52	I/O 1&2 Digital or Serial	Unit: -

Since inputs and outputs 1 and 2 can be used as either a digital I/O or for serial communications, this sets the behaviour of these I/O.

K52 = N_2N_1

N_2= I/O2 function

N_1= I/O1 function

Default: 00

0: Auto Detect

1: Force Serial Communications

2: Force Digital I/O

IN/OUT1 cannot be forced to digital

K53 Brake Output

Unit: -

Allows you to select a motor output to be used as a brake. This output will switch any time the motor is disabled/enabled. This included being manually disabled, or being disabled through an error or alarm.

In order to set an output as the Brake, the output must be set as 0 in K34. You may then enter the output number you wish to be a brake output in K53. If the output has a setting in K34, then K53 will be ignored.

e.g.

Making output 2 a brake output:

K34=01

K53=2

If you wish to invert the output, simply make the output number negative:

K53=-2

Default: 0

Min: -6

Max: 6

K54 Quadrature Output Offset

Unit: pulses

Sets an offset from the motors 0 position for the first pulse on the quadrature output.

See *quadrature encoder output* for additional information.

Default: 0

Min: 0

Max: 32767

K55 In Position Tolerance

Unit: pulses

Sets the position tolerance for when the motor will send the in position signal, and move to the next step in the program if applicable. For example, if you tell the motor to move to position 1000 and K55=10, the motor will send the in position signal when the current position reaches 990. If the motor stops on this position however, it will continue to try and hold the position at 1000, not 990.

Default: 5

Min: 1

Max: 100

K56 Position Error Overflow Alarm

Unit: 1000 pulses

Sets the maximum value for the position overflow error. If the position error reaches above the value set in K56 in thousands of pulses, the motor will generate a position overflow error and will enter the disabled state.

Default: 50

Min: 1

Max: 32767

K57 Overload Alarm Delay

Unit: ms

Sets the time delay between when an overload condition is detected, and when the motor faults and becomes disabled. An overload condition is any time the motors current/torque exceeds the rated maximum torque.

Default: 3000

Min: 100

Max: 10000

K58 + Software Position Limit

Unit: 100 pulses

Sets the positive position limit for the motor. When the motor reaches the programmed position it will stop. In a program bank, any motion that would instruct the motor to go beyond this limit is instead ended at the limit and the program will then move to the next step. A value of 0 will disable this limit.

Default: 0

Min: 0 (off)

Max: 32767

K59 - Software Position Limit

Unit: 100 pulses

Sets the negative position limit for the motor. When the motor reaches the programmed position it will stop. In a program bank, any motion that would instruct the motor to go beyond this limit is instead ended at the limit and the program will then move to the next step. A value of 0 will disable this limit.

Default: 0

Min: 0 (off)

Max: -32767

K60 Pushmode Current Limit

Unit: %

This is the amount of torque used when running a push move. This torque is entered as a percentage of 80% of max torque. For example, K60=30 will cause the push move to use 30% of 80% max torque, or 24%.

Default: 0

Min: 10

Max: 80

K61 Push Mode Holding Time

Unit: ms

Sets the length of time to push for when using a push move. If a time of 3001 is entered, this will result in an indefinite push time.

Default: 200

Min: 10

Max: 3001

K62	RS-485 Node ID	Unit: -

Allows you to set the motor in to RS-485 mode and set the node ID. When using MODBUS mode, set K65 first. For more information, see *RS-485*.

Default: 0

0: RS-232 Mode

1...256: RS-485 Node ID

-1...-256: RS-485 Node ID, No auto-report

K63	External Encoder Input	Unit: -

Allows you to set the inputs to accept the output from an external encoder. Also allows you to enable the high speed counter variables Fx and Cx.

Default: 0

0: None

1: Phase A Only

2: Phase A and B

3: Enable “Fx” and “Cx” Counter Variables

K64	Analog Input Function	Unit: -

Sets the function of the analog input. The digital value of the analog input will be applied to the selected register.

Default: 0

0: None

1: NA

2: P0 (Target Position)

3: S13

4: P24

5: S14

6: P25

7: Proportional Speed Control between 0 and current Target Speed

8: Position Multiplier - Scales the current target position based on analog input value as a percentage. For example if the analog input value is 100 the target position will remain unchanged. If the analog input value is 1000 the target position will be 10x greater.

9: Analog Control Only (see K38)

When using the analog input to set the P registers (P0,P24,P25), the calculation is as follows:

When using the analog input to set the S registers (S13,S14), the calculation is as follows:

Sx = Analog Input * (K40 *5/6) *1000 / (pulse factor * speed factor) /1179
Px= 1024 * 500 / 10
Px=51200

Pulse factor is the maximum resolution of the motor divided by the current set resolution. For example, by default the motor resolution is set to 1000 (see K37). This means that the pulse factor will be 50000/1000 = 50.

Speed factor is set in K37 and is either 100, 10, or 1. By default the speed factor is 100.

For example, if the analog is set to the maximum value of 1024, and k40 is programmed as 200:

Sx = 1024*(200*5/6) *1000 / (50 * 100) / 1179

Sx = 28

K65 Slave Motor Baud Rate

Unit: bits/s

Sets the baud rate for communication to other motors downstream on a daisy chain. If setting the baud rate for Modbus mode, set the last motor only.

Default: 0

0: 38400

1: 9600

2: 19200

3: 57600

4: 76800

5: 129000

6: 173000

7: 515000

Modbus Mode:

10: 38400

11: 9600

12: 19200

13: 57600

14: 76800

15: 129000

16: 173000

17: 515000

K66	Data Streaming	Unit: -

When set, this will cause the motor to continually stream out the requested data at the timing programmed in K67. This is useful for obtaining data to analyze a movement.

Default: 0

0: Disable Streaming

1: Target Speed

2: Real Position

3: Real Speed

4: Real Motor Current

5: Real Position in Full 50k Resolution

6: Real Velocity in Full 50k Resolution

For more details, see K66 Parameters

K67 Data Streaming Sample Time

Unit: ms

Sets the data streaming sample time if there is data programmed to be streamed in K66.

Default: 0

Min: 0

Max: 3000

K69 S-Curve Gain

Unit: -

Sets the gain of the S-curve functionality. By setting a higher gain, the motor will attempt to produce a more aggressive S-curve.

Default: 128

Min: 0

Max: 1024

K70 Data Delimiter

Unit: -

Sets the way in which the motor will delimit the end of any replied data.

Default: 1

0: Carriage Return Only

1: Carriage Return and Line Feed

K71 Temperature Alarm Limit

Unit: °C

Sets the temperature alarm limit. When the temperature in the driver case at the back of the motor exceeds the programmed limit, the motor will enter a disabled state and output the “Ux=128” temperature alarm status. This alarm status can be reset once the temperatures is at least 10°C lower than the programmed alarm temperature.

Default: 150

Min: 0

Max: 150

K72 -

N/A

K72 is not implement and has no affect

K73 Merge Motion Signal Output Length

Unit: ms

Sets the length of time that the merge motion output is active for, if there is an output programmed for the merge motion event in K34. For more Information about merge motion, see *merge motion*.

Default: 10

Min: 0

Max: 1000

K74 External Torque Feedback P-Gain

Unit: -

Sets the gain of external proportional torque feedback.

Default: 0

Min: 0

Max: 1000

K75 External Torque Feedback I-Gain

Unit: -

Sets the gain of external integral torque feedback.

Default: 0

Min: 0

Max: 500

K85 Logic Bank to Start at Power Up

Unit: -

Allows you to set the motor to start a particular logic bank when the motor powers up. This way you may have the motor execute a certain program without the need for manual intervention. Only logic banks can be activated in this way, though program banks can be activated from inside logic banks. A value of 0 will disable any automatic starts.

Default: 0

Min: 0

Max: 30

K86 Coordinated Motion Synchronization

Unit: -

When using coordinated motion with multiple motors, turning on synchronization will cause the motor to stream a sync bit to ensure both motors are moving together with perfect timing. This may cause a reduction in the smoothness of motion in the secondary motor and is not recommended for most applications.

Only enable this bit on motor one, as communication issues could arise if more than one motor is trying to send the sync bit.

Default: 0

0: Off

1: On

K87 Logic Bank Scan Time

Unit: ms

Sets the time it takes for the motor to scan through an entire logic bank. This will be the minimum time, as depending on the number of steps in the bank, it could take longer.

Default: 0

Min: 1

Max: 32767

K88 External Encoder Resolution

Unit: pulses

If you are using external encoder feedback, this will program the resolution of the encoder.

Default: 0

Min: 1

Max: 50000

K89 Modbus Input Register Address

Unit: -

Sets the modbus address for the input register.

Default: 640

Min: 0

Max: 65535

K90 Modbus Output Register Address

Unit: pulses

Sets the Modbus address for the output register.

Default: 2048

Min: 0

Max: 65535