

K Parameters

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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:

$$K25 = N_4 N_3 N_2 N_1$$

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: -
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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:

$K_{34} = N_2 N_1$

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*.

$$K35 = N_2 N_1$$

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	40:300
	1:400	42:600
	2:500	43:800
	3:1000	44:1200
	4:2000	45:1500
	5:2500	46:3000
	6:5000	47:4000
	7:10000	48:6000
	8:25000	49:8000
	10:50000	50:12000
10	20:200	60:300
	21:400	62:600
	22:500	63:800
	23:1000	64:1200
	24:2000	65:1500
	25:2500	66:3000
	26:5000	67:4000
	27:10000	68:6000
	28:25000	69:8000
	30:50000	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. <i>Default: 2000</i> 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. <i>Default: 10</i> 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. <i>Default: 100</i> 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. <i>Default: 100</i> 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. <i>Default: 1</i> 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: -
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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. <i>Default: 30</i> 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. <i>Default: 10</i> Min: 10 Max: 100		

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

$$K52 = N_2 N_1$$

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 <i>Default: 0</i> Min: -6 Max: 6		

K54	Quadrature Output Offset	Unit: pulses
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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:

$$Sx = \text{Analog Input} * (K40 * 5/6) * 1000 / (\text{pulse factor} * \text{speed factor}) / 1179$$
$$Px = 1024 * 500 / 10$$

K65

Slave Motor Baud Rate

Unit: bits/s

Pulse factor is the resolution of the analog input 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:

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

$$Sx = 28$$

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. <i>Default: 0</i> 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. <i>Default: 128</i> Min: 0 Max: 1024		
K70	Data Delimiter	Unit: -
Sets the way in which the motor will delimit the end of any replied data. <i>Default: 1</i> 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. <i>Default: 150</i> 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. <i>Default: 10</i> Min: 0 Max: 1000		
K74	External Torque Feedback P-Gain	Unit: -
Sets the gain of external proportional torque feedback. <i>Default: 0</i> Min: 0 Max: 1000		
K75	External Torque Feedback I-Gain	Unit: -
Sets the gain of external integral torque feedback. <i>Default: 0</i> 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. <i>Default: 0</i> 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