Quick Reference Guide

Version 1.02

COOLMUSCLE - RT3

K parameters

Reliance Precision Mechatronics LLP

COOL MUSCLE

www.rpmechatronics.co.uk

K #	Description	Unit	Values
K20	Uart0 baud rate	Kbits	0:38.4, 1:9.6, 2:19.2, 3:57.6 10:13->modbus 10:38.4, 11:9.6 12:19.2 13:57.6
K21	Semi/full closed loop	0.1 deg	0: full closed loop 1-36: vector angle
K22	Time delay for semi closed loop	msec	min: 10 max: 1000
K23	Event status	N/A	0:Polling only 1: All alarm and motor status codes 2:Input status 4: Output status 8: Disable echo 16: Enable warnings and messages 32: Merge event - "Mx"
K24	Timed trigger and quadrature output interval (see K34)	pulses	min: 10 max: 32767
K25	Time delay for slow signal response	0.1 sec	min: 1 max:9
K26	Invert input signal		0: True 1: False
K27	Input function at target voltage level of Quick Response Signal		0: No Action 1: General Use 2: Origin Sensor 3: Manual Feed CW 4: Manual Feed CCW 5: Output Index signal not Inposition Signal 6: CW limit Switch and origin switch 7: Emergency Stop 8: Full Stop 9: CCW Limit and origin switch
K28	Input function at the rising edge of Quick Response Signal		0:No Action 1:Alarm reset/Pause 2:Motor Free 3:Reset Counter 4:Execute Next Step 5:Execute Previous Step 6:Execute Bank 1 7:Go Origin 8:Jog CW (Execute Bank 2 when K36=2) 9:Jog CCW(Execute Bank 3 when K36=2)
K29	Input function at the falling edge of Quick Response Signal		Same Functions as K28 except 2: Enable Motor
K30	Input function at target voltage level of Slow Response Signal		Same Functions as K27
K31	Input function at the rising edge of Slow Response Signal		Same Functions as K28
K32	Input function at the falling edge of Slow Response Signal		Same Functions as K28 except 2: Enable Motor
K33	Output Logic		0: Normally open 1: Normally closed
K34	Output function		0:Command 1:Inposition 2:Alarm 3:CML O1/F1 4:CML O2/F2 5:Analog Output 6:Output on completion of Origin Search 7:Timed Trigger 8: Quadrature output*/motor free** 9: Torque Limit reached - Push Mode Only *Quadrature output if both outputs set to 8 (E.g. K34=88) **motor free if one output is set to 8. (E.g. K34=80)
K35	Analog output function		0: Target position 1: Target position magnified by 8 2: Current Position 3: Current Position magnified by 8 4: Position Error 5: Position Error magnified by 8 6: Current Velocity/16 7: Current Velocity /2 8:I q Real 9: Iq*8

K #	Description	Unit	Values
K36	Pulse interface		P type 0:CW/CCW 1:Step/Direction C type - 2: enables bank 2 and 3 execution
K37	Resolution and speed unit	Speed unit: 100pps Speed unit: 10pps Speed unit: 1pps	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 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 100: 50000
K38	Analog interface (V-type)		0:Speed Control 1:Position Control
K39	Voltage filter gain	5[rad/sec]	Min:0 Max1028
K40	Max speed for V-Type	rpm	max speed at 4.8V
K41	Travel Range for V-Type	Pulses	Min: -32767 Max: 32767
K42	Go origin speed	100pps	Min:1 Max: 5000
K43	Go origin/manual feed acceleration	kpps^2	Min: 1 Max: 5000
K44	Deceleration ratio	%	Min: 10 Max: 500
K45	Origin direction		0: CW 1: CCW 2: CW with reverse coordintes 3: CCW with reverse coordinates
K46	Origin search method		0:Stopper 1:Stopper(start search on powerup) 2:Origin Switch 3:Origin Switch (start search on powerup) 16: same as 0 but powerup disabled 17: same as 1 but powerup disabled 18: same as 2 but powerup disabled 19: same as 3 but powerup disabled
K47	Origin Stopper Voltage Level	%	Min:10 Max:100
K48	Offset distance between machine origin and mechanical origin	100 pulses	Min: -32767 Max: 32767
K49	Manual feed speed	100pps	Min:1 Max:5000
K50	Manual Jog travel distance	Pulses	Min: 1 Max: 100
K51	Creeping speed	100pps	Min: 1 Max 1000

K #	Description	Unit	Values
K55	Inposition tolerance	Pulses	Min: 1 Max 1000
K56	Overflow alarm level	Kpulses	Min: 1 Max: 32767
K57	Overload alarm time delay	msec	Min:100 Max:10000
K58	Software Limit (+)	100 pulses	Min: 0 (off) Max: 32767
K59	Software Limit (-)	100 pulses	Min: -32767 Max: 0 (off)
K60	Pushmode current level	%	Min: 10 Max: 80 NOTE: pushmode % is based on 80% of full torque
K61	Push time	msec	Min: 1 Max: 30001 (infinite push)
K62	RS-485 Node ID Modbus Statiion ID		0: RS-232 mode 1~256: RS-485 ID -1~-256: RS-485 Node ID, no auto report function NOTE: set K65 first when using Modbus
K63	External encoder input		0:None 1:Phase A only 2:Phase A and B 3: Enable "Fx" and "Cx" variables
K64	Analog input function		0:None, 1:S0, 2:P0, 3:S13, 4: P24 5:S14, 6:P25, 7:Speed 0-Set speed 8:Position Mulitplier 9:Analog control only (K38) NOTE: see documention on logic banks for complete control with analog input
K65	Slave motor Baud Rate Set master motor only Modbus baudrate Set last motor onlu	Kbits	0:38.4, 1:9.6 2:19.2, 3:57.6 4:76.8, 5:129 6:173, 7:515 10:38.4, 11:9.6, 12:19.2, 13:57.6 14:76.8, 15:129, 16:173, 17:515
K66	Data Streaming		0: None. 1: Send back speed target 2: Send back real position 3: Send back real speed 4: Send back real current Iq 5: Position Real 6: Velocity Real
K67	Data Streaming sample timing	msec	0-3000
K68	S curve Function		0:S Curve with fixed timing 1:S Curve without timing
K69	S Curve Gain		0~1024
K70	Send carriage return		0: No line feed after carriage return 1: Line feed afer carriage return
K71	Temperature limit	Deg C	Min: 0 Max: 150
K72	Regeneration voltage return level	0.1V	Min: 0 Max: 391
K73	Merge motion output signal length	msec	Min: 1 Max: 1000
K74	External Torque feedback P-Gain		Min: 0 Max: 1000
K75	External Torque feedback I-Gain		Min: 0 Max: 500
K77	External Torque feedback mean value	4.88mV	Min: 0 Max: 1024
K78	External Torque feedback Gain		Min:-1024 Max: 1024
K85	Logic bank number to start on powerup		Min: 0 (no bank) Max: 30
K86	Coordiniated motion - Synchronize motors		0: Off 1: On
K87	Logic bank scan period	msec	Min: 1 Max: 32767
K88	External encoder resolution		Min: 0 Max: 50000
K89	Modbus input register address		Min: 0 Max: 65535
K90	Modbus output register address		Min: 0 Max: 65535

Quick Reference Guide

Version 1.02

COOLMUSCLE - RT3

CML List

Reliance Precision Mechatronics LLP

COOL MUSCLE

www.rpmechatronics.co.uk

Command	Function	Example
P0, S0, A0, M0	Dynamic commands Position, Speed, Acceleration and Torque S0, A0, M0 can be changed while the motor is running.	P0=1000, S0=200 A0=10, M0=75 ^
^	Dynamic command execution	P=1000,S=100,A=200 ^
^n	Dynamic command execution n=1 to 8	P3=2000,S3=100,A3=100 ^3
P P1-P25	Position (pulses)	P1=12500 P2=2000
S S1-S15	Speed (see K37 for unit)	S1=100 S2=200
A A1-A8	Acceleration (Kpps^2)	A1=250 A2=500
M M1-M8	Torque limit (% full torque) (0-100%)	M0=100 M1=10
T T1-T8	Timer (msec)	T1=100 T2=300
R R1-R25	Radius - Coordinated motion	R5.1=50,R5.2=50 (circle) R5.1=70,R5.2=100 (ellipse)
N N1-N25	Center point - coordinated motion	N1=500 N12=30
V V1-V15	Variable Variables are used in all banks. They can be assigned an internal state in the motor or an integer or string. See RT3 - Banks manual for details	V1="Px" (currnet position) V1="Sx" (current speed) V1="Ix" (current Iq value) V1="Ux" (current motor status) V1="Pe" (current position error) V1="Pt" (target position) V1="Ain4" (analog input 4 - 0~1023) V1="St" (target speed) V1="Fx" (Input 2 frequency) V1="Cx" (Input 2 counter) V1="What" (string type - 4 char max) V1=1976 (long integer type)
U U1-U6	Advanced math function See RT3 - Banks manual for details	U1 - sine U2 - cosine U3 - square root U4 - lookup table U5 - polynomial N U6 - polynomial R
B# END	Program Bank	B1 S1,A1,P1 END
L# END	Logic Bank	L1 S0=V1*S1 END
B100	Clear all program banks	
L100	Clear all logic banks	
[	Execute program bank	[1
[L	Execute logic bank	[L3
>	Execute next line in program bank	>
<	Execute previous line in program bank	<
]L	Stop logic bank	]L
]]1	Pause motor (all motors on a daisy chain) Pause only that motor on a daisy chain Note: To not only stop the motor but completely stop a program bank send the pause command twice with a carriage return or comma between.	]]1.2 e.g.1]] e.g.2],]
*	Emergency stop on all motors	*
*1	disable emergency stop on all motors	*1
}	Stop after current motion	}
C	Call program bank (used only in program banks)	B1 S1,A1,P1 C3 END
CL	Call logic bank (used only in logic banks)	L1 CL2 END
J	Jump program bank (used only in program banks)	B1 J2 END
JL	Jump logic bank (used only in logic banks)	L3 JL1 END
O	Output High	O1
F	Output Low	F1
I	Input Status	I2,C2,C3

Command	Function	Example
X X-	Loop max 255 nested loops allowed	X25 S1,A1,P1+ X25-
Y	P without wait	B1 S1.1,A1.1,Y1.1 P2.2 END
Q	Push mode (Q is set in P)	S1,A1,Q1
Z	Q without wait	A1.1,S1.1,Z1.1 P2.2
T0	No action	I3, C2, T0
W0	wait	I2,C2,W0
~	Continuous Point motion (CP motion) Note: P is assigned at the full resolution of 50 000 ppr.	P=50 ~ …
|(bar)	Origin Search	| - Origin Search |1 - Go to position 0 |2 - Set the current position to 0
(	Enable Motor	(
)	Disable Motor	)
$	Save to EEPROM	$
D	Set Node ID in RS485 Did=serial number	D3=103490138 Sets motor with serial number 103490138 to ID3
{0	Open RS485 communication to all nodes	{0
{n	{n where n=1~255. Address node with ID n. Only node n will communicate until {0 is issued.	{10 - communicate with node 10 {998 - all even number IDs {999 - all odd number ID's {1000 - all IDs
?	Query	?P,?S,?A,?M,?V,?N,?R: All registers ?0~16: Program banks ?1000: All banks (logic and program) ?51: OUT1 status ?52:OUT2 status ?70 :Input status ?71 :Temperature (degrees C) ?74:Analog Input Value CH2 ?76 :Counter Value CH2 (hex) ?79:Push Timer ?85: Power up ID and firmware version ?90 :All parameters ?91:Position Data ?92 :Speed Data ?93 :Acceleration Data ?94:Timer Data ?95:Position Error ?96 :Current Position ?97 :Current Speed ?98 :Iq Real Averaged ?99 :Motor Status 0:Motor running 1:Error Overflow 2:Over regen voltage limit 4:Over load/current 8:Inposition Signal 16: Disabled 32: pushmode torque limit reached (K60) 128:over termperature limit (K71) 256:pushmode timout not reached (K61) 512:emergency stop (*)

CM1 wiring				
Standard motor cable				
Pin #	Colour	Function	Description	Usage
1		+24VDC IN	Motor Power	
2		GROUND1	Power in return	
3		INPUT2-	Return for pin 9	CCW-, Direction-
4		OUTPUT2	Digital Output, Serial Tx	Serial 2
5		OUTPUT1	Digital Output, Serial Tx	Serial 1
6		INPUT4	Digital Input, Analog Input	V+
7		INPUT3	Digital Input	
8		INPUT1-	Return for pin 10	CW-, Step-
9		INPUT2+	Digital Input, Pulse, Counter, Rx	CCW+, Direction+, Serial 2
10		INPUT1+	Digital Input, Pulse, Counter, Rx	CW+, Step+, Serial 1
11		GROUND1	Signal ground	V-
12		+5VDC OUT	Power out (50mA max)	

Wiring Diagram