MQCON Sine-Wave Controller

HCI User Manual

V1.0

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1 Soft Installation and Debugging

1.1 Installation

The soft installation consist of two steps: one is the MQCON interface software installation and the other is usb-485 commutator driver installation.

1-MQCON installation

Double click setup icon under the directory of "MQCON->volume", and finish the installation

according to the default set.

名称	修改日期	类型	大小	标记
🍌 bin	2011/9/5 20:01	文件夹		
길 license	2011/9/5 20:01	文件夹		
退 supportfiles	2011/9/5 20:01	文件夹		
📄 nidist.id	2011/8/21 20:31	ID 文件	1 KB	
🛃 setup	2008/10/8 17:37	应用程序	3,944 KB	
🗊 setup	2011/8/21 20:31	配置设置	8 KB	
📰 setup	2011/8/21 20:31	配置设置		8 KB

Figure 1

2- USB installation

Double Click *setup.exe* icon under the "ch431ser" document and finish the installation according to the default set .

刻录 新建文件夹			
名称 ^	修改日期	类型	大小
DRVSETUP64	2013/2/4 13:35	文件夹	
CH341PT.DLL	2005/7/30 0:00	应用程序扩展	7 KB
CH341S64.SYS	2011/11/5 0:00	系统文件	57 KB
CH341S98.SYS	2007/6/12 0:00	系统文件	20 KB
ch341SER.CAT	2011/11/25 7:22	安全目录	10 KB
CH341SER.INF	2011/11/4 0:00	安装信息	6 KB
CH341SER.SYS	2011/11/5 0:00	系统文件	39 KB
CH341SER.VXD	2008/12/18 0:00	虚拟设备驱动程序	20 KB
🛃 SETUP.EXE	2012/2/15 0:00	应用程序	82 KB

Figure 2

1.2 Debugging

- (1) Use the usb-485 commutator to connect the controller with computer
- (2) Power on the controller $_{\circ}$

Caution : to be sure all connection is right before power on.

(3) Double click the icon *MQCON* on the desktop.



(4) The MQCON setting dialog box open.



Figure 3

Click COMMUNACATION icon, the com configure dialog box open :

MQCON Motor Controller	# H I F AaBt Autor	X
COMMUNICATION! SET! DEBUG! Help!		
RX TX System status 0:power up no finished Battery voltage 0.02 V Battery voltage 9.00 RPM Hall status(CBA) 1 COM CONFIGURE Throttle voltage 1 COM SELECT EbsThrottle voltage 10 Controller temperature 6	Configure Quit	
Error list	Restore factory settings status	0:default
1 A	HALL anlge test status	0:default
16 reseved		
17 reseved		
18 overSpeed		
19 reseved		
20 reseved		OUIT
		Zori
	MQCON Motor Controller	

Firgue 4

(5) Select the right com number, If you don't know the current com number of current USB-485 commutator, you should enter the "system manager" from the control panel of your computer, then you will find the right com number under the COM and LPT icon :

□ 设备管理器	
文件 (E) 操作 (A) 查看 (Y) 帮助 (H)	
□	
	v



(6) Return to the figure 4, when you select the right com number, then click *Configure*, the RX,TX leds on the main interface will twinkle, which mean the communication between the controller and computer succeed, and the *system status* show *system running*, the click the *SET!* Menu, the *parameter setting* dialog box open :

MQCON Moto	or Controller	1 m 1	A STA WEEK	X
COMMUNICATIO	ON SET! DEBUG!	Help!		
RX 🕥 TX	•		• P	
System s	status 0:power up	no finished 💌		
Battery	y voltage 🗐 0.02	V	727	
Mot	tor speed 🗐 9.00	RPM		
Hall sta	atus(CBA) 🗍 10.00			
Throttl	le voltage 🗐 0.00	v	6	
EbsThrottle	e voltage 🗐 0.00	v		
Controller tem	mperature 36.00	Ċ	×	
	Error list		Restore factory settings status	0:default
	1	الخر ا	HALL poles test status	aud a fault
15 res	seved		TALL ange lest status	Utuerauit V
16 res	seved			
17 res	seved			
18 OV	erSpeed			
19 res	seved			87
20 res	seved	<u>ل</u> تے		
			MQCON Motor Controller	

Figure 6

(7) Select the *DEBUG* page :

Before angle matching, the motor must be without any load.

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X X System status O:power up no finished Battery voltage 0.02 Battery voltage 0.02 Motor speed 9.00 Hall status(CBA) 10.00 Trott le voltage 0.00 Control mode normal run 0K Hall angle test diable enable 0K Hall angle 5 reseved 1 15 reseved 17 reseved 17 Parameter store 0K	OMMUNICA	ATION! SET! DEBUG!	Help!				
System status D:power up no finished Battery voltage 0.02 Battery voltage 0.02 Hall status(CBA) 10.00 Throttle voltage 0.00 EbsThrottle voltage 0.00 Control ler temperature 6.00 Error list Error list I feseved I fes	RX 🔘 🛛	тх 🧿			P		
Battery voltage 0.02 PARAMETER SET Motor speed 9.00 Image: Set of the se	Syste	em status 0:powerupr	o finished 🔻		S *		
Motor speed \$9.00 Hall status(CBA) \$10.00 Throttle voltage \$0.00 EbsThrottle voltage \$0.00 Control ler temperature \$6.00 Error list Restore factory settings 1 15 reseved 17 reseved 17 Parameter store DK	Bat	tery voltage 🗐 0.02					
Hall status(CBA) €10.00 Throttle voltage €0.00 EbsThrottle voltage €0.00 Control ler temperature €6.00 Error list 15 reseved 15 reseved 17 reseved 17 reseved 17 reseved 17 reseved		Motor speed 9 .00	BASIC TEMP FUNC TH	COTTLE MOTO			
Thrott le voltage 10.00 EbsThrott le voltage 10.00 Control ler temperature 6.00 Error list Test given current 110,00 A QK Control mode normal run QK Hall angle test disable enable QK Hall angle 15.00 degree QK Error list Restore factory settings QK default default 15 reseved 17 reseved 17 reseved 17 reseved	Hall	status(CBA) 🗍 10.00	Current loop kp 🚽 0.00		Ōκ		
EbsThrott le voltage \$0.00 Control ler temperature \$6.00 Error list 15 reseved 17 reseved 17 reseved Error list Control mode normal run V QK Hall angle test disable enable QK Hall angle \$5.00 degree QK Mall angle Test default V Parameter store QK	Thro	ottle voltage 🗐 0.00	Test given current 🖨 10.00	A	QK		
Control ler temperature 6.00 Hall angle test disable enable OK Hall angle 5.00 degree OK Hall angle 5.00 degree OK	EbsThrot	tle voltage 🚽0.00	Control mode normal	run 🔽	<u>O</u> K		
Error list Restore factory settings Image Image Image 1 1 15 reseved 16 reseved 17 reseved 17 reseved	Controller	temperature 46.00	Hall angle test disable	enable	<u>O</u> K		
Error list Restore factory settings Adefault Ade			Hall angle 🚽 5.00	degree	<u>O</u> K		
1 QK 15 reseved 16 reseved 17 reseved		Error list	Destroy 6 show with		-	default 🗸	
15 reseved 16 reseved 17 reseved		1	Rescore factory sectin	<u>OK</u>			
16 reseved 17 reseved	15	reseved				default	
17 reseved	16	reseved	Parameter store	OK			
	17	reseved		20			
18 overSpeed	18	overSpeed					
19 reseved	19	reseved				-	
20 reseved	20	reseved	<u>1</u>			QUIT	

Figure 7

Type 10 at the input field of *ID cmd*, and Click *OK* on the right .

Select HALL angle test, and Click OK on the right.

Enable hall angle test, and click OK on the right.

Then you will find the motor spin very slowly ,when the matching finish ,the main interface will display the matching result . if matching succeed ,it will indicate: *2: test ok*. On the *BEBUG* page ,*hall angle* will update the latest matching angle. Click *OK*, *parameter store* , click *OK*. Then the parameters modified will be save after power off.

After matching, shut off the controller and then power on it again, then check the matching angle .if the angle is updated, change the throttle input slowly to run the motor. otherwise, the angle should be matched once more.

Caution:

1: the value of "*ID cmd*" should be under 25.

2 : when angle test failed, you can exchange any two phase wires and match again.

3 : if the motor reverse ,you can exchange any two phase wires and match again. Or you can just set as following :

Type 1 at *motor direction* input field. and click *ok*. it will change the spin direction.

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OMMUNICATION! SET! DEBUG!	Help!	- marter		State State
RX > TX > System status 0:power up n Battery voltage \$0.02 Motor speed \$9.00 Hall status(CBA) \$10.00 Throttle voltage \$0.00	o finished PARAMETER SET BASIC TEMP FUNC Motor direction Motor Pn	THROTTLE MOT	OR DEBUG	
Ebsihrottie voltage 🚽 0.00 Controller temperature 🚽 6.00 Error list	Speed limit mode select	extern resista		default
1				
15 reseved				default 🔻
16 reseved				
17 reseved				
18 overSpeed				
19 reseved				
20 reseved	-			OUIT
- and a second				

Figure 8

4 : type the right Pole pair number at the *motor Pn* ", and click *OK*.

5 : Parameters which are modified must be click *OK* and the *parameter store* must be click *OK*, otherwise ,the parameter will not be updated at next time when power on.

Category	Parameter	Remark	Unit	Range
	lack volt	when battery volt is lower than the value,	V	According the controller
		the controller enter lack volt fault status	v	type
	over volt	when battery volt is higher than the value,	N	According the controller
		the controller enter over volt fault status	v	type
	Dc limit	May de lineit aument in nomel mode		According the controller
	current	Max de limit current in nomai mode	A	type
	Boost dc	May de limit aument in boost mode		According the controller
	current	Max de limit current in boost mode	A	type
	max phase current	it is corresponding to the max throttle value	A	According the controller type
	protected phase current	When phase current is higher than the value, the controller enter over current fault status	A	According the controller type
	rated phase current	Continuance run phase current	А	According the controller type
TEMP	unwork	Controller stop work when controller the	°C	90~120

1.3 parameters setting

	temperature	temperature is higher than the value		
	rework temperature	Controller rework when controller the temperature is under the value	°C	80~100
	limited current temperature	Controller begin to limit the output current when the controller temperature reach the value	°C	70~90
	electric brake	If it is enabled ,the controller enter electric brake status when the brake signal is valid	0 : disable 1 : enable	0,1
	electric brake phase current	When controller enter electric brake status, the battery is recharged , the value indicate the max charged current	A	0~150
	Boost/ 3 spd	Select the run mode: boost or 3pd and so on		0,3
FUNC	cruise	If it is enabled, controller enter cruise status when the cruise key is pressed longer than 3 seconds. Controller exit cruise when the brake signal is valid or the throttle restart. If it is disabled ,the cruise key is invalid	0 : disable 1 : enable	0,1
TONO	reverse speed limit	When motor reverse , the max reverse spedd is limited to the value	A	0~100
	flux weakening	If it is enable , the flux weakening function is valid	0 : disable 1 : enable	0,1
	flux weaken current	Max flux weaken current	A	0~150
	regenerative recharge	If it is enable ,the slide recharge function is valid	0 : disable 1 : enable	0,1
	regenerative charge current	When controller enter slide recharge status, the battery is recharged , the value indicate the max charged current	A	0~60
	regenerative charge speed	Only when the motor speed is higher than the speed value ,the controller can enter the slide recharge status if the throttle is zero longer than 1 second	RPM	0~500
THROTT LE	throttle min volt	Throttle min valid volt	0.1V	0.0~5

throttle max volt	Throttle max valid volt	0.1V	0.0~5
accelerate time	It adjust the output current accelerate rate	0.1s	1~500
decelerate time	It adjust the output current decelerate rate	0.1s	1~500

Tips:

1- "throttle min volt" correspond 0 phase current, and "throttle max volt" correspond max phase current.

2- "the max phase current " determine the max output torque ,

3- "the rate phase current" determine the continuous load endurance

4- "accelerate time" determine the response time for the controller to response the throttle output during the accelerate process

5- "decelerate time" determine the response time for the controller to response the throttle release during the decelerate process

2 Fault Information

You can get the fault information from the interface, after the controller connected with computer, the fault information will display as following:

MQCON Motor Controller
COMMUNICATION! SET! DEBUG! Help!
System status 1:system error
Battery voltage 🗐 0.02 V
Motor speed \$9.00 RPM
Hall status(CBA)
Throttle voltage
EbsThrottle voltage
Controller temperature 46.00 °C
Error list Restore factory settings status O:default
1 A 1 mosfet Fault HALL anlge test status 0:default
2 overVolt
3 lackVolt
4 overCurrent
5 mtOverTemp
6 ctoverTemp
Zour -
MQCON Motor Controller

Figure	9	
iguic		

Num	Fault Name	Remark
1	Mosfet fault	Hardware fault
2	overVolt	Battery over volt fault
3	lackVolt	Battery lack volt fault
4	resvd	reserved
5	mtOverTemp	Motor temperature is higher than set temperature
6	ctOverTemp	controller temperature is higher than set temperature
8	overCurrent	phase current is higher than over protected ph current
9	overLoad	The timer that phase current is higher than rated phase current
		exceed the set time
11	Store error	The setting parameter store failed fault
12	HALL test fault	Motor hall fault when matching
13	HALL fault	Motor hall fault
18	overSpeed	The tasks of controller are too many to calculate.
20	Block protect	The block current
21	unInitEeprom	The eeprom of controller is not initialized

Some of faults remark are as following :