

DYI CNC Controller

Attachment to website article UptimFab.com

Rev.02

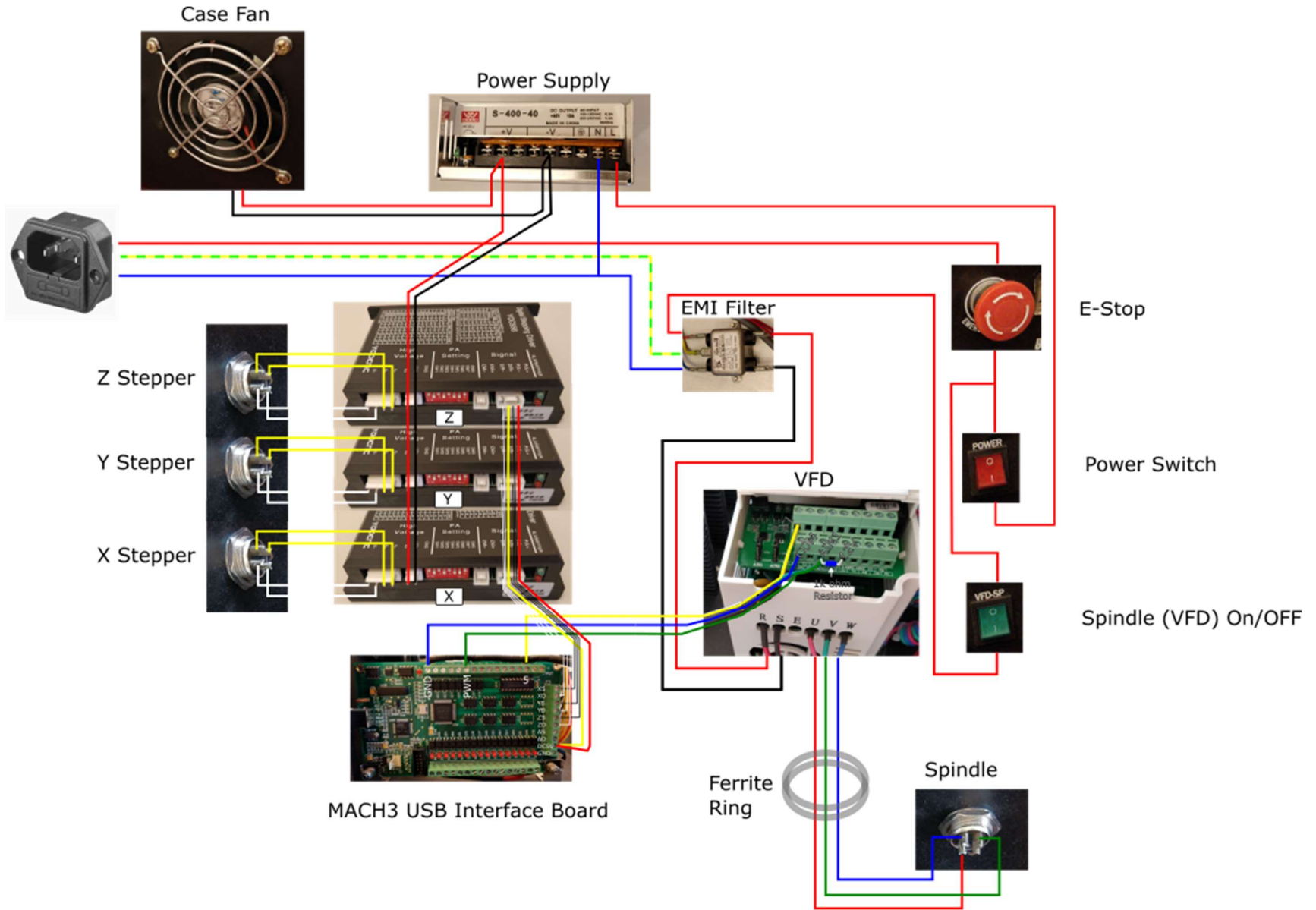
Robin, 15-04-2021

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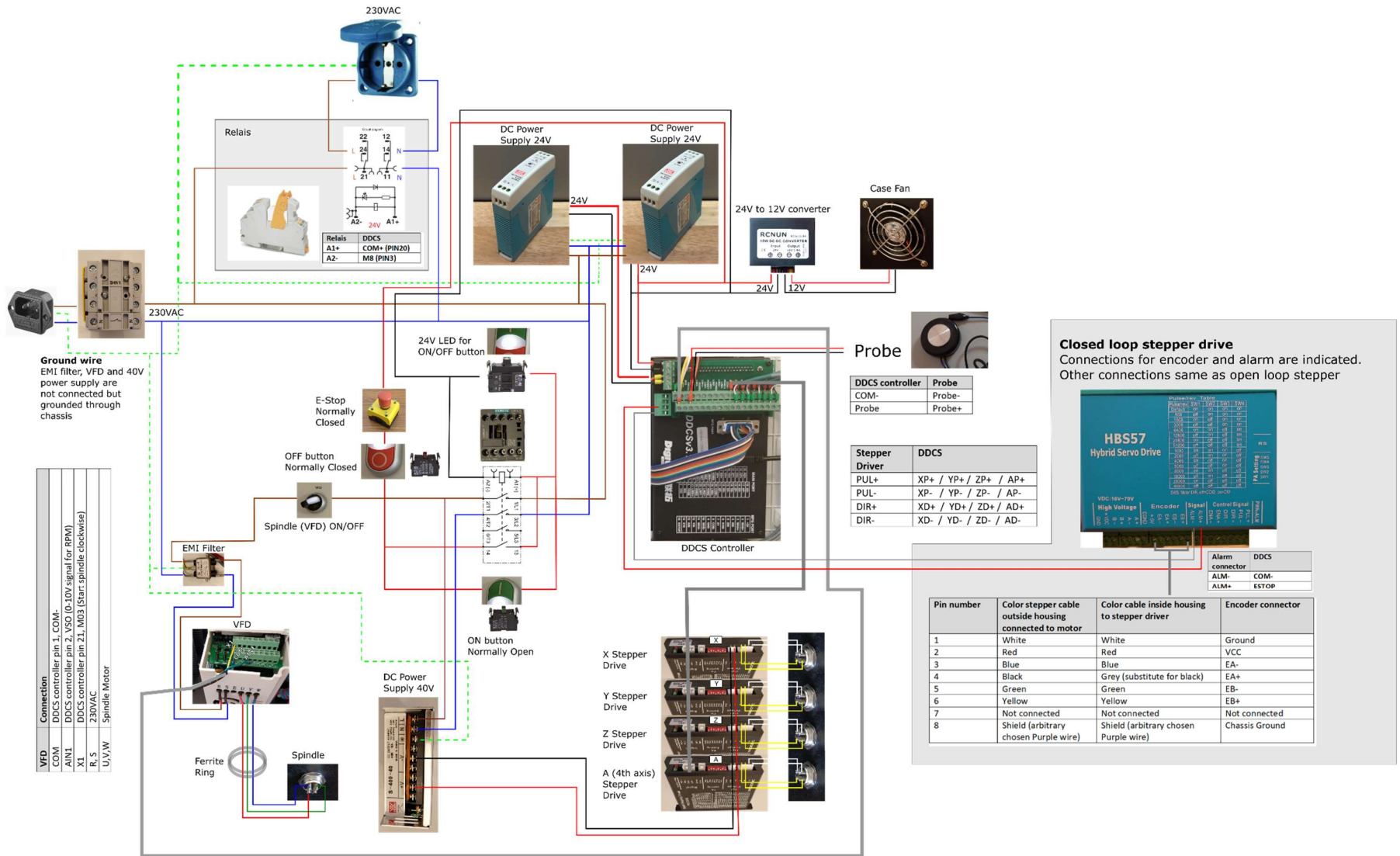
YOO CNC Controller Wiring Diagram

Wiring diagram of the YOO CNC controller as it was supplied from the factory:



DIY controller Wiring Diagram

Wiring diagram of the home made controller as described in this article:

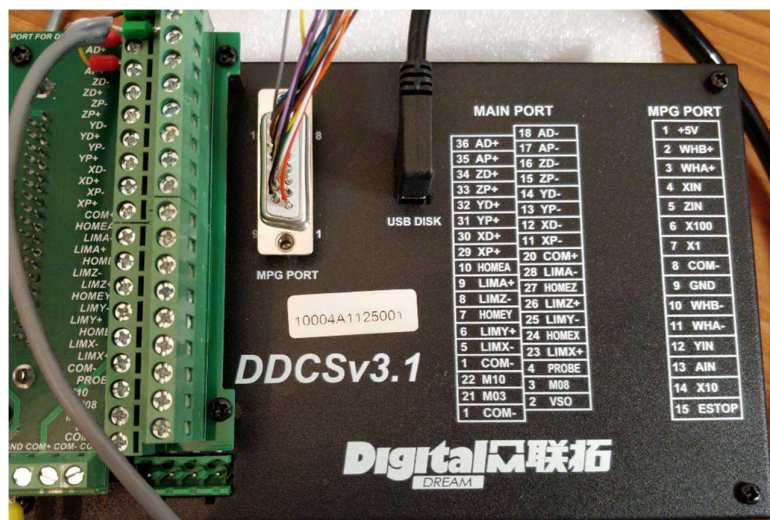


MPG Wiring

In the table below I have listed the pinout for the MPG. Note, that the pin numbering is different between the MPG connector and the connector on the DDCS controller. The colors are however correct, so make sure to look at the colors and to **not** just use the same pin numbers.

I left some wire unconnected, which are marked in grey in the table below.

Pin#	MPG Manual		Printed on Controller	DDCS V3.1 Manual		Soldered	
1	Red	5V	MPG	+5V	+5V	Red	Red
2	Black	0V		WHB+	WHB+	White	White
3	Green	A		WHA+	WHA+	Green	Green
4	White	B		XIN	XIN	Yellow	Yellow
5	Purple	/A		ZIN	ZIN	Brown	Brown
6	Purple/Black	/B		X100	X100	Orange	Orange
7	Green/Black	L+		LED	X1	X1	Grey
8	White/Black	L-	COM-		COM-	Orange/Black	Orange/Black
9	Yellow	X	Axes	GND	GND	Black	Black
10	Yellow/Black	Y		WHB-	WHB-	Purple/Black	Purple/Black
11	Brown	Z		WHA-	WHA-	Purple	Purple
12	Brown/Black	4		YIN	YIN	Yellow/Black	Yellow/Black
13	Pink	5		AIN	AIN	Brown/Black	Brown/Black
14	Pink Black	6		X10	X10	Grey/Black	Grey/Black
15	Grey	X1		ESTOP	ESTOP	Blue	Blue
16	Grey/Black	X10	Increments				
17	Orange	X100					
18	Orange/Black	COM	Control Switch				
19	Blue	C	Emergency Stop Switch				
20	Blue/Black	CN					
21	Red/Black	/	Spare				



VFD Settings

P0 Function Group			
Parameter	VFD Setting	Description / setting options	Setting
Command Source for controlling VFD	P0-000	0: Keyboard Control 1: Analog Terminal Control 2: Communication Control	1: Analog Terminal Control
Frequency Source type	P0-001	0: Main Frequency Source X 1: Assistant frequency source Y 2: Main Frequency Source X + Assistant frequency source Y 3: max (Main Frequency Source X + Assistant frequency source Y)	0: Main Frequency Source X
Main frequency source	P0-002	0: Keyboard potentiometer 1: Keyboard up/down arrow keys 2: AIN1 Analog input terminal AIN1 3: AIN2 Analog input terminal AIN2	2: AIN1 Analog input terminal AIN1
Assistant frequency source (not used for this controller)	P0-003	4: multi function input terminals 5: PID closed loop running	2: AIN1 Analog input terminal AIN1
Starting value when using the keyboard for frequency control	P0-004	Start frequency [Hz]	400.00
JOG frequency (not used for this controller)	P0-005	Frequency used when VFD receives JOG command [Hz]	5.00
Spindle direction	P0-006	0: Standard (according to instruction if direction is provided) 1: Reverse direction 2: Reverse prohibited	0.00
Upper frequency limit	P0-007	Maximum Output frequency [Hz]	400.00
Lower frequency limit	P0-008	Minimum output frequency [Hz]	0.0
Ramp up time	P0-009	Acceleration speed time [s]	8.0
Ramp down time	P0-010	Deceleration speed time [s]	8.0
Carrier frequency	P0-011	[kHz]	6.0
V/F curve setting	P0-012	1: 50Hz 2: 50Hz high starting torque 3: 50Hz, reduced torque 4: 60Hz 5: 60Hz high starting torque 6: 60Hz, reduced torque 7: Factory test	400.00 (This should go from 1-7 , so 400 does not make sense)
Torque boost	P0-013	0.0 – 15.0%	1.0
Automatic torque compensation gain	P0-014	0.0 – 250%	0.0
Automatic slip compensation gain	P0-015	0.0 – 250%	0.0
X1-terminal function	P0-016	0: invalid	1
X2-terminal function	P0-017	1: forward run	24(?)
X3-terminal function	P0-018	2: reverse run	25(?)
X4-terminal function	P0-019	3: wire control	26(?)

		4: fault reset 5: Up command (frequency) 6: Down command (frequency) 7: forward jog 8: reverse jog 9: coast to stop 10: external fault input 11: acc/dec speed pause 12: multi step speed terminal 1 13: multi step speed terminal 2 14: frequency source switch	
Control mode of terminal	P0-020	0: 2-wire mode 1 (see manual for more details)	0.00
AIN min input	P0-021	[V]	0.00
AIN min input corresponding frequency	P0-022	[Hz]	0.00
AIN max input	P0-023	[V]	10.0
AIN min input corresponding frequency	P0-024	[Hz]	400.00
Relay output selection	P0-025	0: No output	1
Y1 output selection	P0-026	1: Stop fault occurred in running 2: inverter running 3: run frequency reached set value 4: upper frequency limit warning 5: lower frequency limit warning 6: inverter zero speed running	3
Analog out AO1 output selection	P0-027	0: output frequency 50Hz -> 10V 1: output current. Rated current -> 10V 2: output voltage 500V -> 10V 3: setting frequency 50 Hz -> 10V	0
Analog Out AO1 gain	P0-028	Setting range: 0.1 – 10.00	1.00
Keyboard DIR/JOG function	P0-029	0: switching at running direction 1: jog command, key is a jog command 2: key is invalid	0
Keyboard STOP key	P0-030	0: invalid in analog or serial control mode 1: effective in analog or serial control mode (equivalent to external fault input)	0
Stop mode	P0-031	0: deceleration to stop 1: coast to stop	0
Start frequency of DC braking	P0-032	0.00 – 50.00 Hz	0
DC braking current	P0-033	0.0 – 150.0%	0
DC braking time	P0-034	0.00 – 60.00 sec	0
Protection current of motor overload	P0-035	50.0 – 110.0%	100.00
Over current protection	P0-036	Over current protection value when lose speed 110.0 – 200.0% (acceleration speed pause when current limit is reached)	150.0
Over voltage protection	P0-037	Over-voltage protection when lose speed 120.0 – 150.0%	130.0

		(deceleration speed pause at over-voltage)	
Dynamic breaking voltage value	P0-038	110 – 140%	125.0
Auto reset times	P0-039	0 - 3times Number of times to reset after issue (0.5 sec interval). Clears after 60 seconds of normal operation	0
Restart after power off instantaneous	P0-040	0: disabled 1: enabled. Start running automatically after under voltage	0
Multi step speed 0	P0-041	0.00 – 600.00Hz	0.00
Multi step speed 1	P0-042		0.00
Multi step speed 2	P0-043		0.00
Multi step speed 3	P0-044		0.00
Setting channels selection	P0-045	0: keyboard digital setting (by P0-046) 1: Keyboard potentiometer (0 – 10V) 2: AIN1: 0 – 10V 3: AIN1: 4 – 20mA 4: AIN2: 0 – 10V 5: AIN2: 4 – 20mA 6: serial communication	0
PID keyboard digital setting	P0-046	0.00 – 10.00V	3.00
PID feedback channel selection	P0-047	0: AIN1: 0 – 10V 1: AIN1: 4 – 20mA 2: AIN2: 0 – 10V 3: AIN2: 4 – 20mA 4: keyboard potentiometer	0
Proportional gain P	P0-048	0.00 – 10.00	1.00
Integral time I	P0-049	0.00 – 100.00s	2.00
Differential time D	P0-050	0.00 – 100.00s	0.00
Traverse amplitude	P0-051	0.0 – 100% relative to setting frequency	0.0
Jitter frequency	P0-052	0.0 – 50.0% relative to traverse amplitude	0.0
Rise time of traverse	P0-053	0.1 – 3200.0s	15.0
Fall time of traverse	P0-054	0.01 – 3200.0s	15.0
Local address	P0-055	1 – 31: address of slave inverter 32: address of master inverter	1
Baud rate	P0-056	0: 2400bps 1: 4800bps 2: 9600bps 3: 19200bps 4: 38400bps	2
Data format	P0-057	0: 1 start bit, 8 data bits, no parity check, 1 stop bit 1: 1 start bit, 8 data bits, even parity check, 1 stop bit 2: 1 start bit, 8 data bits, odd parity check, 1 stop bit	0
PLC run mode	P0-058	0: single run cycle 1: continuous cycle 2: running at multi step speed 15	0
PLC step speed 0	P0-059	0.00 – 600.00Hz	0.00

PLC step speed 1	P0-060		250.00
PLC step speed 2	P0-061		150.00
PLC step speed 3	P0-062		350.00
PLC step speed 4	P0-063		100.00
PLC step speed 5	P0-064		300.00
PLC step speed 6	P0-065		200.00
PLC step speed 7	P0-066		400.00
PLC step speed 8	P0-067		8.00
PLC step speed 9	P0-068		9.00
PLC step speed 10	P0-069		10.00
PLC step speed 11	P0-070		11.00
PLC step speed 12	P0-071		12.00
PLC step speed 13	P0-072		13.00
PLC step speed 14	P0-073		14.00
PLC step speed 15	P0-074		15.00
Unit of PLC run times	P0-075	0: second 1: hour	0
0th step running time	P0-076		0.0
1st step running time	P0-077		0.0
2nd step running time	P0-078		0.0
3rd step running time	P0-079		0.0
4th step running time	P0-080		0.0
5th step running time	P0-081		0.0
6th step running time	P0-082		0.0
7th step running time	P0-083		0.0
8th step running time	P0-084	0.0 – 6553.5sec	0.0
9th step running time	P0-085		0.0
10th step running time	P0-086		0.0
11th step running time	P0-087		0.0
12th step running time	P0-088		0.0
13th step running time	P0-089		0.0
14th step running time	P0-090		0.0
15th step running time	P0-091		0.0
PLC Acc/Dec time setting1	P0-092	0 - 65535	0.0
PLC Acc/Dec time setting1	P0-093		0.0
PLC Acc time 0	P0-094		15.0
PLC Dec time 0	P0-095		15.0
PLC Acc time 1	P0-096		15.0
PLC Dec time 1	P0-097		15.0
PLC Acc time 2	P0-098	0.1 – 3200.0 sec	15.0
PLC Dec time 2	P0-099		15.0
PLC Acc time 3	P0-100		15.0
PLC Dec time 3	P0-101		15.0
PLC run direction setting	P0-102	0 - 65535	0

Note: I found that in my VFD settings P0-103 up to and including P0-110 also exist, but there is no information on these settings in the user manual, so they are also not included in this overview.

P1 Function Group			
Function write protection	P1-000	0: P0 functions can be modified 1: P0 functions cannot be modified	0

Factory reset of P0 parameters	P1-001	0: no action 1: reset all P0 parameters to factory default	0
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DDCSV3.1 Parameters

Below are the values I have changed from the default value.

Motor parameters:

No.	Parameter Name	Factory Value	Unit	My Value	
34	X axis pulse equivalency	640.000	Pulses/unit	400.000	X,Y, Z axis pulse setting: Stepper setting 2000 pulses per revolution Ball screw 5mm pitch $2000/5 = 400$ steps per revolution
35	Y axis pulse equivalency	640.000	Pulses/unit	400.000	
36	Z axis pulse equivalency	640.000	Pulses/unit	400.000	
38	A axis pulse equivalency	640.000	Pulses/unit	33.333	4-th axis pulse setting: Small pulley 10 tooth Large pulley 60 tooth Stepper setting 2000 pulses per revolution With 6:1 ratio this means $2000 * 6 = 12000$ steps per revolution $12000/360 = 33.33$ steps per degree
68	Tool Setting Function Mode	0	Selection	2	Mode 0, mode 1, mode 2. Couldn't find explanation on this in manual. However, mode 2 was the only mode that worked as intended (add thickness of tool sensor to measured value)
76	Default operational speed	3000.000	Unit/min	1000.000	This is the standard continuous jog speed. Decreased because machine moved too fast for my linking when pressing jog keys

Stepper cable connectors GX16, 4pin



Pin number and connection to stepper motor cable:

Pin#	Color stepper motor cable	Stepper Driver	Shielded cable (arbitrarily chosen)
1	Blue	B+	White
2	Yellow	B-	Yellow
3	Red	A-	Brown
4	Green	A+	Green