603288DOC-A - Manual for ZB603288W Controller

Operating Manual

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1. Introduction

The ZB603288W BLDC Controller is designed to efficiently drive 12V or 24V 3-phase BLDC motors up to 8 amps RMS or 240 watts. The controller uses Hall sensor feedback (120º spacing) to electronically commutate the motor in a trapezoidal fashion. It has closed loop speed control, with a range of 700-3500 RPM. The speed is controlled with a PWM signal.

2. Features

- Quiet 20kHz PWM switching frequency
- High-efficiency MOSFETs
- Controller temperature monitoring
- Current monitoring/limiting
- Closed loop speed control
- PWM signal speed control
- Hall effect sensor voltage provided
- 8 amps RMS motor current
- Heat sink/mounting plate included
- Stall Detection
- Input Voltage Reverse Polarity Protection (RPP)
- Conformally Coated Against Humidity

3. Specification

Parameter	Min	Typ.	Max	Units	Notes
Functional Voltage	11	24	30	VDC	
Reverse Voltage	-	24	30	VDC	
Input Current	-	-	10	ADC	
Continuous Motor Current	-	-	8	A RMS	
Motor Current Limit	-	-	18	PEAK	Peak seen on a single phase
Speed Control Range	700	2000	3500	RPM	10 pole motor
Hall Sensor Electrical Spacing	-	120 °	-	Degrees	
Operating Ambient Temperature	0	25	45	C	Non- Condensing
Operating Ambient Humidity	0%		90%	RH	Non- Condensing
Speed Control PWM Range	5%		95%	% duty Cycle	At 20kHz signal frequency

Table 1 – Specification

4. Connections (I/O)

4.1 Pinout – Terminal Identification

See diagram in 4.2 for connector location

Connector Type	Function	Location	Notes
POWER	PHASE A	J7-1	
	PHASE B	J7-2	
	PHASE C	J7-3	
HALL SENSOR	NOT USED	J1-1	
	+VDC	J1-2	
	HALL 1	J1-3	
	HALL 2	J1-4	
	HALL 3	J1-5	
	GROUND	J1-6	
	NOT USED	J1-7, J1-8	
INPUT VOLTAGE	POSITIVE	J8/J6-2	The two pins are connected. Use only one.
	NEGATIVE	J9/J6-1	The two pins are connected. Use only one.
PWM SPEED CONTROL INPUT	NOT USED	J3-1	
	GROUND (REF)	J3-2	
	PWM INPUT	J3-3	3.3V Input
	TACH OUT	J3-4	3.3V signal
	3.3VDC SUPPLY	J3-5	Unused in this application
JUMPER POSITION	PWM CONTROL	J2(JUMPER PIN 1,2)	Jumper installed on pin 1 and 2 at factory.

Table 2 – Pinout

4.2 Connectors

See pinout in 4.1 for individual pin use

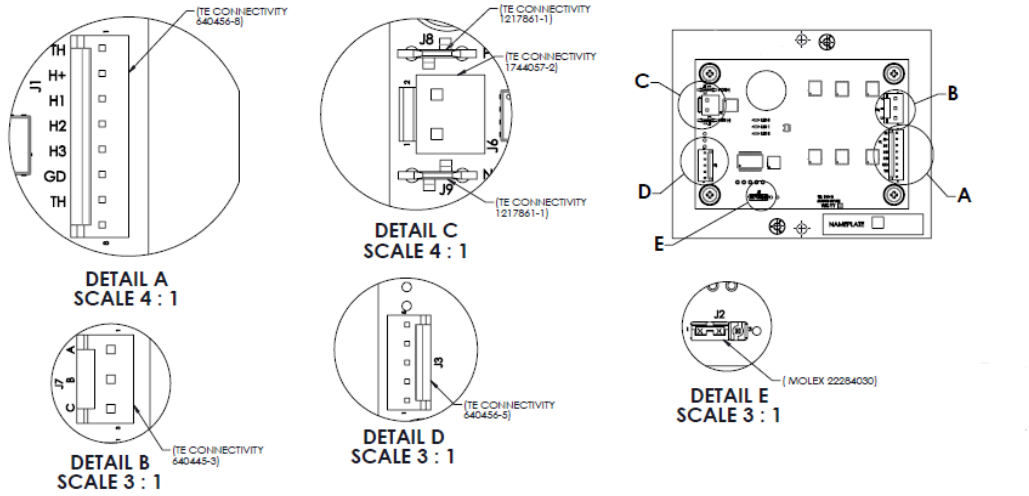

Figure 1 – Connector locations

When using a typical 5 pin motor connector, connect to J1 starting at pin #2 marked H+. See image below for an example. Note: Verify pinout from the motor before connecting.

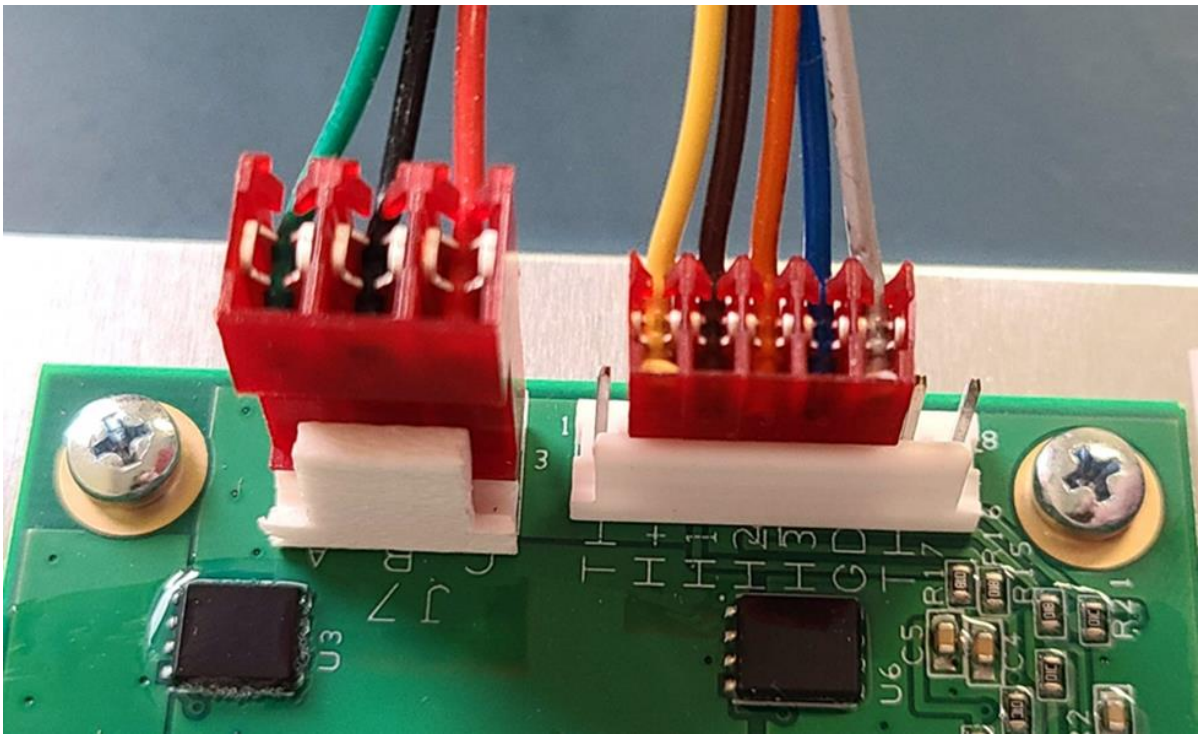

Figure 2 – Connector J1

4.3 Matting Connectors

Connector Designator	Connector MFG	Connector P/N	Matting Connector
J1	TE Connectivity	640456-8	3-640441-8
J2	Molex	22284030	2-382811-1
J3	TE Connectivity	640456-5	3-641818-5
J6	TE Connectivity	1744057-2	2154828-1
J7	TE Connectivity	640445-3	3-640428-3
J8	TE Connectivity	1217133-1	DNF14-250FIB-M
J9	TE Connectivity	1217133-1	DNF14-250FIB-M

Table 3 – Matting Connectors

4.4 Mechanical Dimensions

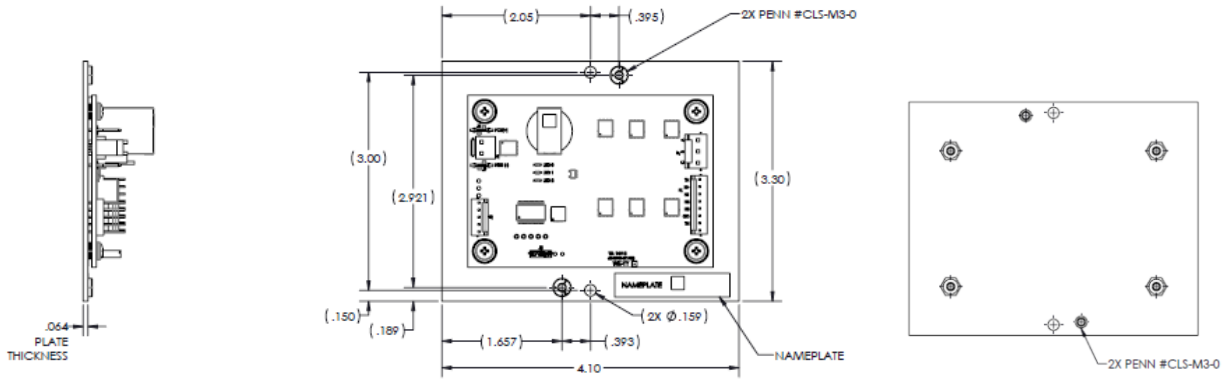

Figure 2 – Mechanical Dimensions

5. Speed Control

The speed of the motor is variable and includes the range of 700 to 3500 rpm. This is controlled by a PWM signal –The recommended frequency range is 20khz. The accepted voltage is 3.3VDC. Motor speed is proportional to duty cycle. Minimum speed (Apx 700 RPM) at 5% and maximum speed (Apx 3500 RPM) at 95%.

6. Protection and Faults

Fault Table

ERROR STATE	LED 0 (GREEN)	LED 1 (RED)	LED 2 (RED)
Operating Normal	ON (STEADY)	OFF	OFF
Pump Running >100 RPM Below Set Speed	ON (STEADY)	OFF	ON (STEADY)
Controller Overheat	OFF	OFF	ON (STEADY)
Stall Condition (locked rotor or loss of Hall sensor)	OFF	ON (STEADY)	OFF

Table 4 – Fault Table