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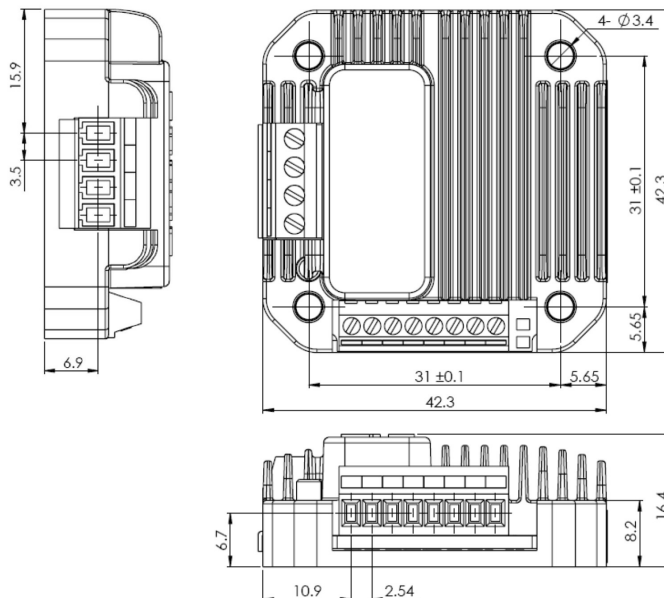
Stepper driver with analogue and PWM speed control input for accurate flow control of Boxer stepper motor driven peristaltic pumps. A4 is the 4.0 amp stepper driver.



## Technical Data

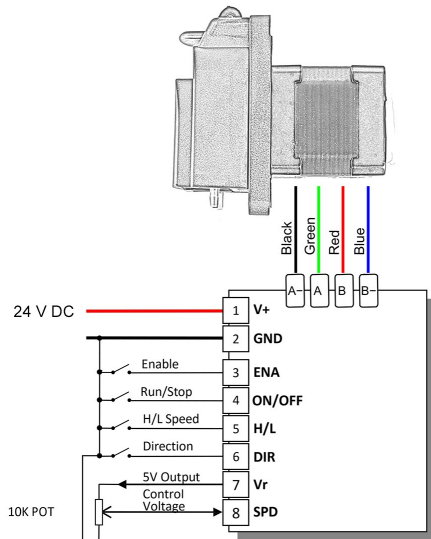
Driver Type	Full H-Bridge for 2 phase unipolar stepper motors
Size / Mounting	Nema 17 motors (15KS/15QQ): direct on motor Nema 23 motors (15KS/15QQ, 15KU, 25K, 6K): via adapter plate on motor
Voltage Range	10 to 30 V DC
Max Current	4.0 A
Current Limiter Factory Setting	2.8 A
Control Inputs	Enable, run / stop, high / low speed, direction, speed
Control Outputs	5 V DC reference output (for use with external potentiometer for speed control)
Current Limiter (on reverse side)	To reduce motor temperature
Micro-Stepping	1/16 (fixed)
Automatic Acceleration (during start or speed adjust)	Ramp over 0.3 seconds
Max Working temperature	85 °C
Weight	100 g

## Drawing

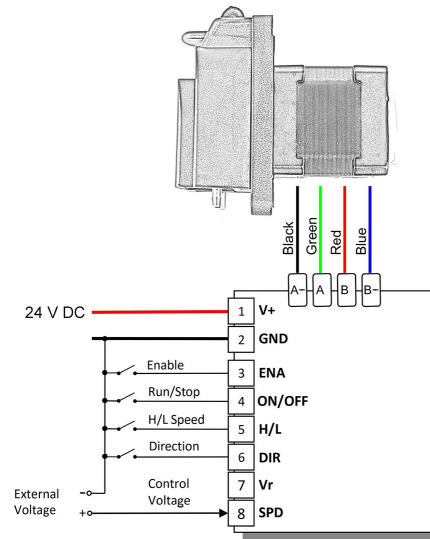


## Electrical Connection Details

① With external potentiometer



② With speed control voltage input



Damage will occur if Vr is connected to GND !

### Outputs (to stepper motor):

A- / A	Black / Green	Phase A
B / B-	Red / Blue	Phase B

Note: reversing polarity of A or B will cause the motor to run in the opposite direction

### Inputs (to driver):

V+	Supply Voltage	+ 24 V DC (range 10 to 30 V DC)
GND	Ground	GND
ENA <sup>1</sup>	Enable / Disable	Open = enabled / To GND = disabled (motor coils are not energised)
ON / OFF <sup>1</sup>	Run / Stop	Open = run / To GND = stopped (motor is locked with energised coils)
H/L <sup>1</sup>	High / Low Speed	Open = speed 0 to 800 rpm / To GND = speed 0 to 150 rpm
DIR <sup>1,2</sup>	Direction	Open = direction anticlockwise (CCW) / To GND = direction clockwise (CW)
Vr	+ 5 V DC output reference	For use with external potentiometer
SPD	Speed Input	0 to 5 V DC (resolution 255 steps / 8 bit) or PWM 0 to 100% (min. 10kHz)

**Always start a peristaltic pump at slow to medium speed (less than 300 rpm) to avoid stalling**

<sup>1</sup> Inputs are internally pulled up

<sup>2</sup>Direction is defined as looking at the pump from the front (clockwise means inlet left, outlet right)

## Current Limiter

The current limiter on the reverse side of the driver is used to reduce motor temperatures. This is especially important when a peristaltic pump is run at slow speed.

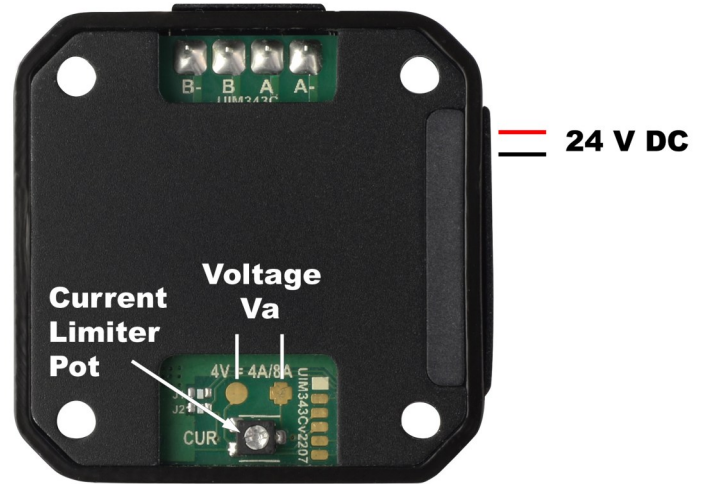
### Procedure:

- connect driver to power supply.
- measure voltage  $V_a$ . Adjust with pot  $V_a$  as necessary<sup>1</sup>.
- clockwise rotation decreases  $V_a$ .
- disconnect power supply
- re-connect power supply (new  $V_a$  value is mapped)
- test new setting

<sup>1</sup>  $V_a$  can be varied between 0 and 4.0 V. It should be reduced until safely above the setting which will cause the motor to stall. Worst case will always be with a new tube with largest ID installed in the peristaltic pump. If  $V_a$  is increased above 4.0 V, the current setting will not increase further.

Factory setting: Limiter set at 2.8 A ( $V_a = 2.8$  V)

Note: the Jumpers J1 and J2 are not populated and have no function



## Driver / Limiter Recommendation

Peristaltic Pump	Driver / Limiter Setting
29QQ	A2 2.0 amp driver with limiter set at 1.0 A ( $V_a = 2.0$ V)
9K, 9QQ, 9QX	A2 2.0 amp driver with limiter set at 1.0 A ( $V_a = 2.0$ V)
15KS / 15QQ with Nema 17 motors	A2 2.0 amp driver with limiter set at 1.0 A ( $V_a = 2.0$ V) or higher depending on desired speed / tube ID
15KS / 15QQ with Nema 23 motors	A4 4.0 amp driver with limiter set at 2.8 A ( $V_a = 2.8$ V)
15KU	A4 4.0 amp driver with limiter set at 2.8 A ( $V_a = 2.8$ V)
6K	A4 4.0 amp driver with limiter set at 4.0 A ( $V_a = 4.0$ V)
25K	A4 4.0 amp driver with limiter set at 4.0 A ( $V_a = 4.0$ V)
30KS	A4 4.0 amp driver with limiter set at 4.0 A ( $V_a = 4.0$ V)

## Order Information

Part Number	Description
6900.018	A4 Stepper Driver (model PWM UIM243C04BT)

All data is representative for initial selection purposes. It is the responsibility of the user to determine suitability for the intended use. Technical changes reserved.