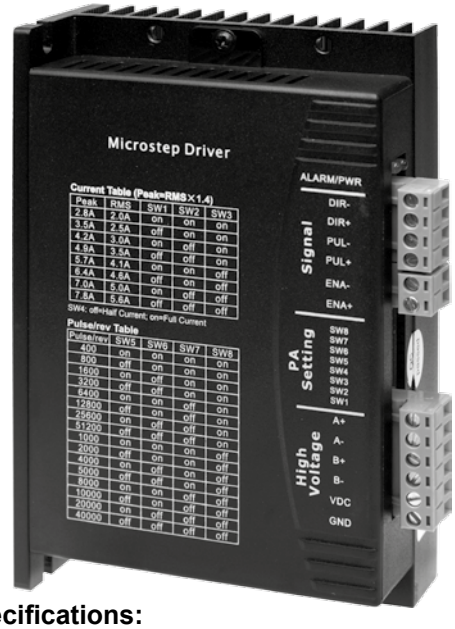
Product Data Sheet

7.8A Stepper Motor Driver (160-020-00200) [from Nov-2011]



Features:

- High performance, cost-effective
- Supply voltage up to +80VDC
- Output current up to 7.2A (7.8A Peak)
- Self-adjustment technology
- Pure-sinusoidal current control technology
- Pulse input frequency up to 300 KHz
- TTL compatible and optically isolated input
- Automatic idle-current reduction
- 16 selectable resolutions in decimal and binary, up to 51,200 steps/rev
- Suitable for 2-phase and 4-phase motors
- Support PUL/DIR and CW/CCW modes
- Short-voltage, over-voltage, over-current and over temperature protection

Specifications:

Motor Power Supply		24-80V DC
Current		7.8A (Peak) Max., 8 settings selectable by dipswitch
Current Control		Pure sinusoidal technology
Logic Signal Inputs		5v logic from current sinking (NPN) interface, 7-16mA, 10mA typical
Microstep		256 Microstep (51200 steps/rev.) Max. 14 settings selectable by dipswitch
Max. Pulse Rate		300kHz
Insulation Resistance		>500MΩ (at 20° C)
Normal Operating Conditions	Temperature	Ambient: 0°C - +40°C
		Operating: 70°C Max.
	Humidity	40% - 90% RH
	Vibration	5.9m/s² Max.
Cooling		Heat Sink
Dimensions		151x97x48mm
Weight		540g

Current Dipswitch Settings:

Current - Peak (RMS) / Dipswitch	2.8A / 2.0A	3.5A / 2.5A	4.2A / 3.0A	4.9A / 3.5A	5.7A / 4.1A	6.4A / 4.6A	7.0A / 5.0A	7.8A / 5.6A
SW1	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW2	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW3	ON	ON	ON	ON	OFF	OFF	OFF	OFF

Microstep Dipswitch Settings (steps/rev.):

Steps/Rev. (Mstep) / Dipswitch	400 / 2	800 / 4	1000 / 5	1600 / 8	2000 / 10	3200 / 16	4000 / 20	5000 / 25	6400 / 32	8000 / 40	10000 / 50	12800 / 64	20000 / 100	25600 / 128	40000 / 200	51200 / 256
SW5	ON	OFF	ON	ON	OFF	OFF	ON	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW6	ON	ON	ON	OFF	ON	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW7	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SW8	ON	ON	OFF	ON	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	OFF	ON

Mode Dipswitch Settings:

SW4	Half Current Mode. Current is automatically reduced to 60% of selected dynamic current 1 second after the last pulse. Theoretically, this reduces motor heating by 36% when motor is at a standstill.	OFF
	Full Current Mode. Current will not reduce at motor standstill.	ON

Internal Jumper Settings: J1 and J3 inside the driver for selecting the active pulse edge or effective level and control signal mode.

J1: Open / J3:Open	PUL/DIR mode and Active at rising edge (NPN) (Default)
J1: Open / J3: Closed	PUL/DIR mode and active at falling edge (NPN)
J1: Closed / J3 Open	CW/CCW mode and active at low level (The fixed level)
J1: Closed / J3: Closed	CW/CCW mode and active at high level (The fixed level)
J2	Used to reverse the default rotation direction

Input Terminal Details:

PUL+ (+5v)	Pulse signal: In single pulse (step/direction) mode, this input represents pulse signal, active at each rising or falling edge (set by inside jumper J3); 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. In double pulse mode (pulse/pulse), this input represents clockwise (CW) pulse active at high level or low level (set by inside jumper J3). For reliable response, pulse width should be longer than 1.5μs. Series connect resistors for current-limiting when +12V or +24V used.
PUL- (PUL)	
DIR+ (+5v)	DIR signal: In single-pulse mode, this signal has low/high voltage levels, representing the two directions of motor rotation; in double-pulse mode (set by inside jumper J1), this signal is counter-clockwise (CCW) pulse active at high level or low level (set by inside jumper J3). For reliable motion response, DIR signal should be ahead of PUL signal by 5μs at least. 4-5V when DIR-HIGH, 0-0.5V when DIR-LOW. Please note that motion direction is also related to motor/drive wiring match. Exchanging the connection of two wires for a coil to the drive will reverse motion direction.
DIR- (DIR)	
ENB+ (+5v)	Enable signal: This signal is used for enabling/disabling the Drive. High level (NPN control signal, PNP and Differential control signals are on the contrary, namely Low level for enabling) for enabling the Drive and low level for disabling the Drive. Usually left UNCONNECTED (ENABLED).
ENB- (ENB)	

Protection Functions:

To improve reliability, the drive incorporates the following built-in protection features:

- **Short-voltage and Over-voltage protection.** When power supply voltage is lower than +18VDC, over-voltage protection will be activated and power indicator LED will turn off. When power supply voltage exceeds +94VDC, over-voltage protection will be activated and the Alarm indicator LED will turn on.
- **Over-current Protection.** Protection will be activated when continuous current reaches to 16A.
- **Short Circuit Protection.** Protection will be activated in case of a short circuit between motor coils or between motor coil and ground.

Cooling:

The drive's *reliable* working temperature should be <70°C, and motor working temperature should be <80°C.

- It is recommended to use the automatic half-current mode so the current automatically reduces to 60% when the motor stops, so as to reduce drive heating and motor heating.
- The drive should be mounted vertically on a metal plate to maximize heat sink area.
- Use a forced cooling method to cool the system if necessary.

Supply Voltage:

The power MOSFETS inside the driver can actually operate within +24 ~ +80VDC, including power input fluctuation and back EMF voltage generated by motor coils during motor shaft deceleration.

Higher supply voltage can increase motor torque at higher speeds, thus helpful for avoiding losing steps.

However, higher voltage may cause bigger motor vibration at lower speed, and it may also cause over-voltage protection or even drive damage.

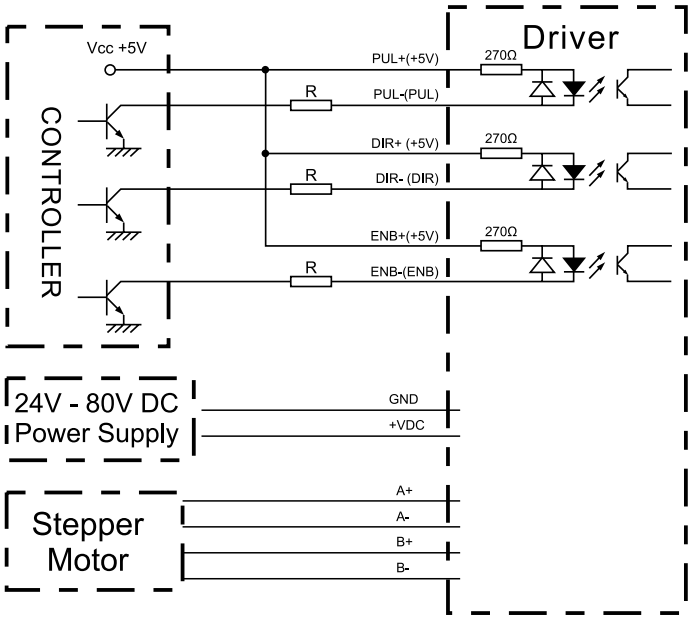
Therefore, it is suggested to choose only sufficiently high supply voltage for intended applications, and it is suggested to use a power supply with theoretical output voltage in the range of +24 ~ +72VDC, leaving room for power fluctuation and back-EMF.

Wiring:

- In order to improve anti-interference performance of the drive, it is recommended to use twisted pair shielded cable.
- To prevent noise in the PUL/DIR signal, pulse/direction signal wires and motor wires should not be tied up together. It is better to separate them by at least 10 cm, otherwise the disturbing signals generated by motor will easily disturb the pulse/direction signals, causing motor position error, system instability and other failures.
- If a power supply serves several drives, separately connecting the drives to the power supply is recommended instead of daisy-chaining.

The inputs are totally isolated from the case (ground) and the logic input terminals and can be connected as Common Positive as shown in wiring diagram (or Common Negative if required).

Typical Wiring Diagram



R=0 if Vcc=5V
R=1K if Vcc=12V (>0.125W)
R=2K if Vcc=24V (>0.125W)
R must be connected to control signal terminal.

Warning:

The driver may suffer permanent damage if the stepper motor is disconnected from the driver whilst energised.

There is high current flowing through motor coils (even when the motor is at standstill). Disconnecting the motor from the driver with power on will cause extremely high back-EMF voltage surge, which may damage the Drive.