

*User Manual*

# 3DM2283

3-Phase Digital Stepper Drive



# 3DM2283 3-phase Digital Stepper Drive

## 150-220VAC, 0.5-8.2A peak, Auto-configuration, Low Noise

- Anti-Resonance provides optimal torque and nulls mid-range instability
- Motor auto-identification and parameter auto-configuration technology, offers optimal responses with different motors
- Multi-Stepping allows a low resolution step input to produce a higher microstep output, thus offers smoother motor movement
- Microstep resolutions from full-step to 51,200.
- Soft-start with no “jump” when powered on
- Supply voltage up to +220 VAC
- Output current programmable, from 0.5A to 11.7A. It can also be set via DIP switches.
- Pulse input frequency up to 200 KHz
- 5V optically isolated input
- Automatic idle-current reduction (Reduction rate can be software configured)
- Suitable for 3-phase motors
- Support PUL/DIR and CW/CCW modes
- Over-voltage, over-current protections

## Descriptions

The 3DM2283 is a high voltage, fully digital stepper drive developed with advanced DSP control algorithm based on the latest motion control technology. It has achieved a unique level of system smoothness, providing optimal torque and nulls mid-range instability. Its motor auto-identification and parameter auto-configuration feature offers quick setup to optimal modes with different motors. Compared with traditional analog drives, 3DM2283 can drive a stepper motor at much lower noise, lower heating, and smoother movement. Its unique features make 3DM2283 an ideal choice for high requirement applications.

## Applications

Suitable for a wide range of stepper motors, from NEMA size 34 to 51. It can be used in various applications such as laser cutters, laser markers, high precision X-Y tables, labeling machines, CNC router, etc. Its unique features make the 3DM2283 an ideal choice for applications that require both low-speed smoothness and high speed performances

## Specifications

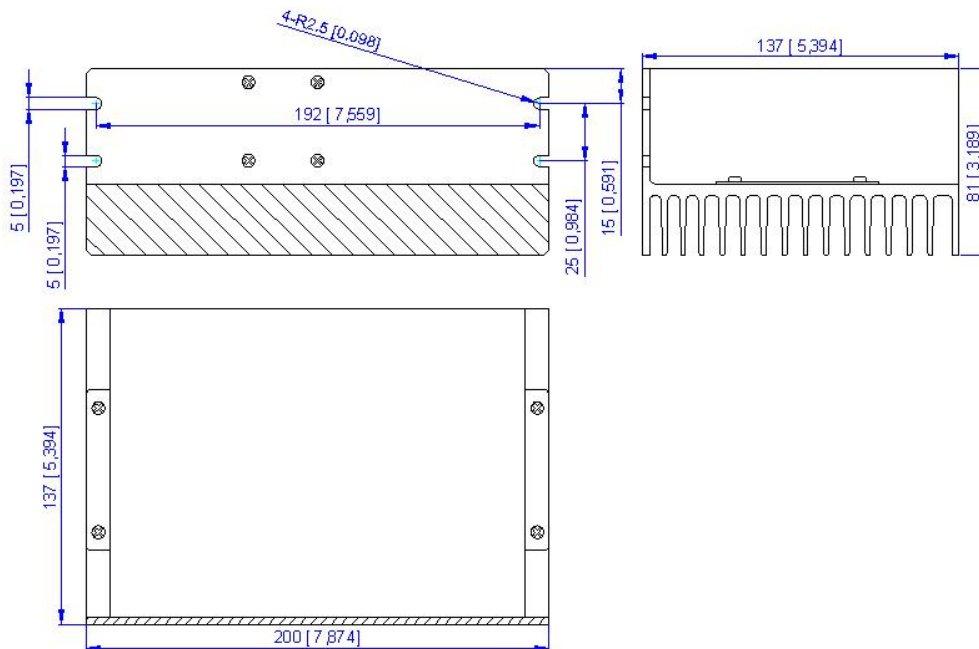
### Electrical Specifications

Parameter	Min	Typical	Max	Unit
Input Voltage	150	220	240	VAC
Pulse Input Frequency	0	-	200	kHz
Logic Signal Current	7	10	16	mA
Isolation Resistance	500	-	-	MΩ

### Operating Environment

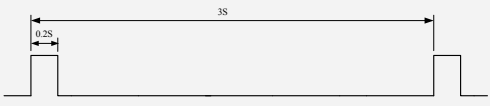
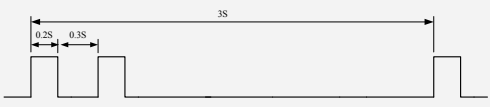
Cooling	Natural Cooling or Forced cooling	
Operating Environment	Environment	Avoid dust, oil fog and corrosive gases
	Storage Temperature	-20°C — 65°C (-4°F — 149°F)
	Ambient Temperature	0°C — 50°C (32°F — 122°F)
	Humidity	40%RH — 90%RH
	Operating Temperature (Heat Sink)	70°C (158°F) Max
Storage Temperature	-20°C — 65°C (-4°F — 149°F)	
Weight	1.3Kg (2.87lbs)	

### Mechanical Specifications



## Protection Indications

The green indicator turns on at power-up. When drive protection is activated, the red LED blinks periodically to indicate the error type

Priority	Time(s) of Blink	Sequence wave of RED LED	Description
1st	1		Over-current Protection
2nd	2		Over-voltage Protection, over 440VDC

## Pin Assignment

The 3DM2283 has one barrier strip connector for power and motor connections and one screw terminal for control signal connections.

Power and Motor Connector			
Pin	Name	I/O	Description
1	PE	-	Recommend connect this port to the ground for better safety.
2	L	I	Power supply inputs. If AC input, recommend use isolation transformers with theoretical output voltage of 150-220VAC.
3	N	I	
4	NC	-	No Connection
5	U	O	Motor Phase U
6	V	O	Motor Phase V
7	W	O	Motor Phase W

## Pin Assignment (Continued)

Control Signal Connector			
Pin	Name	I/O	Description
	PUL+	I	<u>Pulse Signal</u> : In single pulse (pulse/direction) mode, this input represents pulse signal, each rising or falling edge active (software configurable, see DM drives software operational manual for the detail); In double pulse mode (software configurable), this input represents clockwise (CW) pulse, active both at high level and low level. 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. For reliable response, pulse width should be longer than 2.5μs. Series connect resistors for current-limiting when +12V or +24V used. The same as DIR and ENA signal.
	PUL-	I	
	DIR+	I	<u>Direction Signal</u> : In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation. In double-pulse mode (software configurable), this signal is counter-clock (CCW) pulse, active both at high level and low level. For reliable motion

<b>DIR-</b>	I	response, DIR signal should be ahead of PUL signal by 5 $\mu$ s at least. 4-5V when DIR-HIGH, 0-0.5V when DIR-LOW. Please note that rotation direction is also related to motor-driver wiring match. Exchanging the connection of two wires for a coil to the driver will reverse motion direction. The direction signal's polarity is software configurable.
<b>ENA+</b>	I	<u>Enable signal</u> : This signal is used for enabling/disabling the drive. In default, high level (NPN control signal) for enabling the driver and low level for disabling the driver. Usually left <b>UNCONNECTED (ENABLED)</b> . Please note that PNP and Differential control signals are on the contrary, namely Low level for enabling. The active level of ENA signal is software configurable.
<b>ENA-</b>	I	
<b>FAULT+</b>	O	<u>Fault Signal</u> : OC output signal, active when one of the following protection is activated: over-voltage, over current, low voltage, phase error and over-temperature. This port can sink or source 20mA current at 24V. In default, the resistance between FAULT+ and FAULT- is high impedance in normal operation and become low when 3DM2283 goes into error.
<b>FAULT-</b>	O	

## RS232 Communication Port

The RS232 communication port is used to configure the 3DM2283's peak current, microstep, active level, current loop parameters and anti-resonance parameters. See DM driver's software operational manual for more information.

RS232 Communication Port			
Pin	Name	I/O	Description
1	NC	-	Not connected.
2	+5V	O	Not connected.
3	TxD	O	RS232 transmit.
4	GND	GND	Ground.
5	RxD	I	RS232 receive.
6	NC	-	Not connected.

## DIP Switch Settings

### Dynamic Current

Peak	RMS	SW1	SW2	SW3
Default	<b>Default</b>	OFF	OFF	OFF
3.1A	<b>2.2A</b>	ON	OFF	OFF
4.5A	<b>3.2A</b>	OFF	ON	OFF
5.9A	<b>4.2A</b>	ON	ON	OFF
7.3A	<b>5.2A</b>	OFF	OFF	ON
8.9A	<b>6.3A</b>	ON	OFF	ON
10.1A	<b>7.2A</b>	OFF	ON	ON
11.7A	<b>8.3A</b>	ON	ON	ON

**Note:** Due to motor inductance, the actual current in the coil may be smaller than the dynamic current setting, particularly under high speed condition.

### Idle-Current

SW4 determines whether current-reduction is performed when there is no pulse applied to 3DM2283..

	OFF	ON
SW4	Motor current reduces automatically when there is no pulse applied to 3DM2283.	Motor current is the same as the dynamic current when there is no pulse applied to 3DM2283.

### Microstep Resolution

Steps/Revolution	SW5	SW6	SW7	SW8
200	ON	ON	ON	ON
400	OFF	ON	ON	ON
1600	ON	OFF	ON	ON
3200	OFF	OFF	ON	ON
6400	ON	ON	OFF	ON
12800	OFF	ON	OFF	ON
25600	ON	OFF	OFF	ON
500	OFF	OFF	OFF	ON
1000	ON	ON	ON	OFF
1200	OFF	ON	ON	OFF
2000	ON	OFF	ON	OFF
4000	OFF	OFF	ON	OFF
5000	ON	ON	OFF	OFF
6000	OFF	ON	OFF	OFF
8000	ON	OFF	OFF	OFF
10000	OFF	OFF	OFF	OFF

### Auto-Configuration

Switch SW4 two times in two seconds will activate parameter Auto-configuration for 3DM2283's current loop. That is, OFF-ON-OFF or ON-OFF-ON. During Auto-configuration, motor parameters are identified and 3DM2283's current loop parameters are calculated automatically. The motor shaft will vibrate a little during the process of Auto-configuration which takes about 1 to 3 seconds.

**Typical Connections**

**NPN Control Signal**

