

# Stepper Motor Driver

# DM805AI



## 1. Features:

- Anti-Resonance, provides optimum torque and nulls mid-range instability
- Motor self-test and parameter auto-setup technology, offers optimum responses with different motors
- Multi-Stepping allows a low resolution step input to produce a higher microstep output for smooth system performance
- Command Source: 0-5V, built-in potentiometer and pulse
- Two preset velocities, adjustment by built-in potentiometers
- Preset acceleration / deceleration and adjust by built-in potentiometer
- Velocity control mode via 0-5 V or position control mode via pulse
- Built-in pulse generator nulls external motion controller
- Supply voltage up to +80 VDC (recommended not to exceed 72 V because of "back EMF")
- Output current programmable, from 0.3 A-5.0 A (RMS)
- TTL compatible and optically isolated digital input
- Automatic current reduction
- Over-voltage, over-current, phase-error protections

## 2. Description:

The DM805-AI is a 0 – 5 V signal input stepper drive with built-in oscillator which is based on the latest digital control algorithm. It brings a unique level of system smoothness, providing optimum torque and nulls mid-range instability. Motor self-test and parameter auto-setup technology offers optimum responses with different motors and easy-to-use. The driven motors can run with much smaller noise, lower heating, smoother movement than most of the drivers in the markets. Its unique features make the DM805-AI an ideal solution for applications that require low-speed smoothness.

The three built-in potentiometers are used to preset and adjust the velocity, acceleration and deceleration. In 0-5 V speed mode, the motor speed is controllable and follows the analog 0 - 5 V input. In high / low speed mode, the motor speed is selected by digital input and adjusted by the high/low speed potentiometers. The user can run the motor with the least configuration and connection. In position mode, the DM805-AI is a traditional stepper drive. There is a 5 V power supply output for customer use.

## 3. Applications:

Suitable for a wide range of stepper motors of NEMA sizes 23, 24 and 34 (57 x 57 mm to 86 x 86 mm). It can be used in various kinds of machines, such as X-Y tables, engraving machines, labelling machines, laser cutters, pick-place devices, and so on. Particularly well suited for applications where low noise levels, less heat development, high speed and high precision are desired.

## 4. Electrical Specification:

Parameters	Min.	Typ.	Max.	Unit
Output current	0.3	-	7.0 (5.0 RMS)	A
Supply Voltage	+18	+60	+80	V DC
Logical Signal Current	7	10	16	mA
Pulse input frequency	0	-	200	kHz
Minimal pulse width	2.5			µs
Minimal direction setup	5.0			µs
Isolation Resistance	500			MΩ

## 5. Further Specifications:

Parameters	Min.	Typ.	Max.
Microsteps / 1.8°	200		51200
Puls / Direction (PUL / DIR)		X	
NEMA Sizes	23		34
Motor Type Mecheltron	57BYGH-XXX		86BYGH-XXX

# Stepper Motor Driver

## DM805AI

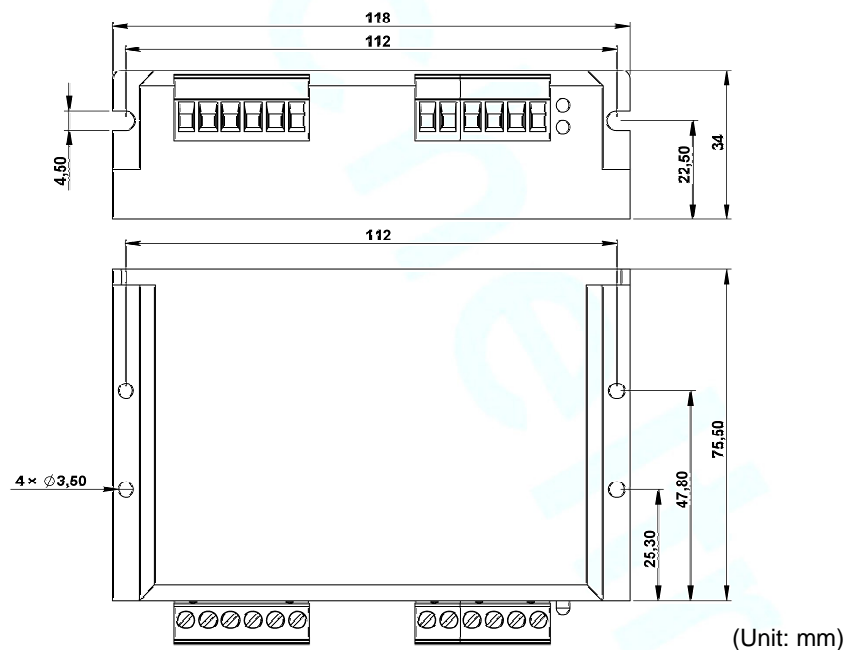
### 6. Velocity Control:

Item	Specification	Reaction Point	Resolution	Min	Max
Analog Input	0 – 5 V Speed Mode	10 mV	10 mV	0 Rev/s	25 ±0.5 Rev/s
	External POT Mode	20 mV			
Accel. / Decel. / Ramp Potentiometer	0 – 25 turns	10 mV	10 mV	0.5 Rev/s <sup>2</sup>	250 ±1 Rev/s <sup>2</sup>
Low Speed Potentiometer	0 – 25 turns	10 mV	10 mV	0 Rev/s	5 ±0.01 Rev/s
High Speed Potentiometer	0 – 25 turns	10 mV	10 mV	0 Rev/s	25 ±0.5 Rev/s

### 7. Environment:


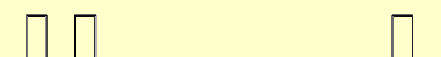

Cooling	Natural or forces cooling	
Operating Environment	Environment	Avoid dust, oil, fog and corrosive gases
	Ambient Temperature	0 °C - 40 °C
	Humidity	40 % RH bis 90 % RH
	Operating Temperature	max. 90 °C
Storage Temperature	-20 °C to 65 °C	

### 8. Mechanical Specifications:



### 9. Protection Indication:

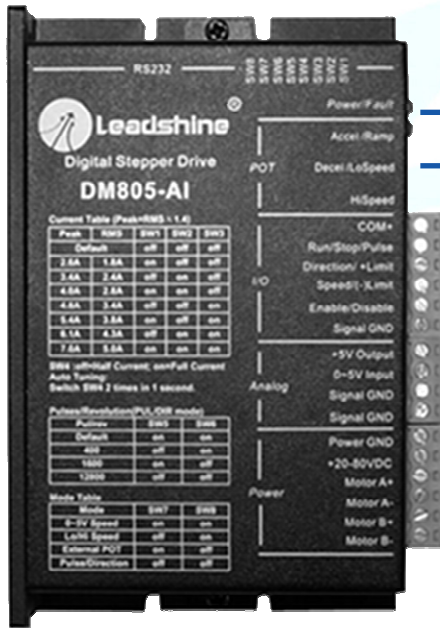
The green indicator turns on when the drive is powered on. When error happens, the red indicator flashes periodically to indicate the error type.

Prio.	Number Flashing	Sequence wave of the LED	Description
1.	1		Over current protection
2.	2		Over voltage protection
3.	3		Reserved

# Stepper Motor Driver

## DM805AI

### 10. Drive Interfaces:



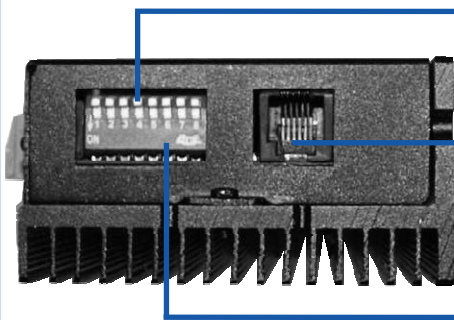
Indicator Green: Power / Indicator Red: Fault

Potentiometers Adjusting Speed, Acceleration and Deceleration

Digital I/O Signal Connector, 6-pin screw terminal, 3.81 mm space

Analog Signal Connector, 6-pin screw terminal, 3.81 mm space

Power Connector, 6-pin screw terminal, 3.81 mm space



Auto Tuning: Switch SW4 two times in one second.

RS232 communication port, RJ11, communicating PC software  
**Note:** It is used to configure and current loop tuning, anti-resonance tuning with the PC software. However, the drive can still work properly without it. The DM805-AI can be fully tuned by the auto-tuning.

DIP switch, 8 bits, current setting, selecting microstep, operating

### 11. Connectors and Pin Assignment:

The DM805-AI has three connectors, connector for digital I/O signals connections, connector for analog 0 - 5 V signal connections and connector for power and motor connections. The three parameters are used to preset or adjust the speed, acceleration and deceleration ramp. They have different functions in different modes.

I/O Signal Assignment in Different Modes				
I/O Signal	0 – 5 V Speed Mode	Lo / Hi Speed Mode	External POT Mode	Pulse / Dir. Mode
Run/Stop/Pulse	Run/Stop	Run/Stop	Run/Stop	Pulse
Direction / (+)Limit	Direction	Direction	+Limit	Direction
Speed / (-)Limit	-Limit	Speed	-Limit	N/A

# Stepper Motor Driver

## DM805AI

Digital I/O Signal Connector			
6-pin screw terminal, 3.81 mm space			
Pin	Name	I/O	Description
1	COM+	Power	+5V Power Input, common reference of all inputs
2	Run/Stop/Pulse	I	Run / Stop signal for 0 – 5 V analog, Lo / Hi Speed and External POT mode. In Pulse / Direction mode, it accepts pulse input.
3	Direction / +Limit	I	Direction input for 0-5V analog, Lo/Hi Speed and Pulse/Direction mode. It is the +limit switch input in External POT mode. When +Limit is activated, the motor speed decelerates to zero in the acceleration set by Ramp potentiometer. The +Limit is only activated when the voltage applied to 0 – 5 V input is 2.5 – 5 V.
4	Speed / (-)Limit	I	Speed selection input in Lo / Hi speed mode. It is the -limit switch input in External POT and 0 – 5 V Speed mode. When +Limit is activated, the motor speed decelerates to zero in the acceleration set by Ramp potentiometer. In External POT mode, the –Limit is activated only when the voltage applied to 0 – 5 V input is 0 - 2.5 V. In 0 – 5 V speed mode, the –Limit is activated only when Direction input is connected to Signal GND.
5	Enable / Disable	I	This signal is used to enable or disable the power stage. Usually left it unconnected to enable the power stage.
6	Signal GND	GND	Signal ground. It is common with the power ground.

Analog Signal Connector			
4-pin screw terminal, 3.81 mm space			
Pin	Name	I/O	Description
1	+5V Output	O	+5 V Power Output, reference to signal ground
2	0-5V Input	I	Analog 0 – 5 V reference input
3	Signal GND	GND	Signal ground. It is common with the power ground.
4	Signal GND	GND	Signal ground. It is common with the power ground.

Power Connector			
6-pin screw terminal, 3.81 mm space			
Pin	Name	I/O	Description
1	Power GND	GND	Power ground
2	+20 - 80VDC	I	Power supply input, 24 – 72 VDC recommended, leaving rooms for voltage fluctuation and back-EMF.
3	Motor A+	O	Motor Phase A+
4	Motor A-	O	Motor Phase A-
5	Motor B+	O	Motor Phase B+
6	Motor B-	O	Motor Phase B-

# Stepper Motor Driver

## DM805AI

### 12. DIP Switch settings:

Operating Mode			
Mode	SW7	SW8	Description
0 ~ 5 V Speed	on	on	Analog 0 – 5 V Speed Mode
Lo / Hi Speed	off	on	Low and High Speed Mode
External POT	on	off	External Potentiometer Speed Mode
Pulse / Direction	off	off	Pulse and Direction Position Mode

**Note:** Mode cannot be changed on-the-fly! After change mode the drive must be reset by power-off, best to change mode when power is off.

Dynamic Current				
PEAK	RMS	SW1	SW2	SW3
Default (set by software)		off	off	off
2.6A	1.8A	on	off	off
3.4A	2.8A	off	on	off
4.0A	2.4A	on	on	off
4.8A	3.4A	off	off	on
5.4A	3.8A	on	off	on
6.1A	4.3A	off	on	on
7.0A	5.0A	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.

Microstep Resolution		
Pulses/Rev.	SW5	SW6
Default (set by software)	on	on
400	off	on
1600	on	off
12800	off	off

**Note:** It is only active in Pulse/Direction mode. Further, the resolution can be set in the ProTuner software from full step to 102400 steps / rev.

Idle-Current		
SW4 decides whether the idle current is reduced automatically or remains the same as the dynamic current setting.		
SW4	Off	On
	The motor idle current reduces automatically when there is no pulse applied to the DM805-AI.	The motor idle current is the same as the dynamic current when there is no pulse applied to the DM805-AI.

Potentiometers				
Potentiometer	0-5V Speed Mode	Lo/Hi Speed Mode	External POT Mode	Pulse/Direction Mode
Accel / Ramp	Acceleration	Ramp	Acceleration	N/A
Decel / LoSpeed	Deceleration	Low Speed	Deceleration	N/A
HiSpeed	High Speed	High Speed	High Speed	N/A

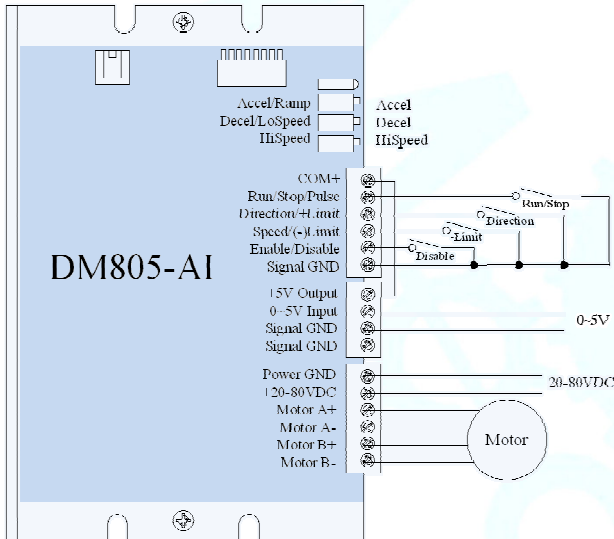
RS232 Communication Port
It is used to configure and for current loop tuning and anti-resonance tuning with the PC software. However, the drive can still work properly without it. The DM805-AI can be fully configured by the auto-tuning function of DIP switch SW4.

# Stepper Motor Driver

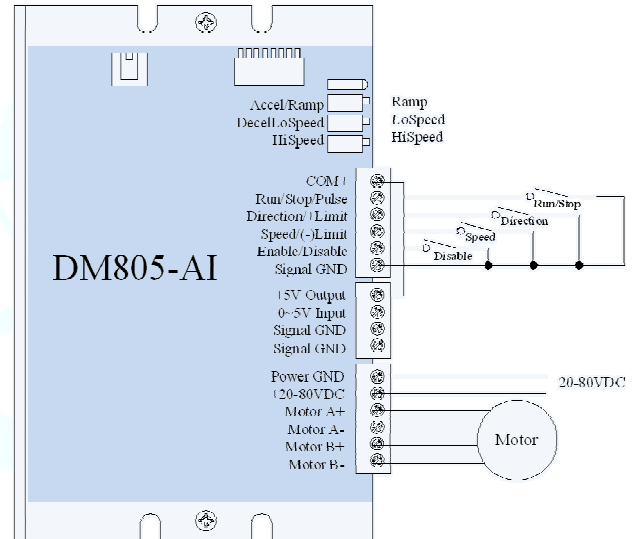
# DM805AI

## 13. Typical Connections

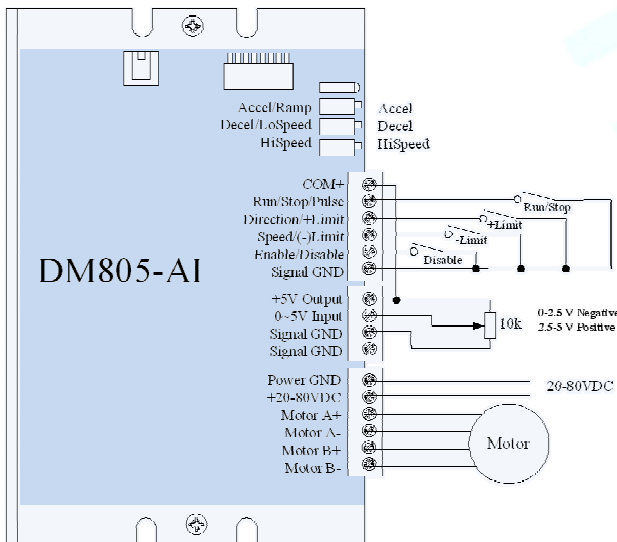
### 0 – 5 V Speed Mode



### Low / High Speed Mode



### External POT Mode



### Pulse/Direction Mode

