

DM805-AI

Stepper Motor Driver



Digital Driver Model DM805-AI

Digital Technology, max. 80 VDC / 7.0 A



Product Description:

The DM805-AI is a 0 – 5 V 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.

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

Specifications

Electrical Specifications:

Parameters	Min	Typ.	Max	Unit
Output current	0.3	-	7.0 (5.0 RMS)	A
Supply voltage	+18	+60	+80	VDC
Logic signal current	7	10	16	mA
Pulse input frequency	0	-	200	kHz
Insulation resistance	500			MΩ

Further Specifications:

Parameters	Min	Typ.	Max
Microsteps per round (1.8° motor)	400 by DIP switches (full-step selectable by software only in pulse / direction mode)	1600	12800 by DIP switches (102400 selectable by software only in pulse / direction mode)
Pulse / Direction (PUL / DIR)		X	
Analog 0 – 5 V input signal		X	
NEMA sizes	17		34
Motor type Mecheltron	42BYGH-XXX		86BYGH-XXX

DM805-AI

Stepper Motor Driver

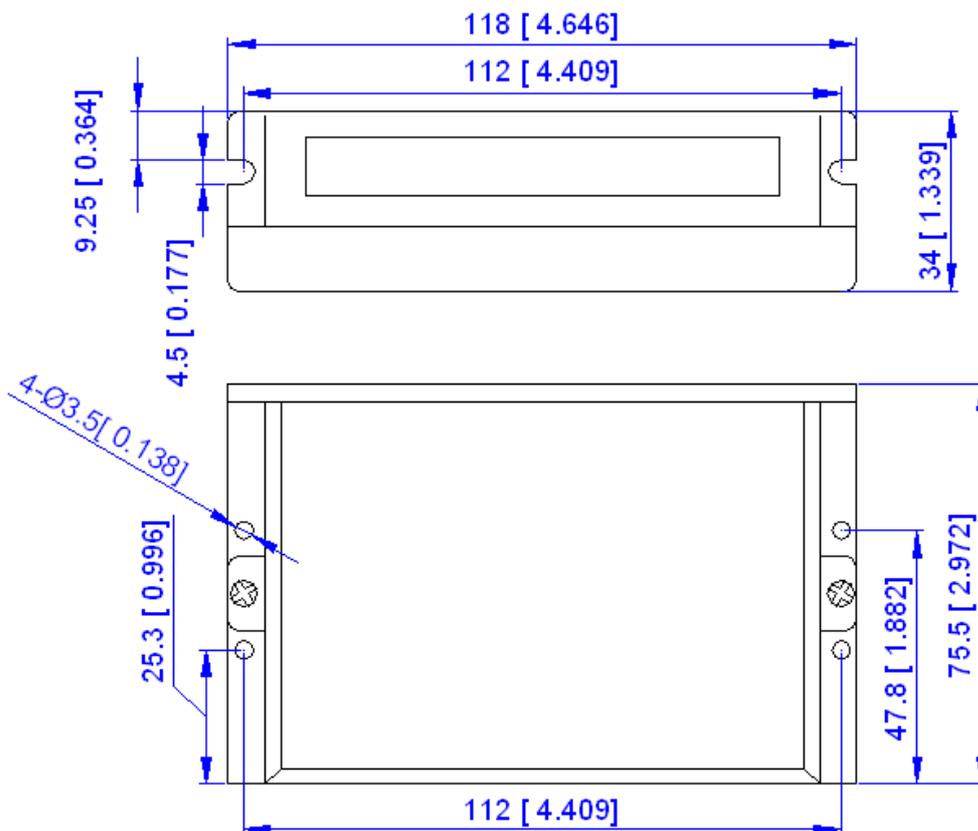
Velocity Control

Item		Specification	Reaction Point	Resolution	Min	Max
Analog Input	0 – 5 V Speed Mode	0 – 5 V	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 ²	250 ±1 Rev/s ²
LoSpeed Potentiometer		0 – 25 turns	10 mV	10 mV	0 Rev/s	5 ±0.01 Rev/s
HiSpeed Potentiometer		0 – 25 turns	10 mV	10 mV	0 Rev/s	25 ±0.5 Rev/s

Operating Environment

Cooling	Natural cooling or forced cooling	
Operating Environment	Environment	Avoid dust, oil, fog and corrosive gases
	Ambient Temperature	0°C – 50°C (32°F – 122°F)
	Humidity	40%RH – 90%RH
	Operating Temperature	70°C (158°F) Max
	Vibration	5.9m/s ² Max
Storage Temperature	-20°C – 65°C (-4°F – 149°F)	
Weight	350g (12.34oz)	

Mechanical Specifications

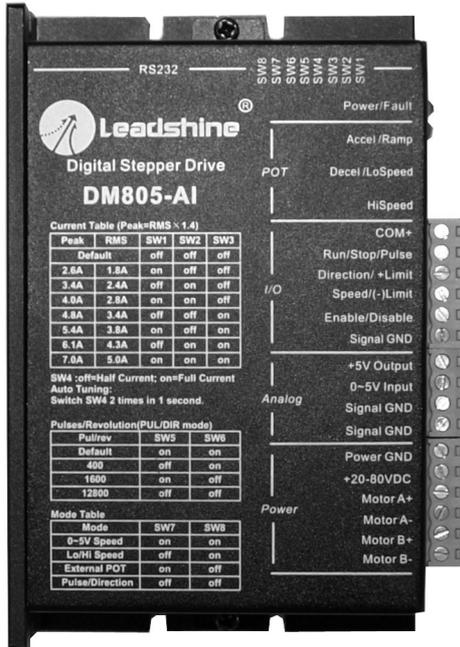


Unit: mm [inch]

DM805-AI

Stepper Motor Driver

Drive Interfaces



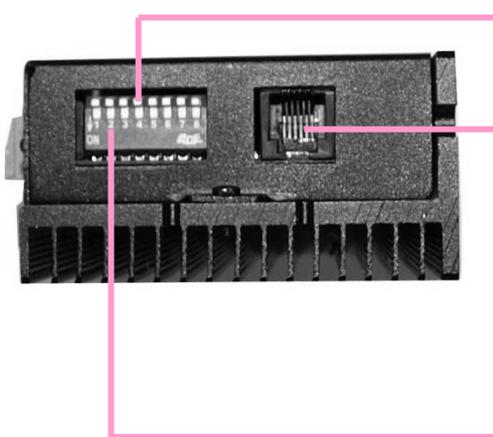
Indicator Green: Power, Red: Fault

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.

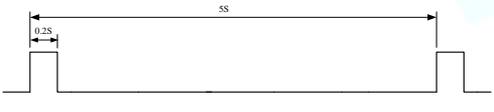
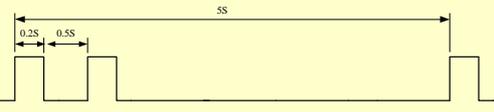
RS232 communication port, RJ11, communicating PC software

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 mode

Protection Indications

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

Priority	Time(s) of ON	Sequence wave of RED LED	Description
1 st	1		Over current protection
2 nd	2		Over voltage protection

DM805-AI

Stepper Motor Driver

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 / Direction Mode
Run/Stop/Pulse	Run/Stop	Run/Stop	Run/Stop	Pulse
Direction / (+)Limit	Direction	Direction	+Limit	Direction
Speed / (-)Limit	-Limit	Speed	-Limit	N/A

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-

DM805-AI

Stepper Motor Driver

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.

	OFF	ON
SW4	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

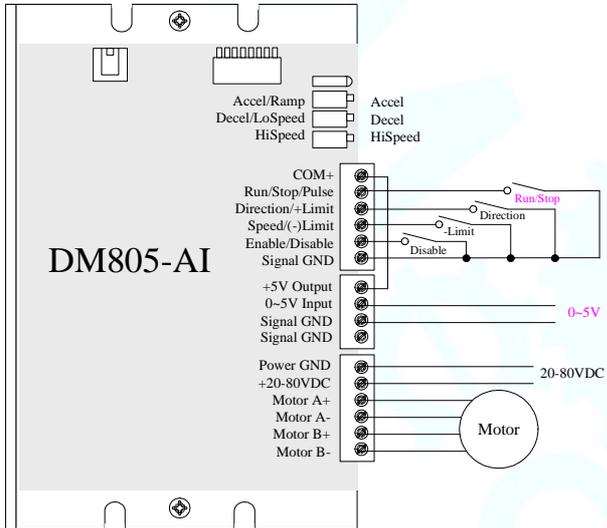
It is used to configure and for current loop tuning and anti-resonance tuning with the PC software. However, the drive can still work properly without it. The DM805-AI can be fully configured by the auto-tuning function of DIP switch SW4.

DM805-AI

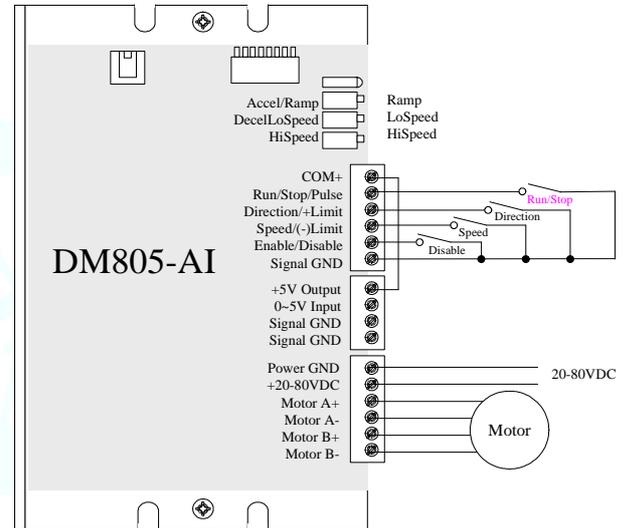
Stepper Motor Driver

Typical Connections

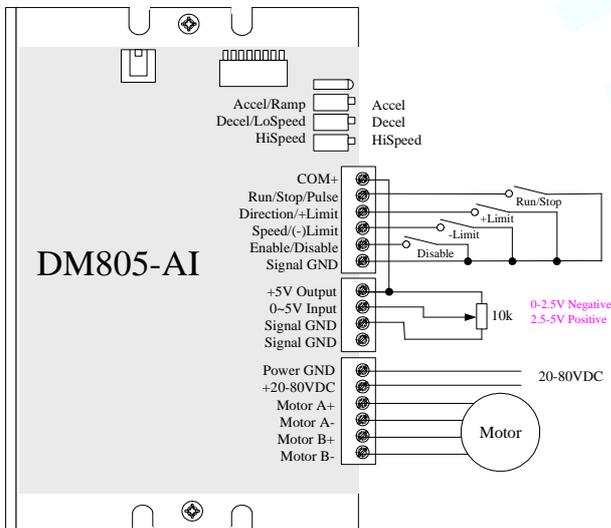
0 – 5 V Speed Mode



Low / High Speed Mode



External POT Mode



Pulse/Direction Mode

