

### **Leadshine 2-phase Digital Stepper Drives**

Leadshine has been an industry leading motion control supplier since 1997, and is one of the largest stepper drive manufacturers in the world. Leadshine steppers offer high quality products (Leadshine factories are ISO9001 certified) at very affordable prices. Leadshine steppers are simple, easy to use, long-lasting, and reliable.

AutomationDirect sells a wide range of linear and switching power supplies, stepper motors, cables, and PLCs with hi-speed outputs that are compatible with Leadshine stepper drives.

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#### **Features**

- 2-phase digital stepper drives
- Anti-resonance for optimal torque, extra smooth motion, low motor heating and noise
- Motor auto-config on power up
- All drives support step and direction control, some models support CW/CCW as well
- Micro-stepping for smooth motor movement
- DIP switch configurable
- Wide range of input voltages supported (12-110 VDC, 18-80 VAC)

- Pulse input frequency up to 200kHz
- Soft-start with no "jump" when powered on
- Automatic idle-current reduction
- Protections for over-voltage and overcurrent
- NEMA 11, 14, 17, 23, 24, 34 and 42 frame size step motors supported





Leadshine Series – Drives Features Comparison1								
Drive Model	DM322E	DM542E	<u>DM556E</u>	DM860E	DMA860E	DM805-AI	<u>EM542S</u>	<u>EM556S</u>
Price	\$27.50	\$39.00	\$43.00	\$53.00	\$69.00	\$113.00	\$50.00	\$61.00
Drawing	PDF	PDF	PDF	PDF	PDF	PDF	PDF	<u>PDF</u>
Drive Type				2-phase digita	I stepper drive			
Supply Voltage	12–30 VDC (24 VDC typical)	4 VDC   20–50 VDC   (48–68 VDC   or (30–60		20-80 VDC (30-60 VDC typical)	20–50 VDC (24–48 VDC typical)			
Pulse Input Type	Single-ended2	ngle-ended2 Differential, Single-ended			Single-ended2	Differential, S	Single-ended	
Step Input Modes	Step & Direction Step & Direction, CW & CCW				Step & Direction, Analog input	Step & Direction	n, CW & CCW	
Digital Input Voltage	5V (add a 1K resistor to accept +12V input, or a 2K resistor to accept +24V input)				DIP switch sele			
PPR Range	400–12800 400–25600 400–51200			200-12800	200–2	25600		
Motor Output Current Range	0.3–2.2 A peak (0.2–1.6 RMS)	1.0-4.2 A peak (0.7-3.0 RMS)	1.8–5.6 A peak (1.3–4.0 RMS)	2.4–7.2 A peak (1.7–5.1 RMS)		2.6-7.0 A peak (0.3-5.0 RMS)	0.5-4.2A peak (0.4-2.9 RMS)	0.5-5.6A peak (0.4-3.9 RMS)
Digital Output	No					+24VDC (Bra Dete	ake and Fault ction)	
Self-test Capable	No	No	No	No	No	Yes	Yes	Yes
Special Features	Soft-start, motor auto-config  Accepts a DC or an AC power supply, soft-start, motor auto-config  Built-in pulse generator, command source				command	Auto-tuning, sof brake outpu		

<sup>1 -</sup> Refer to Specifications Tables for detailed specifications.

<sup>2 -</sup> See the User Manual or Quick Start Guide for instructions on wiring Single-Ended drives to a Differential (Line Driver) controller.







### DM542E, DM556E, DM860E, DMA860E

The DM542E and DM556E drives are capable of pulse and direction operation, with auto-motor config on power up.

The DM860E and DMA860E drives possess the same capabilities but can also do CW and CCW pulse operation. The main difference between these models are output current range to the motor and supply voltage.

Leadshine DM542E, DM556E, DM860E, DMA860E Specifications									
Drive Model		<u>DM542E</u>	<u>DM556E</u>	<u>DM860E</u>	<u>DMA860E</u>				
Output Current		1.0–4.2 A peak (0.7–3.0 RMS)	1.8–5.6 A peak (1.3–4.0 RMS)	2.4–7.2 A peak (1.7–5.1 RMS)	2.4–7.2 A peak (1.7–5.1 RMS)				
Input Voltage		20–50 VDC (24–48 VDC typical)		24–74 VDC (48–68 VDC typical)	24–110 VDC (48–90 VDC typical) or 18–80 VAC (36–70 VAC typical)				
Logic Signal C	Current		7–16 mA (1)	0mA typical)					
Pulse Input Fr	equency		0–20	0 kHz					
Minimal Pulse	Width		2.5	μs					
Minimal Direct	tion Setup	5.0 µs							
Isolation Resis	stance	500mΩ							
	PUL+	Pulse signal: 5V signal, differential input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 µs. Add a 1kl							
	PUL-	resistor for +12V signals, 2k⊞ for +24V signals.							
	DIR+	Direction signal: 5V signal, differential input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 µs. Add a							
Connector P1 Functions	DIR-	resistor for +12V signals, 2k⊍ for +24V signals. Direction Function: requires 5µs setup time. CW/CCW Function (DM860E and DMA860E only): see DIP switch SW14.							
	ENA+	Enable signal: 5V signal, differential input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 µs. Add a							
	ENA-	resistor for +12V signals, 2k□ for +24V signals. Enable Function: Close (pull low) to disable the drive.							
Replacement (	Connectors	Connectors Power = DN-6PLUG, I/O = DN-4PLUG, Enable = DN-2PLUG							
Cooling	Cooling Natural cooling or forced cooling								
Ambient Temp	perature	o°C to 65°C (32°F to 149°F)							
Humidity		40–90% relative humidity							
Operating Ten	nperature	0°C to 50°C (32°F to 122°F)							
Vibration		10–50 Hz / 0.15 mm							
Storage Temp	erature	-20°C to 65°C (-4°F to 149°F)							
Self Test		No							
Weight		227g (8 oz)	300g (10.6 oz)	510g (1.13 lbs)	510g (1.13 lbs)				

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### **DM332E**

The DM322E is a compact drive capable of pulse and direction operation, with motor auto-configuration on power up.



Leadshine DM322E Specifications				
Drive Model		DM322E		
Output Current		0.3–2.2 A peak (0.2–1.6 RMS)		
Input Voltage		12–30 VDC (24 VDC typical)		
Logic Signal Curr	ent	7–16 mA (10mA typical)		
Pulse Input Frequ	iency	0–70 kHz		
Minimal Pulse Wi	dth	7.5 µs		
Minimal Direction	Setup	7.5 µs		
Isolation Resistar	тсе	100mΩ		
	PUL	Pulse signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = $2.5 \mu$ s. Add a $1$ k $\!^{\circ}$ 1 resistor for +12V signals, $2$ k $\!^{\circ}$ 1 for +24V signals.		
Connector P1	DIR	DIR signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 µs. Add a 1½ resistor for +12V signals, 2½ for +24V signals.  Direction Function: requires 5µs setup time.  CW/CCW Function: see DIP switch SW14.		
Functions	ОРТО	This input is the voltage supply for the Pulse, Direction, and Enable opto-couplers. Connect 5VDC (or +12V, +24V with appropriate resistors on Pulse, Direction, and Enable inputs).		
	ENA	Enable signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V.  Minimum pulse width = 2.5 µs. Add a 1kl resistor for +12V signals, 2kl for +24V signals.  Enable Function: Close (pull low) to disable the drive.		
Replacement Con	nectors	Power = 6-pin from STP-CON-4; I/O = 4-pin from STP-CON-5		
Cooling		Natural cooling or forced cooling		
Ambient Temperature		0°C to 65°C (32°F to 149°F)		
Humidity		40–90% relative humidity		
Operating Temperature		0°C to 50°C (32°F to 122°F)		
Vibration		10–50 Hz / 0.15 mm		
Storage Temperature		-20°C to 65°C (-4°F to 149°F)		
Self Test		No		
Weight		90g (3.5 oz)		

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### **DM805-AI**

The DM805-Al is capable of pulse and direction as well as analog input and speed control, with motor auto-configuration on power up and motor self-test capability. Comes with built in potentiometers for adjusting accel and decel rates and can be controlled via an external potentiometer.





Leadshine DM805-Al Specifications				
Drive Model		<u>DM805-AI</u>		
Output Current		2.6–7.0 A peak (0.3–5.0 RMS)		
Input Voltage		20–80 VDC (60VDC typical)		
Logic Signal Curre	nt	7–16 mA (10mA typical)		
Pulse Input Freque	псу	0–200 kHz		
Minimal Pulse Widt	h	2.5 µs		
Minimal Direction S	Setup	5.0 µs		
Isolation Resistanc	е	500mΩ		
Pin Functions	Run/Stop or Pulse	Pulse signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 µs. Add a 1 resistor for +12V signals, 2k for +24V signals.  Run/Stop Function: Close (pull low) to enable the motor.		
	Direction or +Limit	DIR signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 µs. Add a 1kl resistor for +12V signals, 2kl for +24V signals.  Direction Function: requires 5µs setup time.  (+)Limit Function: Close (pull low) to stop motor movement in the positive direction.		
	Speed or (-)Limit	Speed: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 µs. Add a 1kl resistor for +12V signals, 2kl for +24V signals.  Speed Function (Low Speed/High Speed Mode): Close (pull low) to select Lo Speed pot setpoint.  Open (float high) to enable Hi Speed pot setpoint.  (-)Limit Function: Close (pull low) to stop motor movement in the negative direction.		
	Enable/Disable	Enable signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 µs. Add a 1kl resistor for +12V signals, 2kl for +24V signals.  Enable Function: Close (pull low) to disable the drive.		
Replacement Conn	ectors	Power = 6-pin from STP-CON-4; I/O = 6-pin from STP-CON-4; Analog = 4-pin from STP-CON-4		
Cooling		Natural cooling or forced cooling		
Ambient Temperature		0°C to 50°C (32°F to 122°F)		
Humidity		40–90% relative humidity		
Operating Temperature		70°C (158°F) max		
Vibration		4.9 m/s2 max		
Storage Temperature		-20°C to 65°C (-4°F to 149°F)		
Self Test		Yes		
Configuration Cable		<u>1.4.4-0609505-B3</u>		
Weight		264g (9.3 oz)		

Leadshine Series Drive Cables					
Optional Configuration Cable Compatible With Price					
<u>1.4.4-0609505-B3</u> <u>DM805-AI</u> \$5.50					

Note: Configuration cable only required if using optional configuration software. Software configuration not necessary unless DIP switch settings and auto-tuning aren't sufficient for your application. Requires an RS232 port on your PC, or a USB to RS232 converter, like <u>USB-RS232-1</u>.



1.4.4-0609505-B3

Note: ProTuner for DM805-Al is not officially supported by the manufacturer for Operating Systems newer than Windows 7. Some Win10 and Win11 PCs will still run the software, but there is no guarantee from the manufacturer. See a potential solution for newer OS compatibility in our Community Forum: <a href="https://community.automationdirect.com/s/question/0D5Dp0000WPRm8KAH/fix-for-dm805ai-protune">https://community.automationdirect.com/s/question/0D5Dp0000WPRm8KAH/fix-for-dm805ai-protune</a>



### EM542S, EM556S

The EM542S and EM556S are digital stepper drives capable of pulse and direction as well as CW and CCW operation, with motor autoconfiguration on power up and self-test capability. EM542S and EM556S have a built-in current-limiting resistor (on a switch) to allow either 5V or 24V input pulses. They also include a fault and a brake output, and a shaft lock feature. The brake output can be used with an external holding brake to hold the motor in place if power fails or the drive is disabled - you lose power, the brake engages. The shaft lock is set via DIP switch and will lock the motor into position using phase current, but only works when the drive has power.



	Leadshine EM542S, EM556S Specifications					
Drive Model		<u>EM542S</u>	<u>EM556S</u>			
Output Current <sup>1</sup>		0.5-4.2A peak (0.4-2.9 RMS)	0.5-5.6A peak (0.4-3.9 RMS)			
Input Voltage		20–50 VDC (24–48 VDC typical)				
Logic Signal Currer	nt	7–16 mA (1	I0mA typical)			
Pulse Input Freque	псу	0–20	00 kHz			
Minimal Pulse Widt	h	2.5	5 µs			
Minimal Direction S	etup	5.0	) µs			
Isolation Resistanc	e	50	0mΩ			
	PUL+		determines voltage), differential input. High			
	PUL-	input is 4-5V or 22-24V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs. Switch S3 factory default = 24V position. WARNING! If switch S3 is in the 5V position and 24V is applied, the drive will be damaged				
	DIR+	DIR signal: 5V or 24V signal (Switch S3 determines voltage), differential input. High inpu				
Connector P1 Functions	DIR-	is 4-5V or 22-24V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs.  Direction Function: requires 5μs setup time.  CW/CCW Function: see DIP switch SW14.  WARNING! If switch S3 is in the 5V position and 24V is applied, the drive will be damaged				
	ENA+	Enable signal: 5V or 24V signal (Switch S3 determines voltage), differential input. High input is 4-5V or 22-24V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs. Enable Function: Close (pull low) to disable the drive.  WARNING! If switch S3 is in the 5V position and 24V is applied, the drive will be damage				
	ALM	Optional output connection. Maximum of 30V/100mA output, sinking or sourcing.				
Fault and Brake	BR					
Output Connector	СОМ-					
Replacement Conn	ectors	Incoming Power = DN-2PLUG; Motor Power = DN-4PLUG; I/O = 6-pin from STP-CON-4				
Cooling		Natural cooling or forced cooling				
Ambient Temperatu	ıre	0°C to 65°C (32°F to 149°F)				
Humidity		40–90% relative humidity				
Operating Temperature		0°C to 50°C (32°F to 122°F)				
Vibration		10–50 Hz / 0.15 mm				
Storage Temperature		-20°C to 65°C (-4°F to 149°F)				
Self Test		Yes				
Configuration Cable		1.4.4-0409505-B3				
Weight		250g (8.8 oz)	250g (8.8 oz)			
1 - Output current range	1 - Output current ranges are for software settings which allow for a wider current range than DIP switches.					

Leadshine Series Drive Cables			
Optional Configuration Cable	Price		
1.4.4-0409505-B3	EM542S, EM556S	\$5.50	

Note: Configuration cable only required if using optional configuration software. Software configuration not necessary unless DIP switch settings and auto-tuning aren't sufficient for your application. Requires an RS232 port on your PC, or a USB to RS232 converter, like <u>USB-RS232-1</u>.

