Stepper Motor Driver EM882S

1. Features:

- Step & direction (PUL/DIR) or CW/CCW (double pulse) control
- 20-80VDC supply voltage
- 200 KHz max pulse input frequency
- 16 microstep resolutions of 400-51,200 via DIP switches, or 200-51,200 via software (increase by 200)
- 8 output current settings of 2.1-8.2A via DIP Switches, or 0.5-8.2A via software (increase by 0.1)
- Configurable control command smoothing for reducing motor vibration
- Idle current reduction to 50% or 100% selection via SW4
- Sensor-less stall detection
- Auto-tuning and motor model selection to match wide-range stepper motors
- Anti-Resonance for optimal torque, extra smooth motion, low motor heating and noise
- Soft-start with no “jump” when powered on
- Fault output
- Over-voltage and over-current protections

2. Description:

The EM882S is a new digital stepper drive based on Leadshine’s widely implemented DM stepper drives (10+ millions of units in field). While retaining features of simple design, easy setup, high precision and reliability, Leadshine has also upgraded it by adopting the latest stepper control technology and added additional advanced features for better torque (10-25%), quicker response time, control command smoothing, motor selector, etc.
The EM882S is able to power 2 phase (1.8°) and 4 pha se (0.9°) stepper motors smoothly with very low mot or heating & noise. It can take 20-80VDC supply voltage and output 0.5 to 8.2A current. All the micro step, output current configurations and motor model selection can be easily done via built in DIP switches. Therefore, the EM882S is an ideal choice for many applications requiring simple step & direction or CW/CCW control of NEMA 23, 24 and 34 stepper motors.

3. Applications:

The EM882S stepper drive is designed to power 2 phase (1.8°) or 4-phase (0.9°) NEMA23, 24 and 34 hybrid s tepper motors. It can be adopted in many industries (CNC machinery, electronics, medical, automation, packaging…) for applications such as CNC routers, mills, plasma, laser cutters, factory assembly lines, vending machines, etc. Its excellent performance, simple design, and easy setup features make EM882S ideal for many step & direction control type applications.

4. Electrical Specification:

Parameters	Min.	Typ.	Max.	Unit
Output current	0,5	-	8,2 (5,9 RMS)	A
Input voltage	+20		+80	VAC (VDC)
Logical signal current	7	10	16	mA
Input frequency	0	-	200	kHz
Minimum pulse width	2.5			µs
Minimum pulse width for direction change	5.0			µs
Isolation Resistance	500			MΩ

5. Further Specifications:

Parameters	Min.	Typ.	Max.
Micro steps	200		25600 (51200*)
Pulse / Direction (PUL / DIR)		X	
Double Puls (CW / CCW)		X	
NEMA Sizes	23		34
Motor Type Mecheltron	57BYGH-XXX		86BYGH-XXX
Weight	0.5 kg		

*via software

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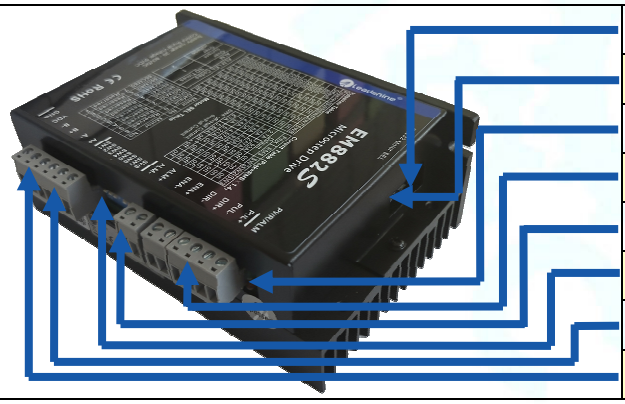
6. Environment:

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

7. Pin and DIP-Switch-Positions



P4: RS232-Connection
S2: Rotation Switch Selector 2
Status LED's
P1: Control signal inputs
P2: Alarm outputs
S1: DIP Switch terminal
P4: Motor connection
P3: Power connection

8. DIP Switch Settings:

Dynamic Current Settings (SW1-3) (S1)				
Peak Current	**RMS Current**	**SW 1**	**SW 2**	**SW 3**
2,10 A	1,48 A(Default)	On	On	On
2,70 A	1,93 A	Off	On	On
3,60 A	2,57 A	On	Off	On
4,60 A	3,29 A	Off	Off	On
5,50 A	3,93 A	On	On	Off
6,40 A	4,57 A	Off	On	Off
7,30 A	5,21 A	On	Off	Off
8,20 A	5,86 A	Off	Off	Off

Idle Current Setting (SW4) (S1)

SW4 of the EM882S is used to set the percentage of the output current when the motor is at a standstill. The no-load current percentage is set to 50% in the OFF position and 100% in the ON position. If the driven stepper motor is idle for 0.4 seconds (no movement), the output current of the EM882S is automatically reduced to the configured percentage

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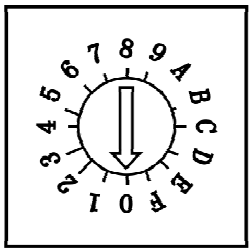
Micro Step Resolution Setting (SW5-8) (S1)

Each EM882S has 16 micro step settings that can be configured via DIP switches SW5 to SW8. See the table below for details. When set to default, the micro step can be set via Leadshine ProTuner Software.

Micro Step	Steps/rev. (1,8°)	SW 5	SW 6	SW 7	SW 8
1/2	400 (default)	On	On	On	On
1/4	800	Off	On	On	On
1/8	1600	On	Off	On	On
1/16	3200	Off	Off	On	On
1/32	6400	On	On	Off	On
1/64	12800	Off	On	Off	On
1/128	25600	On	Off	Off	On
1/5	1000	Off	Off	Off	On
1/10	2000	On	On	On	Off
1/20	4000	Off	On	On	Off
1/25	5000	On	Off	On	Off
1/40	8000	Off	Off	On	Off
1/50	10000	On	On	Off	Off
1/100	20000	Off	On	Off	Off
1/125	25000	On	Off	Off	Off
1/200	40000	Off	Off	Off	Off

Auto-Tuning (Rotary Switch) (S2)



Motor	Code	Motor	Code
Default	0	Reserved	8
57CM23	1	Reserved	9
60CM30X	2	Reserved	A
86CM35	3	Reserved	B
86HS40	4	Reserved	C
86CM45	5	Reserved	D
86CM80	6	Reserved	E
86CM85	7	Reserved	F

Auto-tuning means that the current loop parameters are automatically configured when the EM882S is powered on. When the rotary switch is set to “0”, or “8” - “F”, you can turn off auto-tuning and modify current loop parameters through ProTuner. Motor Model Selection means that the current loop parameters and resonant point damping parameters are automatically configured when EM882S is powered on. Every time change the rotary switch, you need to restart the power supply to activate the setting

Smoothing Filter Time Configuration (ProTuner)

EM882S has an advanced feature called control command smoothing to make the input pulse from pulse generator (controller, PLC, etc.) S-curve acceleration, to improve motion smoothness and high-speed start frequency in many circumstances. The Filter Time value must be set to the same for each EM882S in multi-axis applications.

Activated Pulse Edge Setting (ProTuner)

The factory setting is activated at voltage rising edge, make sure this setting will match the pulse generator (controller, PLC, etc.). When the stepper motors loss step, first this parameter for a test.

Control modes Settings (ProTuner)

The factory setting is single pulse (step & direction, or pulse & direction) control. Please modify this parameter when you need the double pulse (CW/CCW) control mode.

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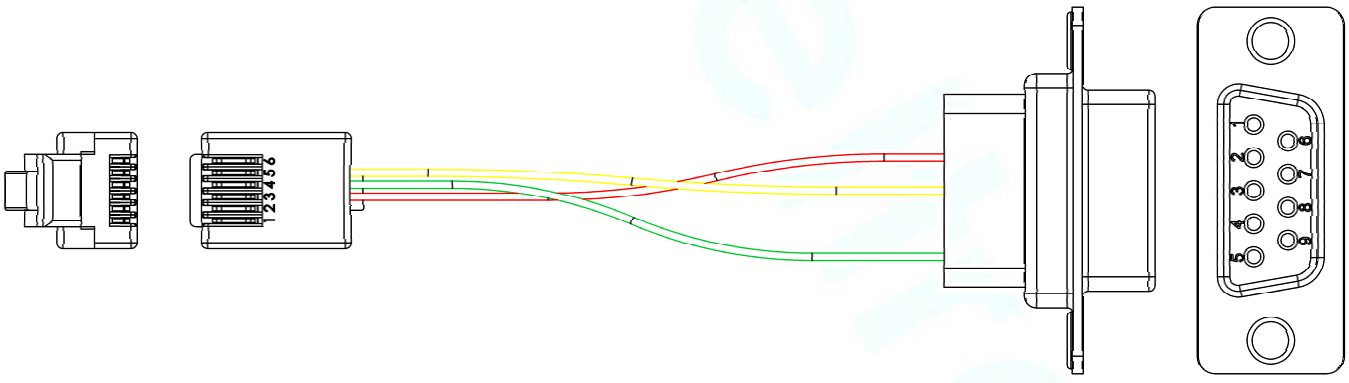
9.Pin Assignment:

Pin	I / O	Details
Control terminal connector (P1)		
PUL+	I	(1) Optically isolated, high level 4.5-5V, low voltage 0-0.5V (2) Maximum 200 KHz input frequency (3) The width of the PUL signal is at least 2.5μs, the duty cycle is recommended at 50% (4) Single pulse (step & direction) or double pulse (CW/CCW) is set by Leadshine ProTuner (5) The DIR signal must precede the PUL signal by at least 5 μs in PUL/DIR mode. (6) The voltage of control signal is 5V, need to connect a 2K resistance when it's 24V.
PUL -	I	
DIR +	I	
DIR -	I	
ENA +	I	(1) Optically isolated, differential. (2) Disable the drive by 4.5-5.0V input connection; enable the drive by 0-0.5V connection (default no connection) (3) ENA signal requires advance DIR signal minimum 5μs in single pulse mode (4) Enable time to be at least 200ms
ENA -	I	
Alarm output connector (optional) (P2)		
ALM +	O	(1) Maximum 24V/80mA output when over-voltage and over-current error protections activated. (2) Sinking or sourcing. (3) The resistance between ALM+ and ALM- is low resistance as default, and will change to high when the drive goes into error protection.
ALM -	O	
Power Connector (P3)		
GND	I	Connect to the ground connection of the power supply unit.
+V DC	I	Connect to the positive connection of the power supply. Recommended 24-72V DC
Motor Connector (P4)		
A+	O	Motor A+ Connection
A-	O	Motor A- Connection
B+	O	Motor B+ Connection
B-	O	Motor B- Connection
RS232-Connection (P4)		
The EM882S has an RS232 interface for changing the drive parameters, but this is only used for setting the parameters (e.g. via a PC with ProTuner software) and not for controlling the device.		



(schematics)

RJ11-6p-Connector-male		D-SUB9-Connector-female
Pin	Signal	Pin
6	NC	-
5	RxD	3
4	GND	5
3	TxD	2
2	NC	-
1	NC	-

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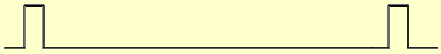
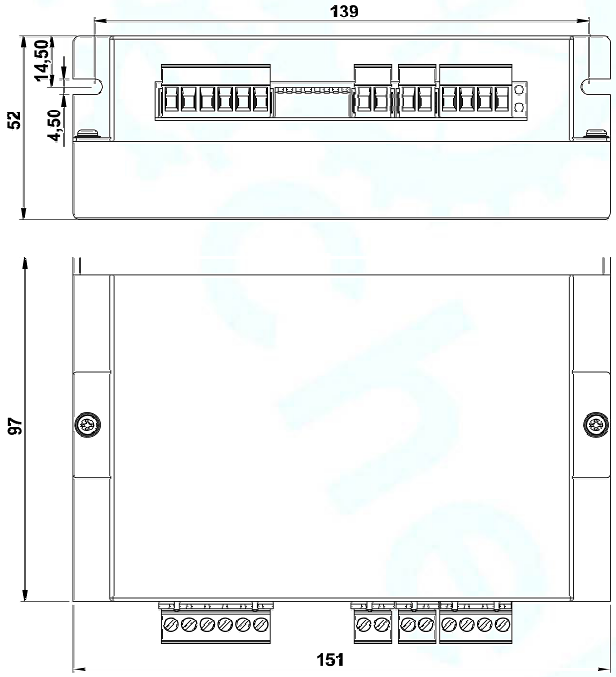
10. Protection indicator:

Prio.	Times flashing	Sequence of the red LED	Description
1.	always on		The drive was short-circuited or burned out
2.	1		The overcurrent protection is activated if the peak current exceeds the limit value.
3.	2		Overvoltage protection activated.

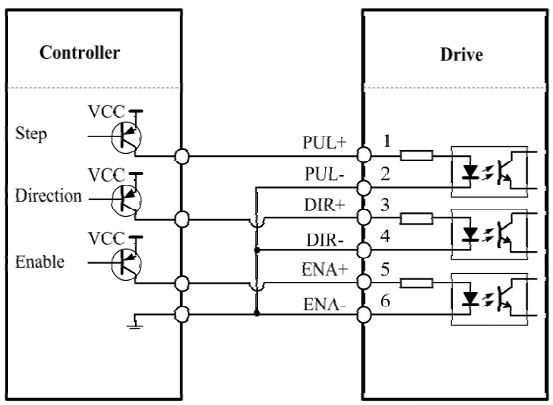
11. Mechanical Dimensions:



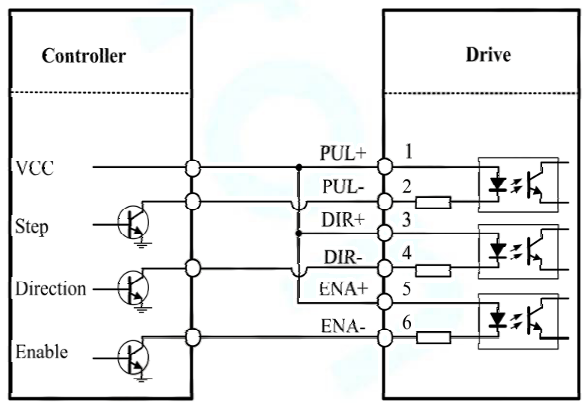
(Unit: mm)

12. Wiring:

A complete system consists of stepper motor, stepper motor driver, power supply unit and controller (pulse generator). The EM882S can accept differential or unbalanced control signals (PUL/DIR and ENA) via the P1 connection. It is recommended to connect an EMI line filter between the power supply and the driver to increase the noise immunity of the driver in noisy environments.



Common-Anode



Common-Cathode