ORION ELECTRONICS

Operation Manual

for

Stepper motor drive: MSD-2A5-032-24

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STEPPER MOTOR DRIVE

1. Introduction

MODEL NO. MSD-2A5-032-24

Stepper motor drive has now become a commonly used device, for various motion control applications. Stepper motors, along with good drives; present many unique abilities and features. For example-

- Good stopping accuracy.
- Instant start / stop and direction reversal at least up to 60 rpm.
- Constant speed even if supply voltage changes.
- Good power efficiency.

Compact, economic and reliable stepper drives is the need of many automation products.

This model **MSD-2A5-032-24**, presents all the above advantages. A convenient Chassis (default) which is ideal for control panels can be opted for.

2. Specifications

1. **Drive Voltage Supply**: 12 to 24 VDC

2. **Inputs:** Opto-coupled
   By default 5V signal levels
   (Higher voltage, on request)

3. **Signals:** Clock, Direction (PNP, NPN)

4. **Current setting:** Up to 2.5 Amp per phase, by on-board request

5. **Type:** Bipolar/ Micro-stepping

6. **Maximum Input frequency:** 50 KHz

7. **Resolution**: 6400 ppr

8. **Outermost size**: 42*42*30 mm(L*B*H)

3. Installation and Settings

The drive module should be mounted in a well -ventilated place in the control panel. The output devices heat up. For continuous duty cycle it may be necessary to provide a cooling fan, depending on ambient conditions.

The unit cannot work without proper interfacing of signals. The attached diagrams indicate how sinking or sourcing signals of various voltages can be connected. Ensure that the signals are connected properly and the power supply polarity is correct, before putting the power on.

- **Power supply and clock signal** is minimum requisite of the drive to run.

- You may choose to keep **the start signal** active permanently.

- **The direction signal** may be left open if unidirectional motion is sufficient. In such case, initial setting of direction may be affected by exchanging the connections A1 and A2 of the motor, as shown on the connection diagram

- Stepper motors, when stopped, may remain energized or completely de-energized, as desired by the user.

4. How to set the suitable current and micro-stepping:

Remove the top cover of the box and heat sink, and the drive card will be seen.
The diagram shows the component side view of the PCB when the top heat sink is removed. Please note the orientation of the PCB. The 4 pin connector is on top side and a 4 pin connector is on the right-hand side for motor, and a 2 pin connector is on the bottom for the supply input.

A blue-colored "Current SET" preset is easily visible just below the 4 pin motor connector with smaller heat sink.

Put the power on, with clock signal unconnected. It is best to remove the clock signal wire from pin marked 'Clock' (Brown wire on the 4 pin connector) before putting the power on.

The formula is-
Vset = Iset * Rsense

Put the positive of Multi-meter (Red probe) on TP1 and negative (Black probe) on TP2. Set the multimeter on DC Voltage. Turn the blue preset knob so that the voltage reading says 2.72V. This means the current set is at 2.5A. The resistor value is 1.1 ohm at full current. To set the required micro-stepping, please refer the connection diagram provided along with this manual. By manually changing the DIP switch positions, you can easily select the micro steps that you require. A blue-colored 4 pin DIP is as connected on the drive.

5. Check points and trouble shooting

Refer the pin numbers on the diagram page.

Voltage measured between:

Pin 1 (2 pin connector at the bottom): 0 VDC

Pin 2 (2 pin connector at the bottom**)**: 24 VDC

Both these DC voltages may be unregulated but they should be well-filtered.

By default the inputs are designed for 5 V signals. If you are using 12V or 24 V signal level, appropriate resistor should be connected in series. This is illustrated in the diagram attached.

Resistance measured between (Power must be off)

- A1 & A2 Winding-A resistance
  (Generally, it will be a few ohms only)
- B1 & B2 Winding-B resistance
  (Generally, it will be a few ohms only)

Both the above readings should be equal.

Check this if motor is vibrating or unwarranted direction change is taking place.

Remember....

"DR" input active will reverse the direction of motion.

6. A few points worth noting

- Generally, the stepper motors get heated up, to about 75°C. It is a good practice to provide heat sinking by way of a well-machined mounting plate, made of good conducting material. Providing good air flow with a cooling fan is necessary for machine with long working cycles.
- The cables running from the drive to the motor, should be of proper size. Unnecessary lengths of this cable should be avoided. While designing the panel cabling layout, make it a point, not to bunch the signal and motor cables together.
- Use shielded cable for signals, especially when you are using higher lengths.
- It is critically important that the stepper motor shafts are not machined at customer's end. The motor may get permanently damaged. Similarly, in case there is some problem with the motor, **do not try to open the motor and do not put oil.** Instead, the manufacturer should be informed and motor should be sent for repairs.
- Do not attempt component level servicing on drive or other PCB's without instructions from ORION.