PRECAUTIONS

· Poor connections can cause arcing, which can burn out motors or control chips. Always make sure plugs and connections are fully engaged and making good contact before powering up.

· Do not pull on wires to disconnect motor. Always grasp the plastic connector or the plug itself.

· In manual mode, crank handwheel no faster than 1 rev/second to avoid back-current.

SHERLINE PRODUCTS

INCORPORATED 1974

Installing Stepper Motors

Stepper Motor Installation Instructions

In order to prevent damage during shipment, some of the stepper motors have not been pre-installed. Install them using the following procedure:

1. If not already installed, carefully plug the white cable connector into the slot in the motor. Orient the motor so the plug is either on the right side or on the bottom to keep chips and coolant from causing a possible electrical short at the connection. If you wish, a small amount of silicon sealant or hot melt glue can be used to secure the white plug to the motor and seal the joint.

2. Note the location of the flats on the stepper motor shaft. Always assure that the coupling and handwheel set screws are tightened against the flat on the shaft. Tightening the set screw against the round part of the shaft can gall the shaft and make it impossible to remove from the coupling later.

3. Align the coupling set screw with the access hole in the side of the stepper motor mount and assure that the set screw is sufficiently released so that the motor shaft can be inserted.

4. Insert the motor shaft into the coupling, making sure the set screw is aligned with the flat. Keep the motor square to the mount so as not to flex the coupling during insertion. Loosely tighten the set screw.

5. Install three 8-32 x 3/8" socket head cap screws (SHCS) through the holes in the motor flange and into the stepper motor mount holes. Instead of a 4th screw in the four o'clock position use a tie wrap through that hole to secure the wire bundle from the motor. This will help relieve strain on the motor plug connection.

6. Assure that the flat on the motor shaft is still aligned with the coupling set screw (observe the position of the rear flat or handwheel set screw—the two flats are parallel) and tighten the coupling set screw. Install and turn the handwheel and observe the movement of the leadscrew to make sure everything is turning smoothly.

Using Handwheels on the Stepper Motors

When turning an unpowered stepper motor by hand, you may notice a slightly "notchy" feel because of the permanent magnets in the motor. This is normal. When the motors are powered up they lock in position, and it will be very difficult to move them with the handwheels. Therefore, if you wish to use manual mode, you should first turn off the power to the motors using the ON/OFF switch on the external driver box or on the side of the computer if the driver box is built in. Turning a DC motor by hand causes it to act as a generator, sending current backward through the circuit. However, low amounts of current will not damage the board, so avoid cranking faster than about 1 rev/sec to be safe. For longer travels, use EMC's jog mode for approximate positioning, then turn off driver box power and use the handwheel for fine tuning.

CABLE CONNECTOR

Use fourth Socket Head Cap Screw here, or use a tie wrap to attach wires at this corner.

67111
8-32 x 7/8" SHCS (2)

12050
8-32 x 3/8" SHCS (4)

67127
STEPPER MOTOR

67115
5-40 x 7/8" SHCS

671052 COUPLING
w/ 40520 SET SCREW

8-32 x 3/8" SHCS

TIE WRAP IN 4th MOUNTING HOLE

HOLES FOR MOUNTING TO MACHINE
(Holes on top as shown for mill X-axis and lathe crosslide and leadscrew. Holes on bottom for mill Y-axis.

67120
BALL BEARING (2)

67101
STEPPER MOTOR MOUNT

PRELOAD NUT
Lathe Leadscrew—67104 (RH 1/4-28 for inch and metric)
X-axis and crosslide—67106 (67108 metric)RH
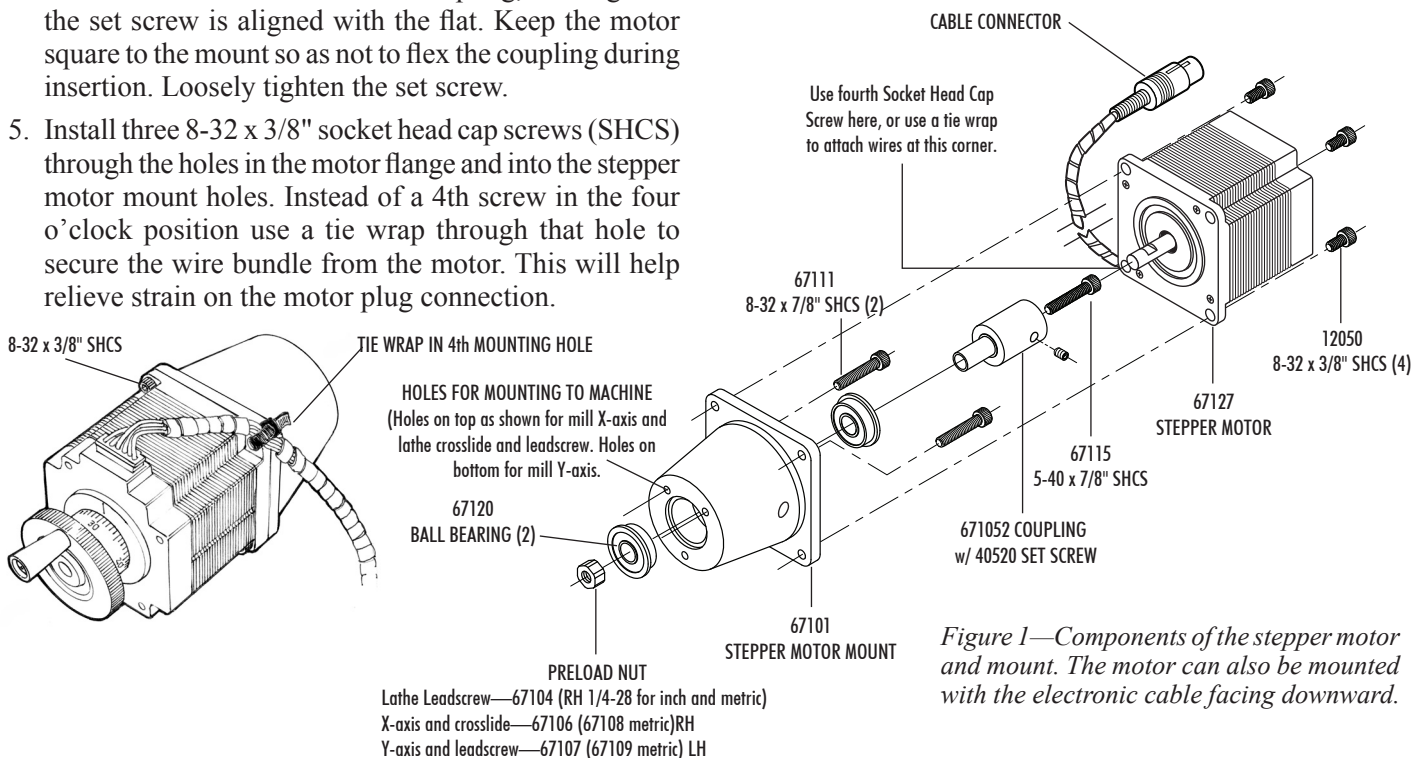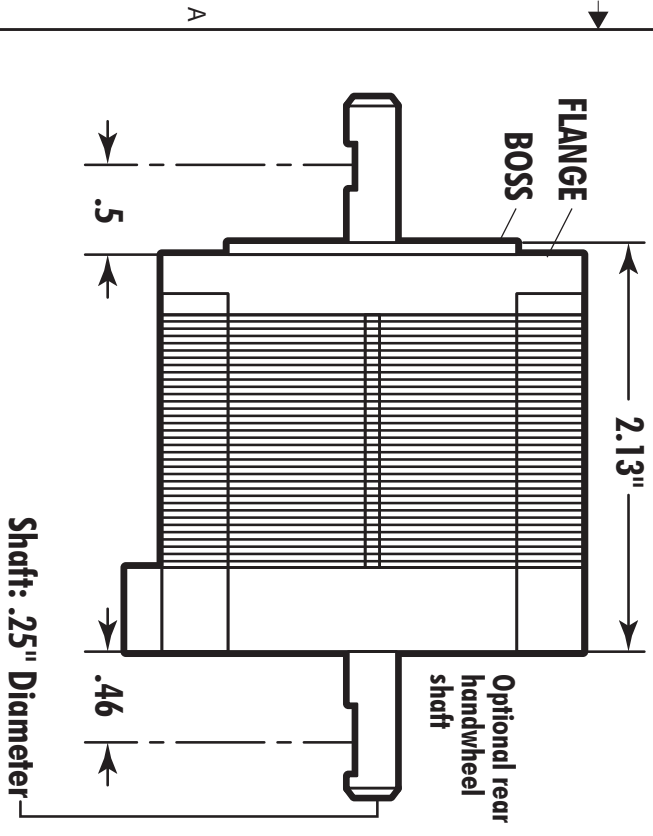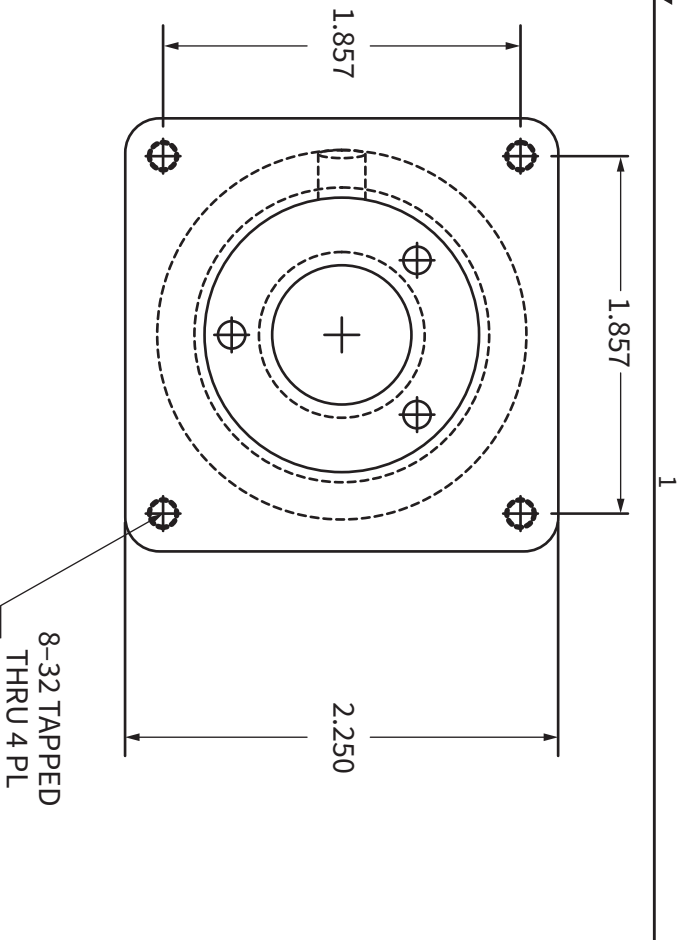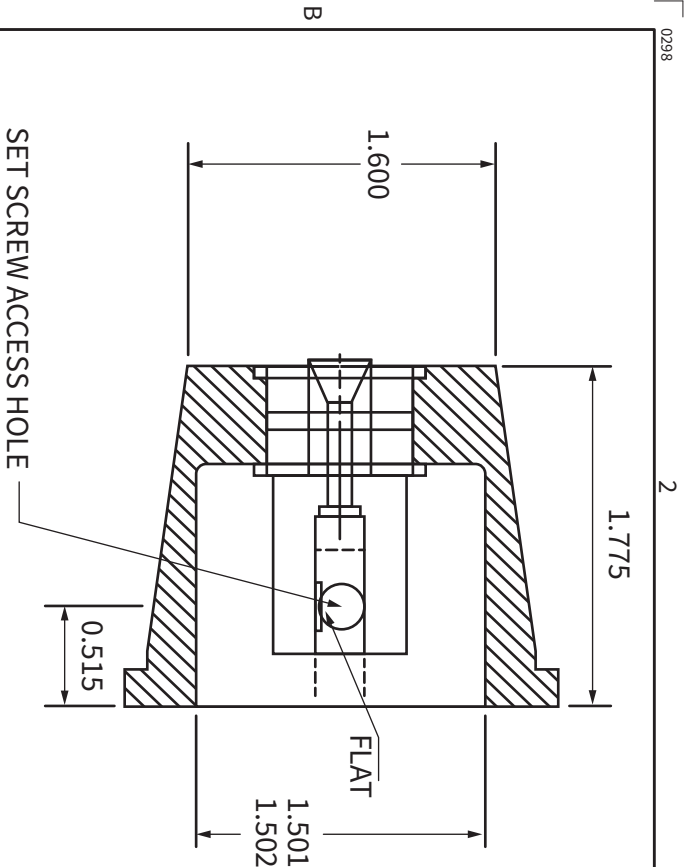Y-axis and leadscrew—67107 (67109 metric) LH

Figure 1—Components of the stepper motor and mount. The motor can also be mounted with the electronic cable facing downward.

8/11/21

FLANGE

BOSS

SET SCREW ACCESS HOLE

.5

2.13"

.46

Shaft: .25" Diameter

Optional rear
handwheel
shaft

If using a non-Sherline stepper motor, make sure to grind flats on the shafts
as shown where the coupling and handwheel set screws contact the shaft.

1.600

1.775

0.515

FLAT

1.501
1.502

1.857

1.857

2.250

8-32 TAPPED
THRU 4 PL

Mounting Instructions

To mount the motor, start by turning the leadscrew until the coupling set screw lines up
with the access hole in the mount. Carefully insert the motor shaft into the coupling. With
the flanges touching, rotate the stepper motor until the flat on the shaft is in alignment
with the coupling set screw. Tighten the set screw. Rotate the motor to align with the
motor with the 8-32 tapped holes. We usually attach the motor using three screws and
use a zip tie in the fourth hole to secure the wire bundle.

If you decide to use Loc-tite® on the shaft set screw, a problem can occur if the motor
has to be removed. What can happen is the shaft ends up glued to the coupling. If this
occurs, loosen the preload nut until the motor and shaft can be backed out to expose the
coupling so you can work on it. Be careful not to flex the coupling or it can break at the
dampening slots.

DO NOT SCALE DRAWING !!!				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.				
TOLERANCES ARE:				
DECIMALS .00	±0.006			
DECIMALS .000	±0.003			
ANGLES	1°			
DEBURR	HAND			
HEAT TREAT	NONE			
FINISH	BLACK ANODIZE			
DRAWN	JOE MARTIN			
CHECKED	JOE MARTIN			
DESIGNER	JOE MARTIN			

SHERLINE

SHERLINE PRODUCTS, INC.

TITLE

STEPPER MOTOR MOUNT

SCALE				
1 = 1				

SIZE	PART NUMBER
A	67101

MATERIAL	
3 5/16 ROUND 6061 T6	

REV.
1998-09

SHEET
1 of 1

SHERLINE STEPPER MOTOR SPECIFICATIONS

Sherline P/N: 67127 (w/ DIN plug and flats on shaft)
                     67130 (no plug, flats on shaft)
Frame size: NEMA #23
Step angle: 1.8°
Voltage: 3.2 V DC
Current: 2.0 A/Φ
Resistance: 1.6 Ω/Φ
Inductance: 3.6 mH/Φ
Holding torque: .775 N.m (Newton meters)
                     7.9 kg-cm
                     109.71 oz/in (ounce inch)
                     6.856 in/lb (inch pound)
Rotor inertia: 250 g-cm^2
Number of wire leads: 6 (See color code diagram FIG. 2)
Weight: 1.32 lb (0.6 Kg.)
Length: 2.13" (54 mm)
Shaft: Double ended, 1/4" diameter

DRIVER : TYPE B(Vs=24V)
CURRENT=2.0A/Phase
EXCITING MODE=2Phase
INERTIAL LOAD : 100g-cm^2

FIGURE 1—Motor torque curve

Lead Wire Connection and Color Code

FIGURE 2— Color of internal wiring for stepper motors

See figure 3 for the pin diagram and wire color layout of the stepper motor connector cables we supply with our stepper motors. Since there is no industry standard for wire colors in this field, if using a connector not supplied by Sherline each pin and color should be confirmed with a continuity tester before applying power.
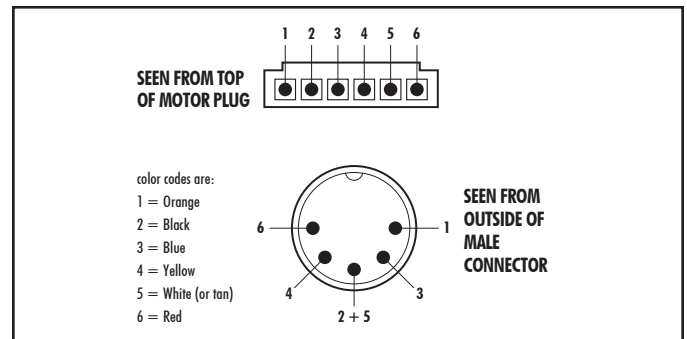

SEEN FROM TOP OF MOTOR PLUG

color codes are:
1 = Orange
2 = Black
3 = Blue
4 = Yellow
5 = White (or tan)
6 = Red

SEEN FROM OUTSIDE OF MALE CONNECTOR

FIGURE 3: diagram shows which pin in the DIN connector is wired to which position in the motor connector.

NOTE: Motors can be wired in either unipolar or bipolar configuration depending on how the leads are connected. Sherline motors with plugs are wired for unipolar operation.

PRECAUTIONS

- Make sure the ends of raw wires are not touching each other when turning the handwheel by hand to drive the stepper motor and leadscrew. It can cause the motor to feel rough and hard to turn.

- DC motors generate current when hand cranked that can damage the control unit. When positioning a stepper motor by hand using the handwheel, do not crank faster than about 1 rev/second. For long travels, use the jog mode of your CNC control software.

- Poor connections can cause arcing, which can burn out motors or control chips. Always make sure plugs and connections are fully engaged and making good contact.

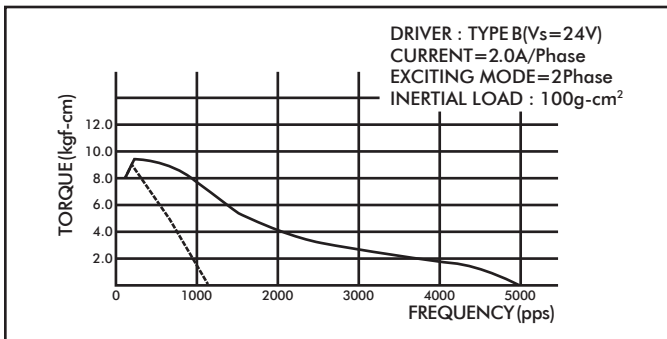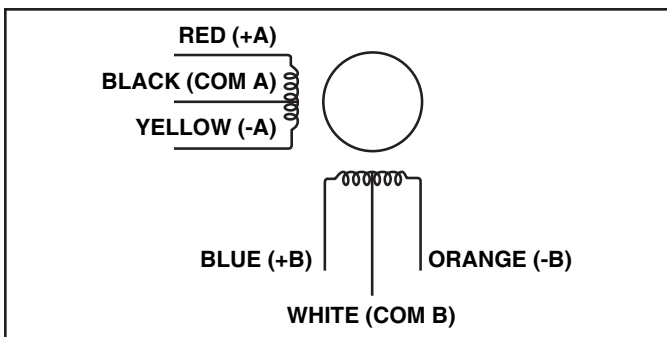- Always turn off driver box power before plugging in or unplugging a stepper motor.