Service Information Letter	SIL # 002

Seco 8800 to 2005 Conversion

Equipment:	Seco 8800 DC controllers	**Date Issued:**	9-10-02
		Revised:	8-8-03
Additional Reference:	Seco owners installation and operation manual	**Revision #:**	2
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Field conversion of Seco 8800 to Seco model SE 2005 DC controllers.

All work is to be performed only by qualified individuals.

Parts required:

If the conversion is for a system that already has a 0 to 10 VDC speed control signal (command speed signal) capability only the controller and a resistor are needed:

SE 2005 controller …….. Astec part number ….. 070890 (old 045423)
2K 2W resistor …… Astec part number ….. 027474

If the unit is to be used in a system that utilizes an isolation card, like most all Barber-Greene systems, then a new isolation card is also required.

Isolation card (0 to 10 VDC) … Astec part number …..045425

All parts are quantity one (1) per controller.

Before mounting the controller, Follow steps A through K.

A) The new controller is a model SE 2005, designed for 5 HP max at 230 VAC. Input = 230 VAC, 50/60 Hz, 35 Amp. This information should be on a tag on the side of the controller chassis. Make sure it reads this way.

Jumpers and switches:

B) Cut and/or remove the jumper between pins 16 and 20, on the program connector P1. This **must** be done if it is not already. Refer to figure #2 for location and figure #1 for identification of the connector and jumper.

Please refer to figure #2, for the location of all the following components.

C) Make sure jumper J1 is in the 180 position. This designates a 180-volt armature.

D) Make sure jumpers J2 and J3 are in the 230 Volt position

Note: J2 and J3 are "wires", located under the transformer. All other jumpers are of the plastic two pin plug-in type.

E) Put jumper J4 in the "A" position.
F) Jumper J5 is not used on standard Barber-Greene and Astec systems. Leave in the "A" position.

G) The SE 2005 is capable of controlling DC motors from one to Five horsepower. Put jumper J6 in the appropriate position for the size of motor being controlled.

Motor HP	J6 Position
5	E
3	D
2	C
1 1/2	B
1	A

H) Put jumper J7 in the "B" position.

I) Put jumper J8 in the:

"SH" position if the motor is of the shunt wound type.

Put it in the "PM" position if the motor is a permanent magnet type.

J) Make sure J9 is in the "A" position.

K) SW1 is a switch. Make sure it is in the "speed" position.

L) Mount the Controller.

Note: The SE 2005 mounting dimensions are identical to the model 8800. However, **the SE 2005 must be mounted in a vertical position. This permits proper cooling of the heat sinks.**

Follow all warnings and safety precautions in the Seco owner's installation and operation manual.

M) Connect motor wire to the terminal strip on the controller chassis. Please refer to figure #3.

Note: Barber-Greene system utilized a "three wire motor hook-up". There is a four-conductor cable going to the motor.

1. One wire is ground
2. One wire is common to A1 and F1
3. One wire is F2
4. And one wire is A2 (this is the variable voltage to the armature that controls speed)

On the 8800 Seco, TB1 connections, were made as follows.

A1 and F1 were internally "common". At the motor A1 and F1 would be tied together. This wire then connected to terminal 3 on the 8800 (there may also have been a jumper from terminal 3 to terminal 7).
F2 wired to terminal 8.
A2 wired to terminal 4 or 5 depending on the motor horsepower (3 or 5 respectively).

For the SE 2005 controller:

A2 and F2 are internally "common". The wire that was on terminal 3 of the 8800 (A1F1) goes on one of these terminals, A2 or F2 it doesn't really matter. However, for consistency we are going to use terminal A2. Re-label this wire A2F2.
The 8800 wire A2 then goes to terminal A1 on the 2005. Re-label this wire A1.
The 8800 wire F2 then goes to terminal F1 on the 2005. Re-label this wire F1.

8800 wire	Becomes	2005 wire
A1F1		A2F2
A2		A1
F2		F1
GND		GND

N) Connect AC power wires. **Do not apply power.**

The following connections are to be made on the terminal strip TB2, on the control board. Please refer to figure #2 for location.

O) Make sure there are jumpers from terminals 1 to 3, and from terminal 5 to 6. If they are missing – add them.

P) This step applies to Barber-Greene systems that utilizes a FR (feeder run) relay.

Connect the n.o. (normally open) contacts of the FR relay to terminals 1 and 6. Leave the coil wired to one leg of the 230 VAC as it was.

Barber-Greene systems; with the 8800, used a set of normally closed contacts (n.c.) from the FR relay. This was an 8 pin DPDT (double pole double throw) "ice cube" type relay. It was usually located next to, or just above, the controller. The n.c. contacts used were terminals 1 and 4, on the relay base. These wires connected to terminal 12 and 13, respectively, on the 8800.

For step "P" the wire on terminal 1 of the relay base must go to terminal 1 of TB2 on the SE 2005. The wire on terminal 4, of the relay base, must move to terminal 3 (making it normally open) and connects to terminal 6 of TB2 on the SE 2005.

Q) Connect a 2K-2W resistor (Astec part number 027474) across terminals 16 and 18 on TB2.

Note: Steps R and S apply only if an isolation card is used. If the current system is capable of supplying a 0 to 10 VDC speed control signal, then proceed to step T. Please refer to the comments at the begging of this letter.

R) Install the new isolation card and wire exactly as the old one.

S) Connect the wire from terminal 3 on the isolation card to terminal 17 of TB2 on the SE 2005. This is signal positive (sig. +).

Connect the wire from terminal 4 on the isolation card to terminal 16 of TB2 on the SE 2005. This is signal negative (sig. -).

Note: Step T applies only to systems with their own 0 to 10 VDC speed control signal (command speed signal).

T) Connect the positive (+) signal wire to terminal 17 of TB2 on the SE 2005. Connect the negative (-) signal wire to terminal 16 of TB2 on the SE 2005.

Note: The following step (U) applies only to Barber-Greene units with analog rate meters. For units with digital, or no, rate meters go directly to the Run / Set-up procedures.

U) Connect the rate feed back wires (coming from the A-181-104kt, resistor board) to A1 and A2 on terminal strip TB1A on the SE 2005 controller chassis. These are the same wires that were on terminals A1F1 and A2 of the 8800.

Note: If the rate meter drives below zero, on initial power-up, reverse these wires.

Run / Set-up

Note: **Power is off.**

1) With a digital voltmeter, on the 2K-ohm scale, measure across terminals A1 and A2 on the controller chassis. The armature should read very low resistance, 1 to 8 ohms.

With the meter still on the 2K-ohm scale, measure between terminals F1 and F2 on TB1A, on the controller chassis. The field should measure relatively high resistance, 200 to 800 ohms.

These readings depend on the motors, but usually are within these ranges. There should be no continuity between any of the above wires and ground.

2) Check field excitation voltage (shunt wound motors only).

   a) Disconnect the armature lead A1 from the controller, terminal strip TB1A on the chassis, and insulate safely.

   b) Apply AC power to the controller. With a voltmeter, check voltage across terminals F1 and F2 (on TB1A on the controller chassis). There should be about 200 VDC.

   c) Turn off the AC power and re-connect A1.

3) With AC power to controller off. Turn on control console power and set command speed pot(s) to maximum. With a voltmeter, check across terminals 16 (-) and 17 (+) of TB2.

   This is the 0 to 10 VDC speed reference signal. I must be set to a **maximum of 10 VDC. Do not set over 10 volts.**

   If the control system uses an isolation card (Astec part number 045425) use the maximum speed pot on the isolation card to set this voltage. On an Astec MBU (manual back-up unit) use the max speed pot on the back of the MBU. On other types of control systems this adjustment will be located elsewhere, refer to your system specifications for location.

   Note: The appropriate interlocks will have to be on.

   Turn off power after adjusting.

   After the operation of all relays, interlocks, and switches have been verified, do the following before proceeding:

   If the motor is on a piece of equipment that could be damaged by reverse rotation it is necessary to disconnect the motor from the driven machinery. Do this before proceeding.

Note: Refer to figure #2 for the location of the following adjustment pots.

4) Set the MIN SPD pot (minimum speed, R101) on the SE 2005 to minimum – full CCW (counter-clock-wise). Set the command speed pot(s) to zero (on the control console).

   Set the TORQUE LIMIT pot (R116) to maximum (full CW).

Set the TORQUE SLOPE pot (R117) to minimum (full CCW).

Turn on the appropriate interlocks. Turn on the motor. **At this point the motor should not be running.**

Slowly bring up (increase) the command speed pot(s) (speed reference signal). Note the rotation of the motor. **If the rotation of the motor is incorrect. Turn of, and lockout / tag out, the AC power and reverse the armature leads at the motor.**

5) Once rotation is correct. With a voltmeter across A1 and A2 on TB1A, have a helper bring the command speed pot(s) up to maximum speed. **Do not allow the armature voltage to exceed 180 VDC.** Once the command speed pot(s) are at maximum, use the MAX SPD pot (maximum speed pot, R112) on the controller to set armature voltage to 175 VDC, if there is some load on the motor.

   Note: Armature voltage is directly linear to motor RPM (revolutions per minute). 180 VDC equals 1800 RPM. 175 VDC equals 1750. Most 1800 RPM motors turn 1750 RPM when loaded. So set them this way.

6) With the bin empty, or the drive disconnected (no load). Using the command speed pot(s), bring the command speed back to a point where there is about 50 VDC across the armature (A1 and A2 on TB1A). Write down the voltage. It does not have to be exactly 50 VDC, but you do need to know exactly what it is. Turn off the motor but do not touch the command speed pot(s).

   Load the bin, or reconnect the drive (loaded condition). Turn the motor back on. Adjust the IR COMP pot (internal resistance compensation, R107) so there is exactly the same voltage across the armature as with no load.

   Go back to step 5 and check for the correct maximum speed voltage (it may change). It will not be necessary to repeat step 6.

7) Turn the command speed pot(s) to zero. Adjust the MIN SPD pot (minimum speed, R101) so that there is just under 1 VDC across terminals A1 and A2 on TB1A. The motor should not creep.

The control is now fully adjusted. You can now draw graphs, etc. if desired.

Please note: The following pots, on the control, are not used and should not be adjusted.

ACCEL TIME	(R98)
DECEL TIME	(R99)
JOG	(R100)

Under no circumstances should R32 be adjusted in the field.

Note: You may want to go back and relabel the A1, F1, A2, and F2 motor wires where they connect at TB1A, to match the nomenclature on TB1A. This may help you avoid any future confusion.

On Barber Greene plants, with the original analog rate meters.

Use the screw on the front of the rate meter to set the meter at zero, when the control is at zero. This is setting zero.

Bring the commands speed pots up to maximum. Use the appropriate pot on the cold feed mother board (part number A-181-100KT, in the control console) to set the rate meter at 100%. This is how you Span the meter.

It may be necessary to repeat these steps, zero and span, several times in order to get the meter to go from exactly zero to exactly 100 %.

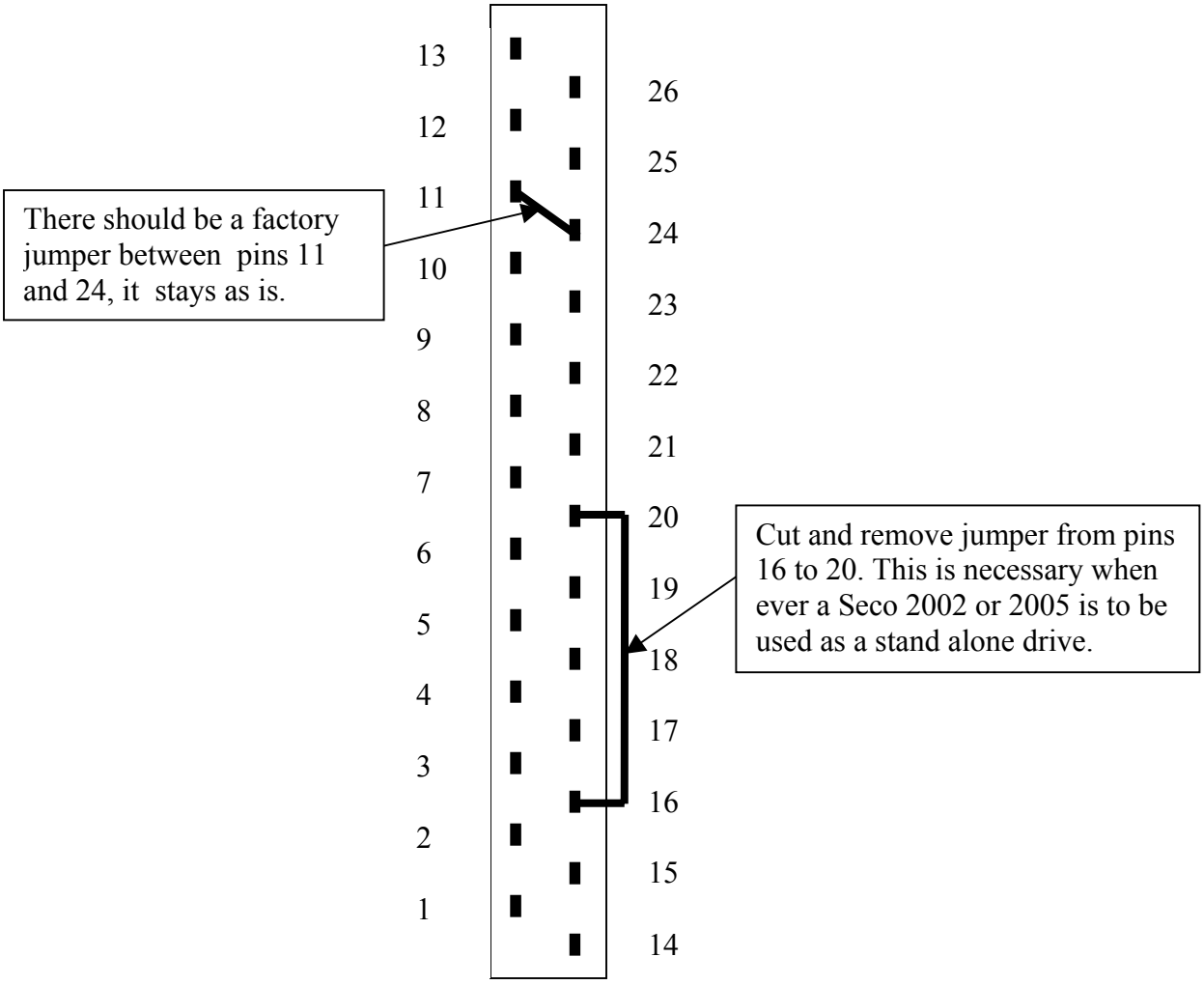

Figure #1, program connector P1.

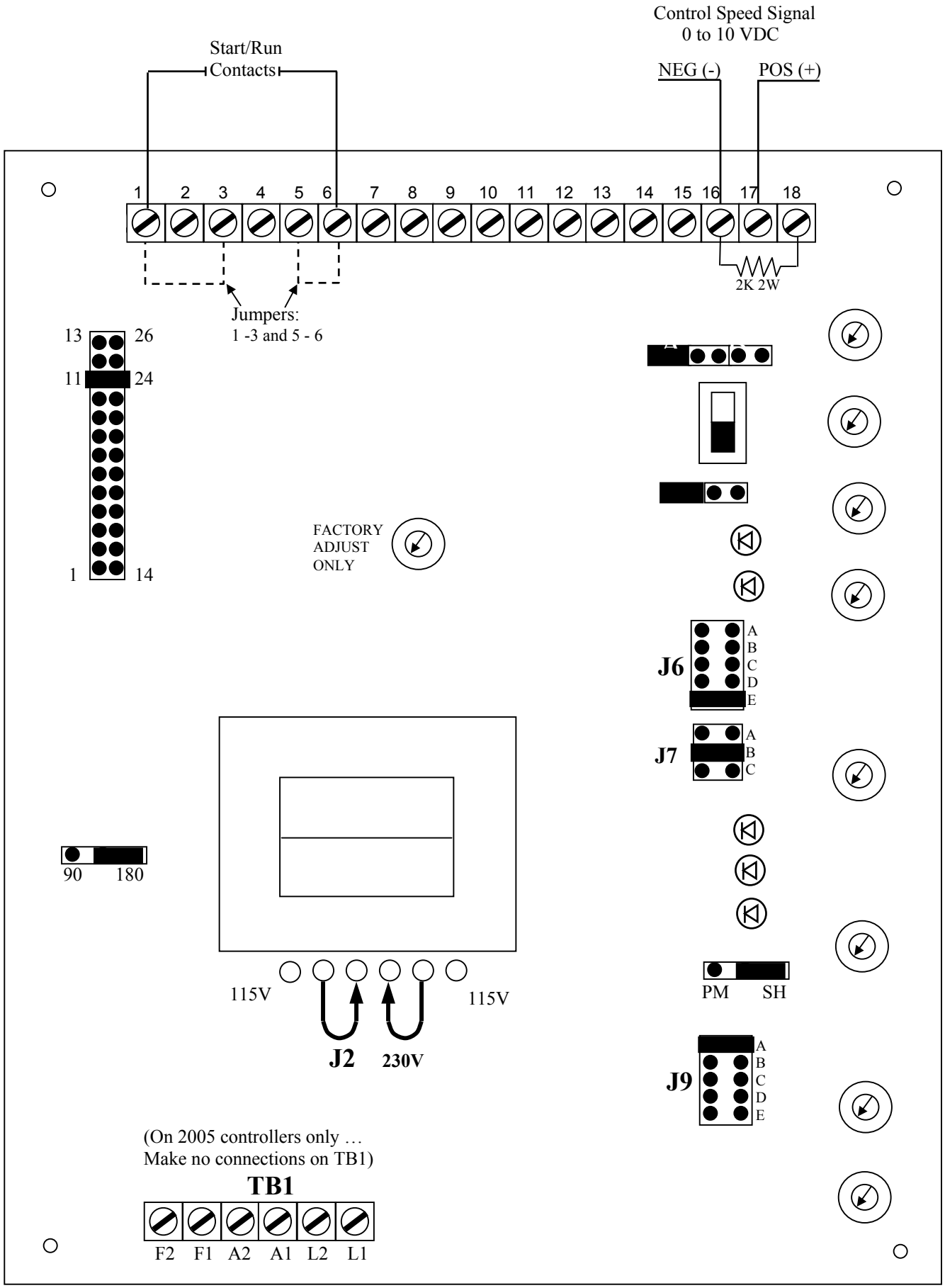

Figure #2, (Note: not to scale, for reference of component locations only)

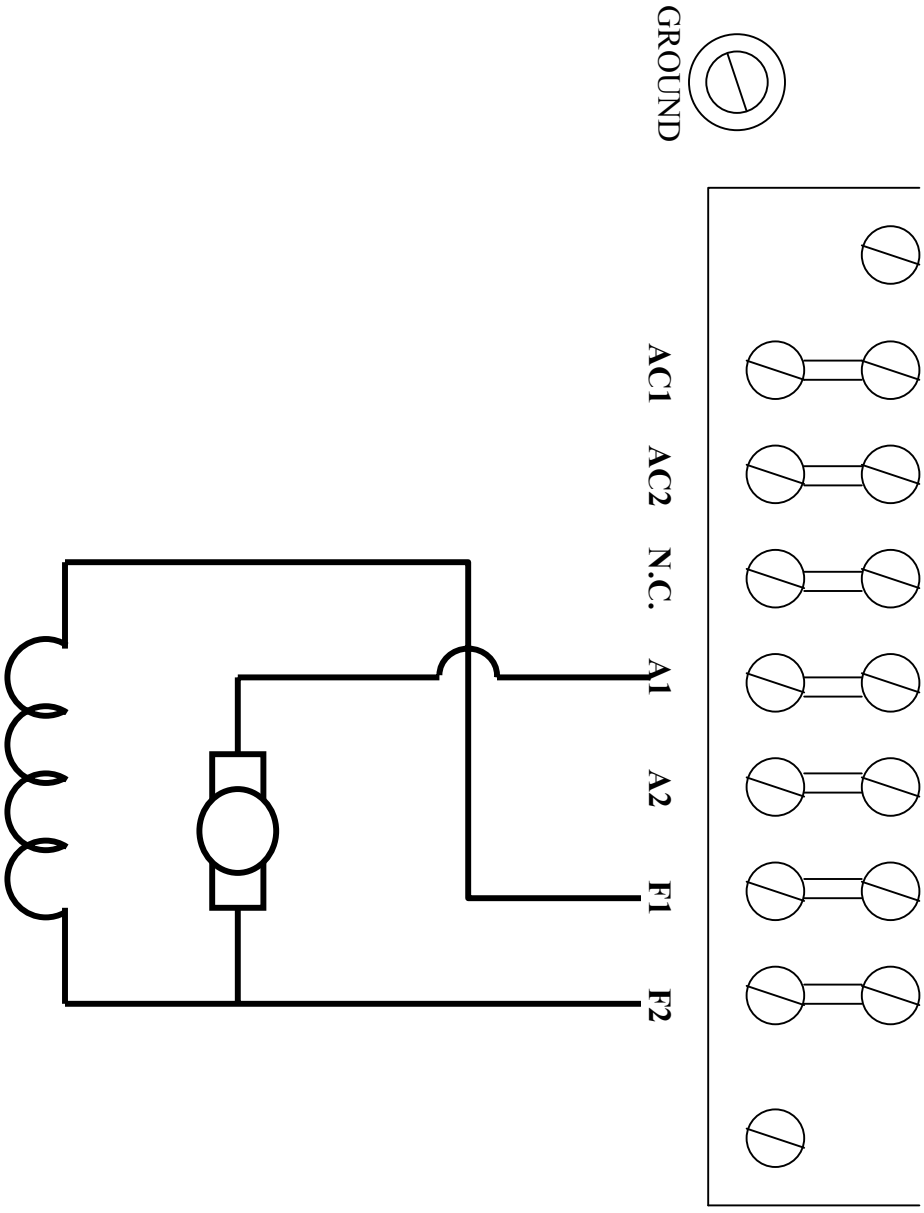

Figure #3, Terminal strip, motor leads