

# C & K Mod 2000

## Setup Instructions

The following steps will set up the C & K Mod 2000 Modulating Positioner. Simply adjusting the unit's potentiometers performs calibration. The potentiometers are located at the edge of the unit as shown on top left of the locator diagram (Figure 1) and are easily accessible. Use the locator diagram (Figure 1) to find the desired potentiometers, jumpers and test points. A calibrator (such as a Ronan) providing 4ma and 20ma signals and a DVM (digital voltmeter) are required for setting up the unit. Connect the calibrator's current output plus and minus to the unit's **I REF** and **I COM** respectively (the top 2 terminals on the left terminal block **TB2 /11** and **TB2/12** on the diagram).

Two potentiometers are factory set and should not be adjusted. They are **R114** (reference voltage mid left on diagram) and **R107** (isolation zero 5<sup>th</sup> from top left on diagram).

### **I. Calibration Procedure**

1. Preset the following potentiometers to the specified end of travel. The end of travel is detected by a clicking sound.
  - 1.1. **R55** (dead band top left on diagram) **Fully CCW (Counter Clockwise)**
  - 1.2. **R110** (max speed 8<sup>th</sup> from the left on diagram) **Fully CCW (Counter Clockwise)**
  - 1.3. **R105** (duration 7<sup>th</sup> from the left on diagram) **Fully CW (Clockwise)**
  - 1.4. **R128** (min speed 6<sup>th</sup> from left on diagram) **Fully CCW (Counter Clockwise)**
2. This step will set up the motor's speed. With the Pushbutton Station in the **MANUAL (LOCAL)** mode, run the actuator in either direction using the **CLOSE or OPEN** switches. While the motor is running adjust potentiometer **R110** (max speed 8<sup>th</sup> from left on diagram) **CW** until the desired speed is reached. You may need to turn **R110** several turns **CW** to get the motor going. With a DVM, check the signal voltage at the input of the Drive (for the single phase 115 VAC drive or the 220 VAC drive, the voltage between P2 and P1 should be no greater than 5 volts. For the 460 VAC drives, the voltage should be no greater than 10 volts. For the DC drives, the voltage should be no greater than +/- 10 volts).
3. In the **MANUAL (LOCAL)** mode, run the actuator to the **CLOSE LIMIT** by actuating the **CLOSE** switch.
4. With the actuator at the **CLOSE LIMIT SWITCH** set the **Calibrator** to **4 ma**.
5. With the DVM across test points **TP1** And **TP2** (top left on locator diagram) adjust **R74** (zero adjust 3<sup>rd</sup> from left) until a voltage of **-10 to -15 millivolts** is read.

6. Run the actuator in **MANUAL (LOCAL)** mode to the **OPEN LIMIT** using the **OPEN** switch.
7. With the actuator at the **OPEN LIMIT SWITCH** set the **Calibrator** to **20 ma**.
8. With the DVM across test points **TP1** and **TP2** (top left on locator diagram) adjust **R103** (span 2<sup>nd</sup> from left on diagram) until a voltage of +10 to +15 millivolts is read.
9. Repeat steps 3 through 7. (R74 and R103 may have a slight effect on each other).
10. Switch the Pushbutton Station to **REMOTE (AUTO)**.
11. Run the actuator between the **OPEN LS (Limit Switch)** and the **CLOSE LS** by adjusting the Calibrator between **20ma.** and **4ma.** respectively. Verify that the actuator reaches the limit switches.
12. With the Positive lead and the Negative lead of the DVM between **TP1** and **TP2** respectively verify that at the **CLOSE** and **OPEN** positions the voltages set in **steps 5 and 8** are correct. If the voltages do not correspond to the previous settings the actuator's mechanical slop in the gears is effecting the accuracy. This requires the following additional steps.
  - 12.1. In the **REMOTE** mode run the actuator to the **CLOSE LS** by a **4 ma.** command.
  - 12.2. Adjust **R74** so that the voltage across **TP1** and **TP2** is **-10mv to -15mv.** Note: this voltage may need to be more negative if the **CLOSE LS** is not reached
  - 12.3. In the **REMOTE** mode run the actuator to the **OPEN LS** by a **20 ma.** command.
  - 12.4. Adjust **R103** so that the voltage across **TP1** and **TP2** is **+10mv to +15mv.** Note: this voltage may need to be more positive if **OPEN LS** is not reached
13. Run the actuator to the **CLOSE LS (4ma.)** and adjust potentiometer **R145** (4ma output zero lower left side of the diagram) to give an output current of **4 ma.** at **I OUT** (3<sup>rd</sup> terminal from the top on the left Terminal block **TB2/10**).
14. Run the actuator to the **OPEN LS (20ma.)**. **I OUT** should be **20 ma.** If not 20 ma. adjust **R89** (20ma output adjust lower left side of the diagram). **Steps 13 and 14** may need to be repeated once or twice.
15. Potentiometer **R55** (top left) controls the **DEADBAND**. Set the deadband as desired by adjusting **R55**, which was set fully **CCW** at the beginning of the setup. Rotating **R55 CW** increases the deadband **CCW** decreases it.

16. Potentiometer **R105** (7<sup>th</sup> from left Fig. 1) controls the **DURATION**. It was set fully CW for maximum duration at the beginning of the setup. Set the duration as desired by adjusting **R105**. Rotating **R105 CW increases** the duration **CCW decreases** it.
17. Potentiometer **R128** (6<sup>th</sup> from left Fig.1) is the **MINIMUM SPEED** function. This is factory set to the **minimum CCW** position. To **increase** the minimum speed turn **R128 CW**.

This concludes the initial setup procedure.

## **II. Factory set potentiometers and their functions**

1. Potentiometer **R114** adjusts the unit's **6.25 volt DC reference**. This is measured between pin 1 of U3 and TP2.
2. Potentiometer **R107** adjusts the offset between the unit's main and isolated sections.
  - 2.1. Move the actuator in **REMOTE** mode to any mid-travel position
  - 2.2. With the actuator stopped, use a DVM to verify that the voltage between **TP1** and **TP2** is 0 volts DC.
  - 2.3. Remove **JU7** the **CALIBRATION** jumper.
  - 2.4. With a DVM monitor the voltage between **TP3** and **TP4**. Adjust **R107** so that the voltage between **TP3** and **TP4** is **0 volts DC**.
  - 2.5. Reinstall **JU7** the **CALIBRATION** jumper.

## **III. Factory Set Jumpers and their functions (Figure 2 shows jumper locations)**

**Caution! JU1, JU3, JU7, JU8, JU9, JU10, JU11, JU12, JU13 are factory set and must not be changed!**

**Note: \*JU1 and JU3 must be configured identically!**

1. **\*JU1** 1-2 **DC Drive** Operation. Bipolar (+/-) output voltage.  
2-3 **AC Drive** Operation. Positive output voltage only.
2. **\*JU3** 1-2 **DC Drive** Operation. Bipolar (+/-) output voltage.  
2-3 **AC Drive** Operation. Positive output voltage only.
3. **JU7 Factory Calibration.**
4. **JU8 Enable Common** Special Drive Enable Reference
5. **JU9** 2-3 **10 Volt Control Signal** Operation.  
1-2 **5 Volt Control Signal** Operation.

## 6. JU10, JU11 115VAC 230VAC Selection

- 1 - 2 **230VAC operation**
- 2 - 3 **115VAC operation**

## 7. JU12, JU13 Feedback Selection

- 1 - 2 **4 - 20 mA Feedback**
- 2 - 3 **Potentiometer Feedback**

**Note:** For 4 - 20 mA feedback connect the positive (+) current source to the 4 mA Terminal TB1/10 and the negative (-) current return to the Wiper Terminal TB1/11.

## IV. Options

The Following Jumper options are available (see **Figure 1** for **jumper locations**):

1. Jumper **JU5** to monitor presence of **Command** signal with the **MONITOR RELAY**.
2. Jumper **JU4** to monitor **LOCAL** mode with the **MONITOR RELAY**.

**Note:** For a system using **DELAY BEFORE START timer** Jumper **JU4** must be installed to provide **delay bypass** in **LOCAL MODE OPERATION**.

3. Jumper **JU2** to monitor **STOP** with the **MONITOR RELAY**.
4. Jumper **JU6** to **LOCK IN LAST** for the actuator to stay in the last position if the command signal is lost.
5. Jumper **JU6** to **LOCK IN POSITION** for the actuator to travel to a position set by potentiometer **R62** (4<sup>th</sup> from the top left on the diagram).  
Full **CCW CLOSE** 0%  
Full **CW OPEN** 100%

# MOD2000 LOCATION DIAGRAM

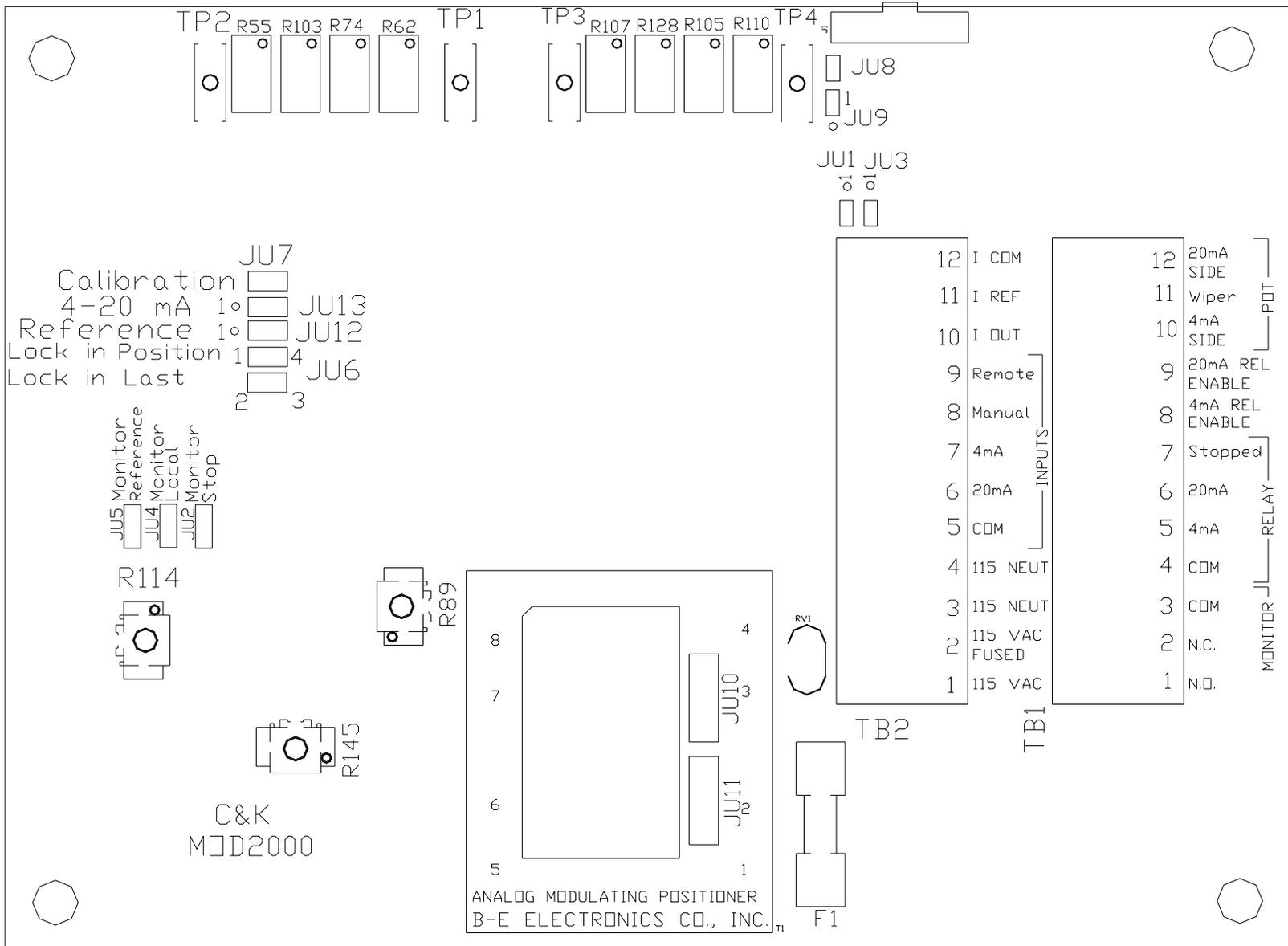


FIGURE 1