ELECTRONIC
MACHINE
PARTS, LLC

EMP Series 1000
Motor Tuning Manual

"Black & White"
Touch Screen

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3/2006

EMP Series 1100/1000 TS
Servo Registration System
For use on 6700/6500/5500/4500 TRINE Machinery

Motor Tuning Manual

BLACK & WHITE touch screen

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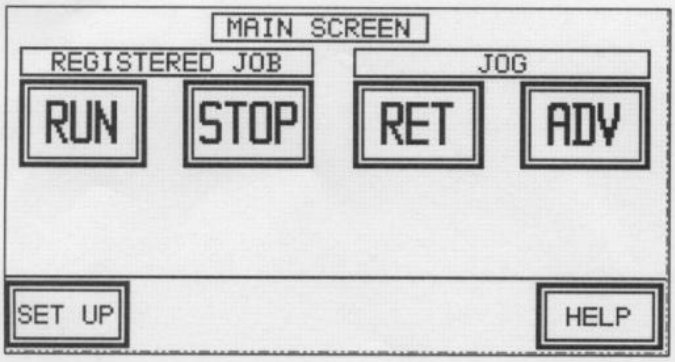
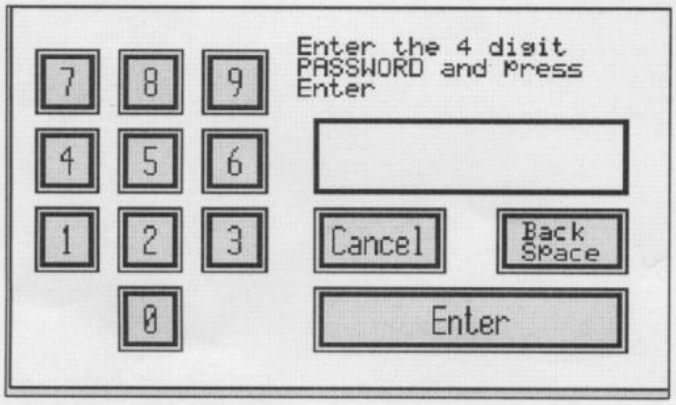
Instructions for tuning a Servo Motor from EMP Touch Screen

Accessing the Initial Set-Up Screen



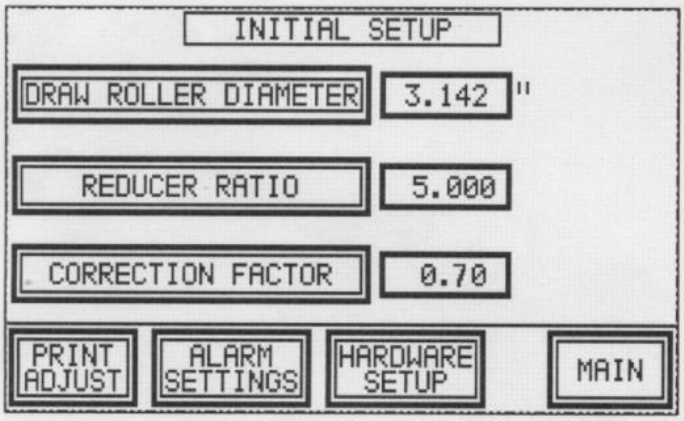
Press "SET-UP" to access the Set-Up Screen.

Press "INITIAL SET-UP" to access the Password Screen.



A password is required to access the initial set up screen.

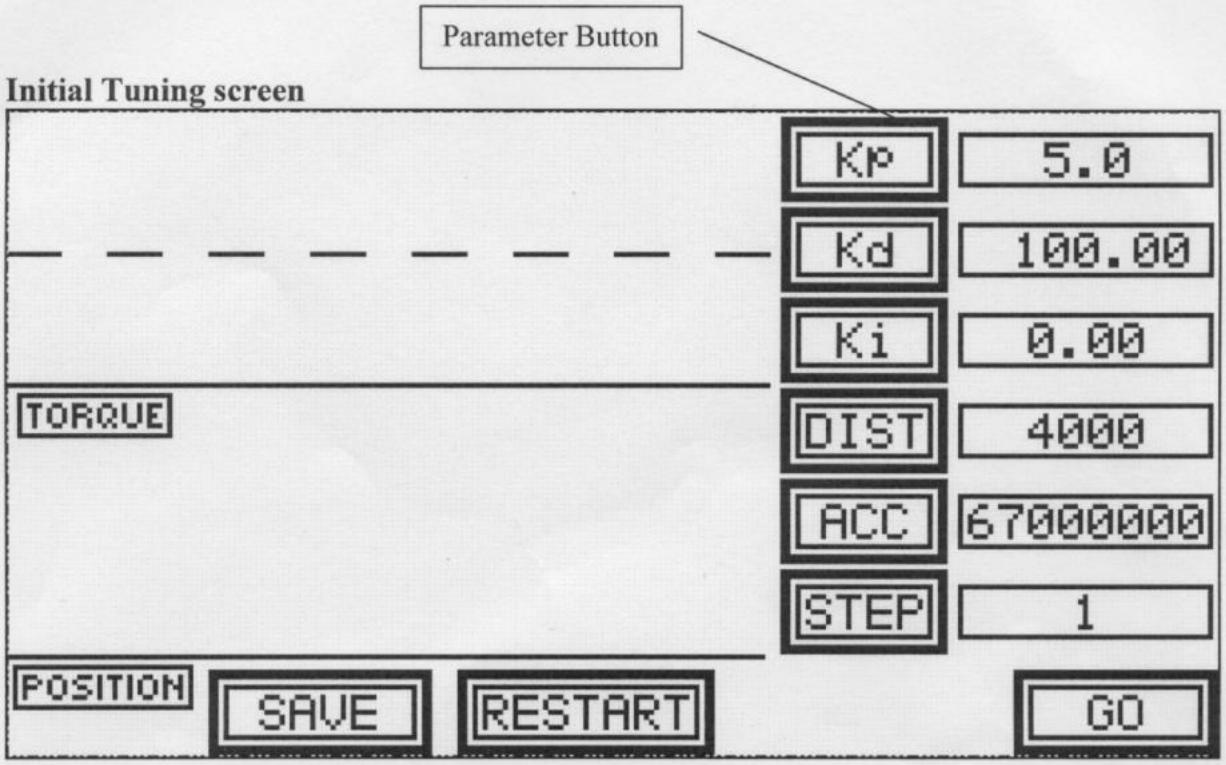
2.2 Entering Initial Set-Up Data



Press "HARDWARE SETUP"

Press " Stop running Program and Download Tuning Program"

Series 1000 / 1100 > BLACK & WHITE TouchScreen Only



Parameters

In a Servo system the controller always expects the motor to be at the target position. Any deviation from this position generates an error.

Kp : Also called Gain, sets the system response to a position error. High values of Kp tend to make the system overshoot and oscillate. Low values of Kp tend to make the system respond sluggishly.

Kd : Also called Damping, helps to prevent 'Hunting'. (oscillating around a target position but not finding it)

Ki : Normally set to 0 on register systems.

Dist : Sets how far the motor will move during test. A Dist value of 4096 = 1 revolution. This is usually ok except for very large inertial loads.

ACC : Sets the acceleration and deceleration used during the test move. Normally this is set to a very high value as shown above.

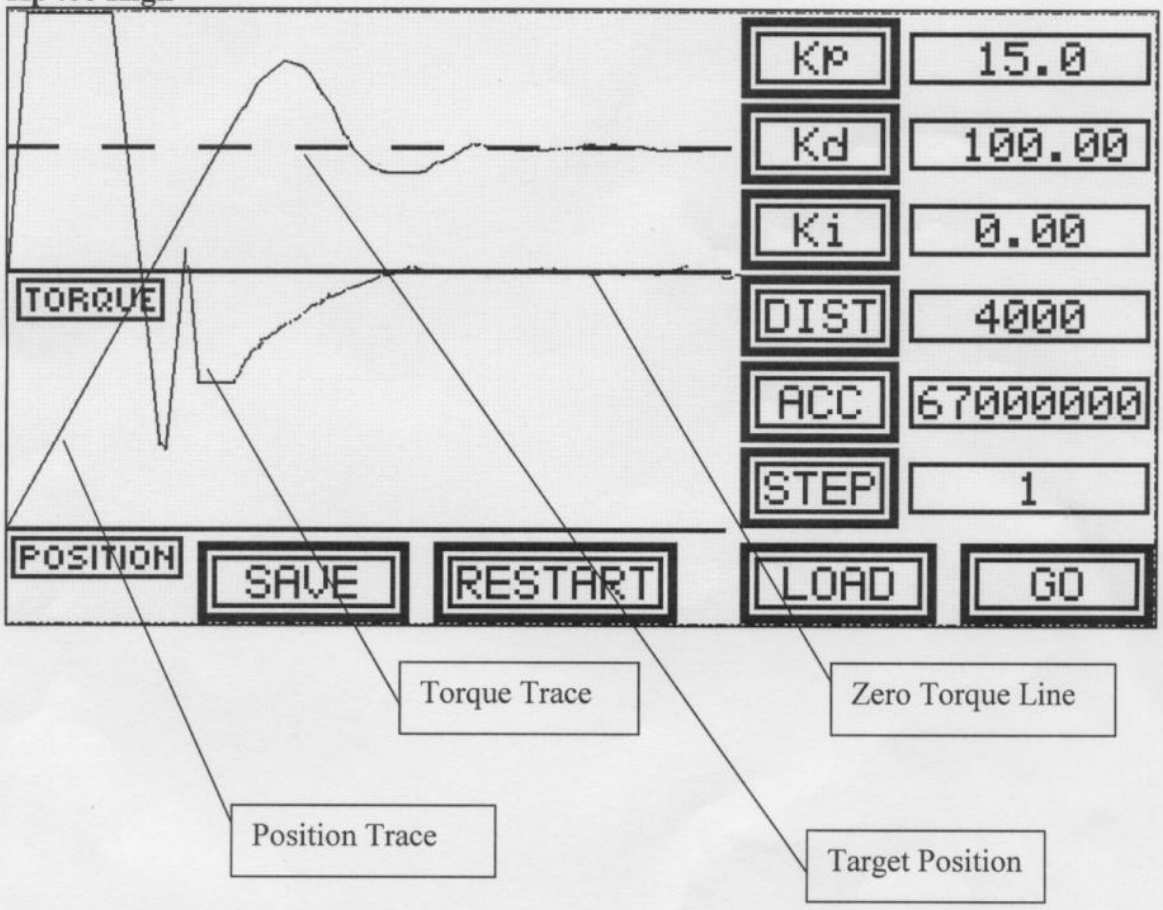
Step : Determines the time interval between measurements. Should be set to larger values only for large motors with high inertial loads.

Note the parameters may be changed by pushing the appropriate parameter button.
The above values for Ki, Dist, Acc and Step are OK for all motor sizes.

Testing the System

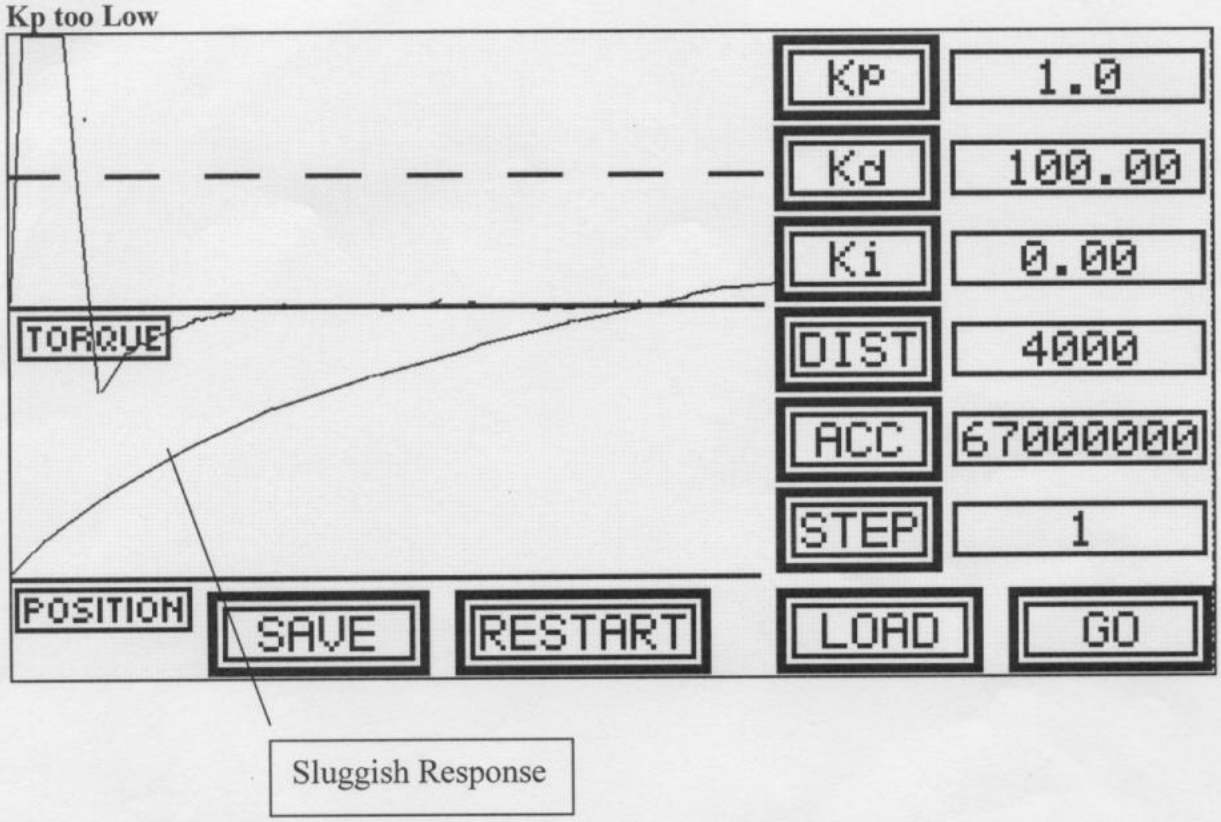
- To perform a tuning test, set the desired parameters and press the "GO" button.
- !! CAUTION !! the motor will turn rapidly when the "GO button is pressed. After the move a "LOAD" button appears.
- To read the results of the test press the "LOAD" button.

Kp too High



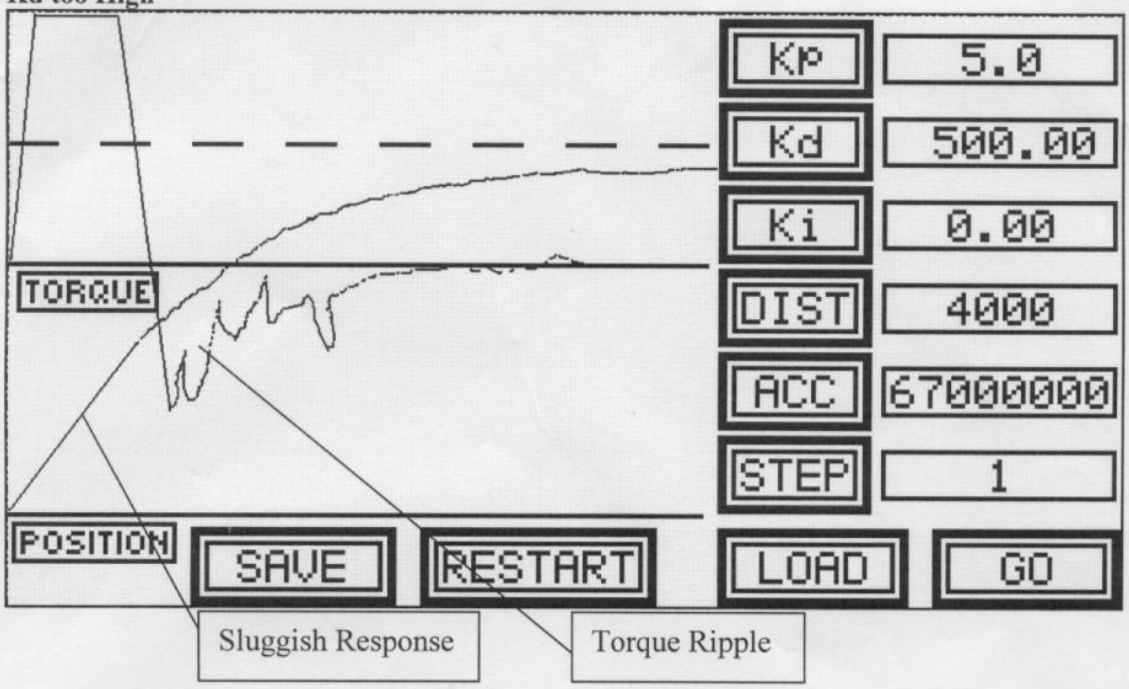
In the example above, Kp is set too high which causes the position to overshoot and oscillate around its target. Note the torque trace does not ripple indicating that Kd value is O.K. A higher value of Kd would reduce the overshoot but could cause 'torque ripple' or vibrations. High values of Kd also cause excessive motor heating.

Kp too Low



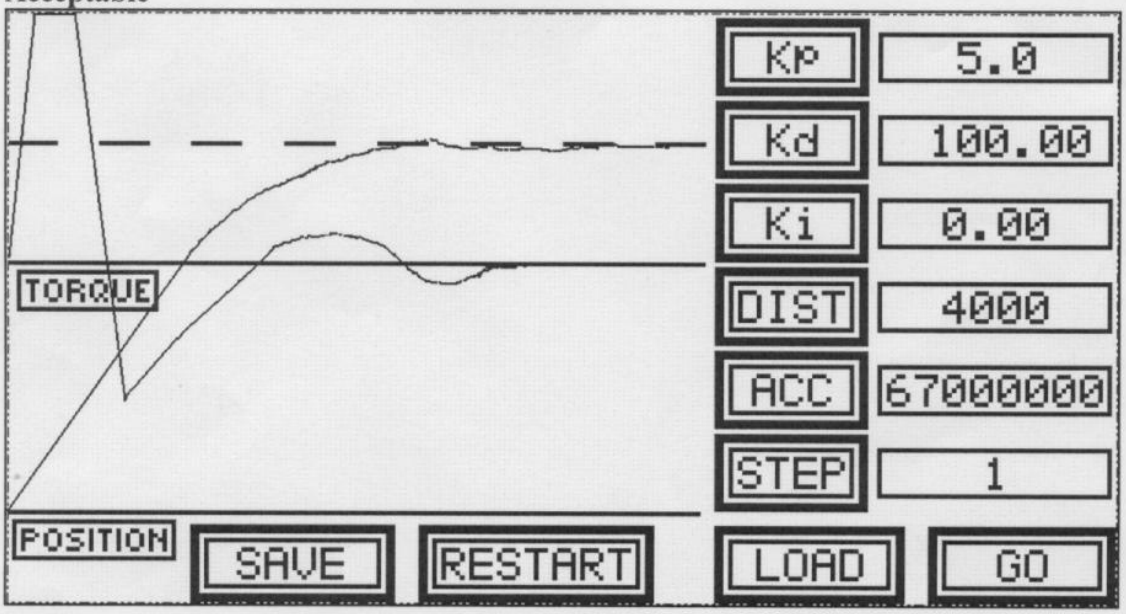
The position trace is responding very sluggishly indicating that the Kp value is too low or the Kd value is too high. The torque trace shows no ripple indicating that the Kd value is OK,

Kd too High



Here again the motor position trace responds sluggishly but now we see torque ripple on the motor torque trace indicating too high a value for Kd.

Acceptable



A well tuned system:

Good response from the Motor Position trace, with no overshoot, and no torque ripple on the Motor Torque Trace.

To Finish

1. Press save to store the parameters in the controllers memory.
2. Remove power from servo system.
3. Reconnect the front panel.
4. Turn power on and run the system.