Automation
Consultants Inc.
"Sales, Service and Support for Modern Manufacturing"

<u>Rigid Tap Troubleshooting for Excel 510 Colt</u>

<u>**Main Spindle Board Adjust**</u>
Power up the machine. Do not call any spindle speed or orientation commands.

1.   Verify voltage levels on the main spindle board (+5Vdc referencing ØV)   Adjust with RV4.

2.   Test between ØV and TS3. Adjust RV3 to obtain ØVDC.

3.   Set F10 and F11 to 128.(See procedure to et spindle parameters)
        Verify zero speed on spindle. (Change keep relay 503.7 to 1 in order to   accept a SØ Command.) Adjust F10 for forward drift and F11 for   reverse drift). (Be sure to set the "set" jumper!) Issue an M5 between   forward and reverse directions.

4.   Verify spindle speed forward and reverse (adjust RV1- forward, RV2-   reverse)

* When testing spindle speed verify that the override = 100%

<u>**ORIENTATION BOARD ADJUSTMENTS**</u>

1.   Speed feedback voltage offset.
        Adjust RV1 until TSA2 voltage becomes 0 ±1 mV.

2.   Gear high position gain.
        Adjust RV2 to the maximum range where the spindle does not   overshoot.

3.   Gear high offset.
        Adjust RV3 until LED4 lights or flickers when an M19 command is being issued.

4.   Speed loop gain.
        Adjust RV6AC to prevent motor from hunting. The rigidity increases   during stop by turning the pot clockwise. If you go to far the motor will   "hunt".

RIGID TAP ADJUSTMENTS

1.   Verify following error using rigid tap program.

Rigid Tap Program

```
G30 G91 ZO G80        (Second reference point)
G0G90G54 YOS500M3 (Spindle work offset called)
G42 Z23 H29 (tool length compensation)
M29 S500 (call rigid tap)
G84 Z-2. F38.46153 K5 (K5- this makes the machine tap the hole 5 times)
G80      (Canned cycle cancel)
G30      G91      Z0
M30
```

Use this program (Don't use any tool in spindle)

Tool length offset #29 = -8.000

$$Feedrate = \frac{1}{Threads/IN} \times RPM$$

- While running the program, while the tap cycle is going down, check parameter 627 and record the value.   This is spindle error in rigid tap.
- Record the value for diagnostic 802 during the same portion of the program. This is the Z axis following error.
- *Record the highest value possible, this is difficult but important.

- Offsets must be equal in both directions of the Z axis. If not, check the spindle forward and reverse adjustments. Modify as needed.

Use the formula below and see if the answer is close (within 3-5 pluses) to parameter 627. If it is not equal, adjust parameter 616 up/down. Make the adjustments in increments of 5.

IMPORTANT-
Each time you adjust parameter 616, you must shut off the machine and re-zero the axes before making another check.

HELPFUL HINTS—Reducing 616 increases 627
1.   By increasing the value of parameter 616, you decrease Parameter 627
2.   By decreasing parameter 616, the value of 627 is increased.

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Formula

(Diagnostic 802)   / 25.4

$$\frac{(\text{Diagnostic } 802) / 25.4}{1/TPI} \times 4096 = \text{Parameter } 627$$

Diagnostic 802 is usually around 540. This is recorded as .540 in the formula.

P616---Loop gain multiplier
P627---Spindle position deviation
D802---Z axis following error

Example: using a ½-13 tap and diagnostic 802 = 537

(.537 / 25.4) / (1 / 13) x 4096 = 1126

Normal values

Diagnostic 802-Z axis following error
Parameter 627- Spindle following error

802	627
535	1121
537	1126
540	1132
543	1138
545	1142