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## **RIGID TAP UPGRADE FOR FADAL MACHINES**

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Since we buy, sale and repair all Fadal CNC boards, we are occasionally able to offer pre-owned versions of the Rigid Tap software in a kit which allows the user to upgrade their existing machine. The installation is a simple procedure when following the enclosed instructions.

### **Features:**

Rigid Tap Upgrade Kit Includes

- 1010 Spindle Card RT Software Eproms (pre-owned)
- Encoder Interface Cable (Drive to 1010 Card)
- Instructions: installation, adjustment and testing procedures

### **Upgrade Requirements:**

- Requires a machine currently using either a AMC or Baldor spindle drive that is in Vector control, commonly called "Closed Loop".
- 1400-4 CPU hardware or higher
- CNC software version 89 or higher.
- A 1010-4 Spindle controller card or higher:

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**DISCLAIMER:**

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not intend to cover all details or variations of the products, nor to provide for every possible contingency in connection with handling, installation, operation, or maintenance. Features may be described herein, which are not present in or on all products. ITS assumes no obligation of notice to holders of this document with respect to changes subsequently made.

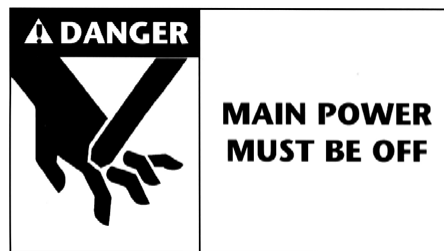
ITS makes no representation or warranty, expressed, implied, or statutory with respect to, and assumes no responsibility for the accuracy, completeness, sufficiency, or usefulness of the information contained herein. No warranties of merchantability or fitness for purposes shall apply.

**SAFETY PRECAUTION:**

**WARNING:** DISCONNECT ELECTRICAL POWER WHEN PERFORMING MAINTENANCE OR SERVICE ON EQUIPMENT! THIS INCLUDES:

- ◆ WHEN ADJUSTING OR CHANGING TOOLS
- ◆ WHEN MAKING MECHANICAL ADJUSTMENTS
- ◆ WHEN PERFORMING MAINTENANCE WORK OR PERFORMING ANY SERVICE TO THE MACHINE
- ◆ WHEN REMOVING ANY GUARD
- ◆ WHEN REMOVING ANY BELTS OR PULLEYS

**TO AVOID INJURY, ELECTRICAL POWER MUST BE OFF WHEN PERFORMING MAINTENANCE OR SERVICE ON EQUIPMENT!**



**SERIOUS PERSONAL INJURY IS ALWAYS A HAZARD IN AN INDUSTRIAL ENVIRONMENT. EXTREME CAUTION, IN ALL FACETS OF SAFETY, SHALL BE MAINTAINED. ALL COMPANY SAFETY STANDARDS, PRECAUTIONS AND REGULATIONS OF O.S.H.A. SHALL BE MAINTAINED DURING TRAINING, ASSEMBLY, AND DISASSEMBLY OF PRECISION SPINDLES.**



## **GENERAL SAFEGUARDS:**

- DO NOT OPERATE THE SPINDLE ASSEMBLY AND/OR ITS COMPONENTS UNLESS YOU HAVE READ THIS DOCUMENT.
- RETAIN FOR FUTURE REFERENCE.
- FOLLOW ALL WARNINGS AND INSTRUCTIONS IN THIS DOCUMENT AND/OR THE VMC.

### **1. Read and Follow Instructions**

Read all the safety and operating instructions supplied by Fadal prior to operating the spindle and/or its components

### **2. Attachments and Equipment**

Remove any tool from spindle and lock out access to work zone; i.e. the spindle.

Never add any attachments and/or equipment to the spindle assembly without approval of the manufacturer as such additions may result in spindle failure, personal injury and/or voiding of the warranty.

### **3. Servicing**

Do not attempt to service the spindle drive and/or its components yourself as opening or removing covers and/or guards may expose you to dangerous hazards. Refer all servicing to qualified service personnel.

### **4. Power**

Disconnect all power to the machine before adding upgrade kit.

### **5. Protection**

Always wear proper eye, foot and head protection when lifting, transporting and/or servicing/operating any machinery.

### **6. Accessories**

Any mounting of the spindle assembly and/or its components should follow the manufacturer's instructions, and should use a mounting accessory recommended by Fadal, if applicable.

# INSTALLATION PROCEEDURE

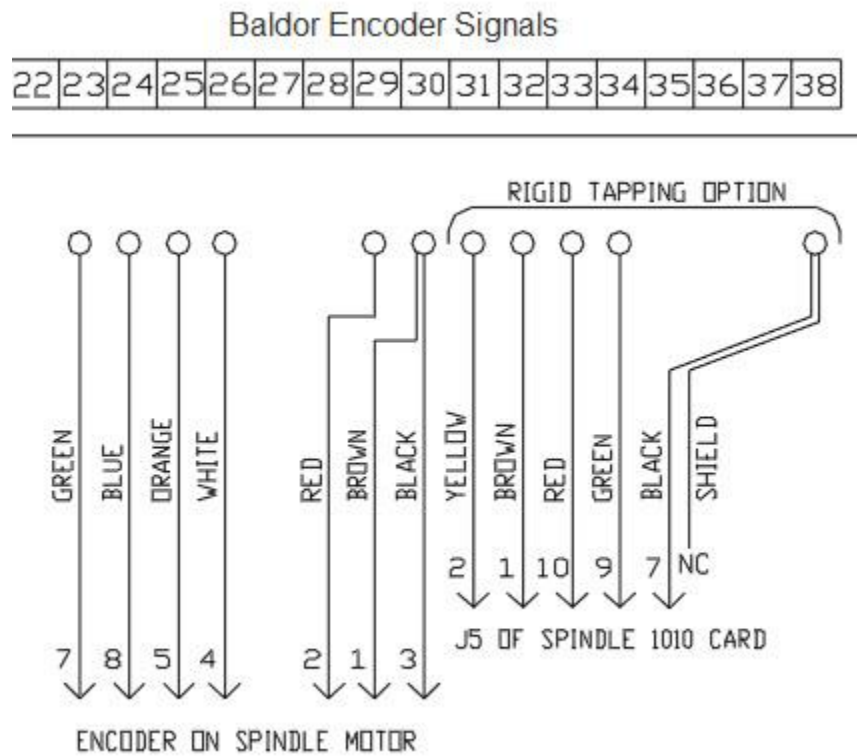
## STEP 1 – INSTALL ENCODER CABLE:

Your Spindle Vector drive currently is using the encoder on the spindle motor. The encoder power comes from the drive to the encoder. The encoder signals come back to the drive and are used for the Vector control of the motor. The drives are capable of sharing the encoder with another device, in this case the CNC for Rigid Tapping.

The supplied cable connects from the Vector drive outputs to the CNC control. Feed the wire from the CNC card cage to the spindle drive. The cable side with the loose wires will need to go to the Spindle Drive.

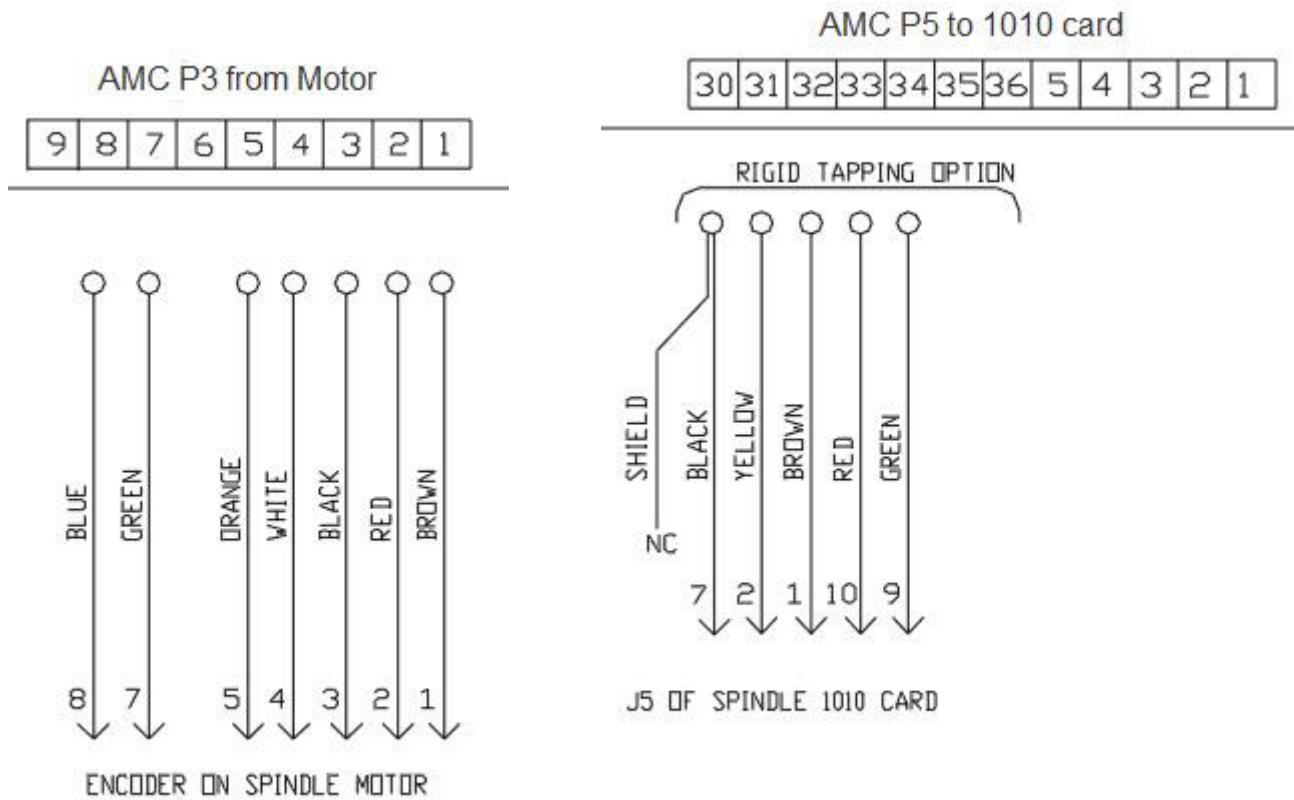
### For the Baldor drive connect as follows:

- Wire 2 to terminal 31
- Wire 1 to terminal 32
- Wire 10 to terminal 33
- Wire 9 to terminal 34
- Wire 7 and shield ground to terminal 38



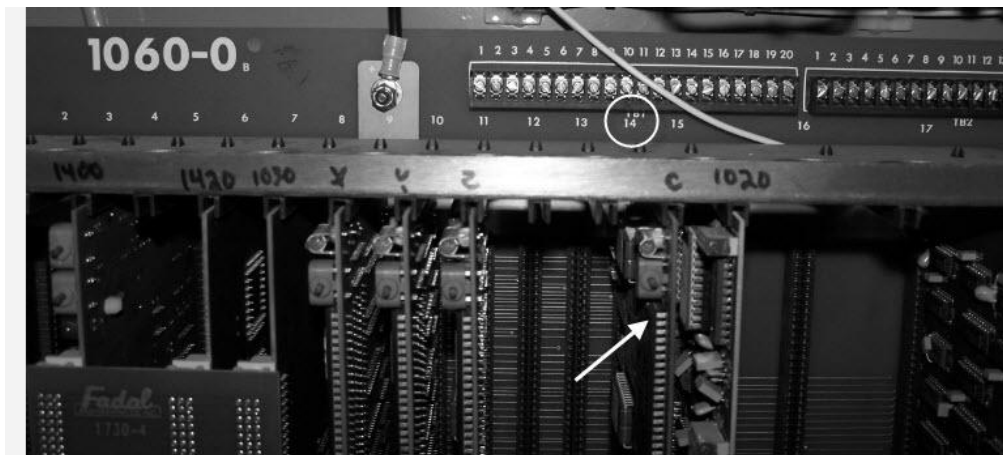
**For the AMC drive connect as follows:**

- Wire 2 to terminal 31
- Wire 1 to terminal 32
- Wire 10 to terminal 33
- Wire 9 to terminal 34
- Wire 7 and shield ground to terminal 30

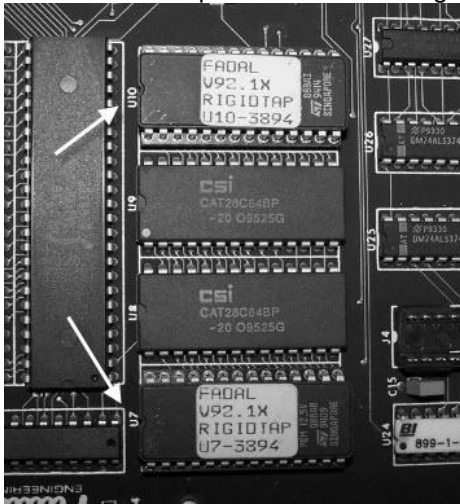


**STEP 2 – INSTALL THE SOFTWARE EPROMS:**

Locate the Spindle controller card in slot # 14 of the 1060 motherboard and remove the spindle controller board. Make note of the current wires plugged into the board, they will go back in the same positions.



Locate the two Eeproms to be exchanged on the 1010 Spindle Card:



There are two Eeproms labeled AC LINEAR, the Eeproms are identified by U7 and U8 or U15 and U18 on a sticker and on the PCB. For example; Eeprom labeled U10 goes in socket U10. The orientation of the Eeprom is identified by a notch, it matches the notch printed on the circuit board; show by the arrows.

Carefully remove them by prying up on both sides of each Eeprom (a little on one side then a little on the other side) and install the new Eeproms labeled RIGIDTAP. Be careful that none of the pins bend while installing into the socket.

Replace the card and the original connectors.



The new encoder connector goes in bottom edge connector labeled J5.

**STEP 3 – PARAMETER SETTINGS:**

Set the control parameters by entering the SETP command.

There are five parameters that need to be set according to your specific machine.

Use the table below for machines with INCH PITCH and METRIC ballscrews using DC motors:

**Inch Screws**

	7,500 RPM	10,000 RPM	15,000 RPM
	L Models	ALL	ALL
RPM Factor	0	0	0
Orientation Factor	15	10	10
Gain	58±15	82±15	65±15
Ramp	150	100	150
Z Tap Gain	High	High	High

Use one of the table below for machines with METRIC PITCH ballscrews with AC motors depending on XYZ 1010 axis software version AC-0017 and higher (0018 etc.) see sticker on axis Eproms:

**Software Version AC-0017 and Later**

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**Metric Screws**

	7,500 RPM	7,500 RPM	7,500 RPM	7,500 RPM	7,500 RPM	10,000 RPM	15,000 RPM
	A Models	L Models	EMC	6535 40T	6535 50T	ALL	1:2 ratio
RPM Factor	0	0	0	0	0	0	0
Orientation Factor	10	15	20	10	10	10	10
Gain	60±15	45±15	45±15	70±15	50±15	90±15	90±15
Ramp	150	150	150	150	150	100	150
Z Tap Gain	Medium	Normal	Normal	Medium	Medium	Medium	Medium

**Before AC-0017 Software Version**

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**Metric Screws**

	7,500 RPM	7,500 RPM	7,500 RPM	7,500 RPM	7,500 RPM	10,000 RPM	15,000 RPM
	A Models	L Models	EMC	6535 40T	6535 50T	ALL	1:2 ratio
RPM Factor	0	0	0	0	0	0	0
Orientation Factor	15	15	15	10	15	10	10
Gain	38±15	38±15	38±15	70±15	50±15	58±15	45±15
Ramp	150	150	150	150	150	100	150
Z Tap Gain	Normal	Normal	Normal	Medium	Medium	Normal	Normal
							160

#### **STEP 4 – TESTING:**

Adjustment Parameters in the CNC control using the SETP command. In most cases the only tuning you'll need to do is with the Orientation Factor. In most cases the values in the tables will be sufficient.

**ORIENTATION FACTOR** affects the speed; too slow (low value) causes a time out error. Too high causes overshoot and the spindle will turn a couple of times before locking into position.

**GAIN** affects servo response of the spindle. Too low causes various errors such as ERROR 13 codes. Too high and the spindle will be unstable, excessively vibrate while holding after G84.2.

**RAMP** factor affects the length of time to get up to speed during a tap move (Z down/up).

**Z TAP GAIN** affects the servo stiffness of the Z-axis during a tap move.

In MDI enter the following codes.

- Test forward and reverse

M3 S1000

M4

- Test Orientation

M19

- Adjust the Orientation Factor if needed.

G84.2

- The spindle will rotate 3 turns and stop, holding at the orientation position. Adjust Gain parameter if vibrates, a little is normal but not unstable.

#### **End of Installation**

**Begin testing using the G84.1 code to Rigid Tap holes.**

**If you have any questions, call us at 877-765-9838 or email [service@vmcelectric.com](mailto:service@vmcelectric.com)**



**LIMITED WARRANTY:**

Any component, sold by Independent Technology Service Inc., which, under normal operating conditions in the plant of the original purchaser thereof, proves defective in material or workmanship within specified time (one year) from the date of shipment by us, as determined by an inspection by us, will be repaired or replaced, at our discretion, free of charge for repair. Customer is responsible for the shipping costs.

Provided that you promptly send to us notice of the defect and establish that the component has been properly installed, maintained, and operated within the limits of rated and normal usage, and that no factory adjustments have been tampered with or damage has occurred from contamination; i.e. water, coolant, any foreign material such as chips or dust.

Independent Technology Service Inc. or agents liability is limited to repair or replacement of defective parts. as examined and determined by us. Repaired items will carry a 90-day warranty or until fulfillment of original warranty time; which ever is greater.

All expressed and implied warranties, including the implied warranties of merchantability and fitness for a particular purpose are limited in duration to the warranty period, and no warranties, whether expressed or implied, will apply after this period.

Under no circumstances shall Independent Technology Service Inc. or any of our affiliates have any liability whatsoever for claims or damages arising out of the loss of use of any product or part sold to you. Nor shall we have any liability to yourself or anyone for any indirect or consequential damages such as injuries to person and property caused directly or indirectly by the product or part sold to you, and you agree in accepting our product or part to save us harmless from any and all such claims or damages that may be initiated against us by third parties.

**POLICY INFORMATION:****CORE RETURNS:**

A CORE is defined as a used or broken part, capable of being repaired at a reasonable cost as determined by Independent Technology Service Inc. A credit is given to parts specific and defined by us. Upon reception of the CORE and if is determine by us to be repairable, we will issue a "Core Credit" for the amount determined at the initial sale of the component less the cost of unusable parts of the assembly. Core returns not considered repairable by us with either be returned or destroyed according to the customer's instructions.

**RESTOCKING:**

We cannot receive a return part that has been damaged or in a condition that makes it unable to resale as originally sold. Parts being returned must be returned in the same packaging and in the same condition (as determined by us) as it was originally received. Components returned to us that are not under a warranty repair will be subject to a 15% restock fee. We will contact the customer to discuss returns considered unusable or damaged for possible solutions.

**SHIPPING:**

Customer is responsible for all shipping unless determined by us to be our fault; i.e. the wrong part was shipped.