



Enabling Your Ideas

# Technical Document

**File name:** TD32096 Load Meter Install Series 3.pdf

**Rev:** 1.0

**Date:** 10/21/2011

**Product Identification:** Tormach Spindle Drive Load Meter Accessory Installation Instructions. This product is intended for use only with the Series 3 PCNC1100 due to mounting considerations. This product can be fully functional when used on PCNC 770 mills, and PCNC 1100 Series II mills, though the user will have to devise their own method of mounting than what is shown below.

## Background:

This load meter aids the machinist with a visual display of how hard the spindle motor and drive are working relative to the limits of the drive system. This accessory can be used to predict tool wear, or modify programs to improve material removal rates while limiting the risk of tool breakage.

NOTE: The load meter will only mount in the electrical cabinet door front of PCNC1100 Series 3 machine.

## What Comes With Your Kit:

- 1 Meter assembly
- This install document
- Electrical Schematic D40419

## What You Will Need:

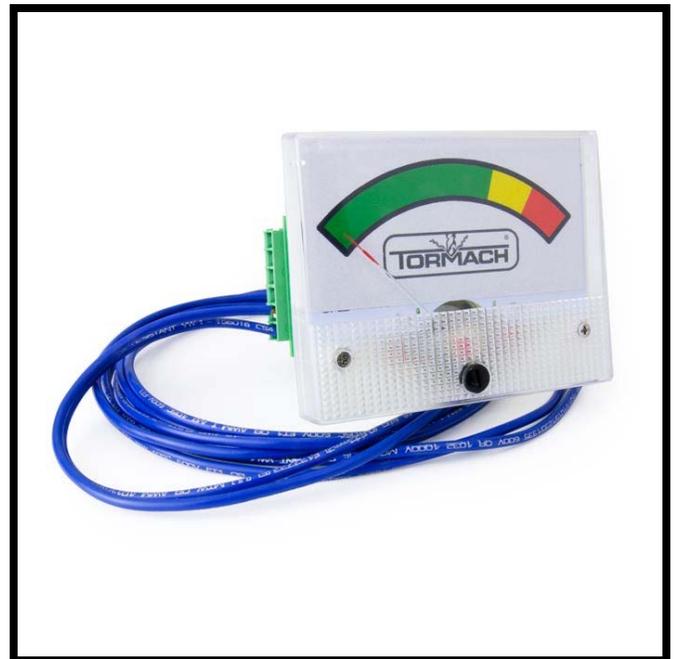
- sharp utility knife or razor knife
- Small terminal screw driver
- Small wrench

## Before You Start:

It is best when working with electricity to power down the entire mill and un-plug it from the wall.

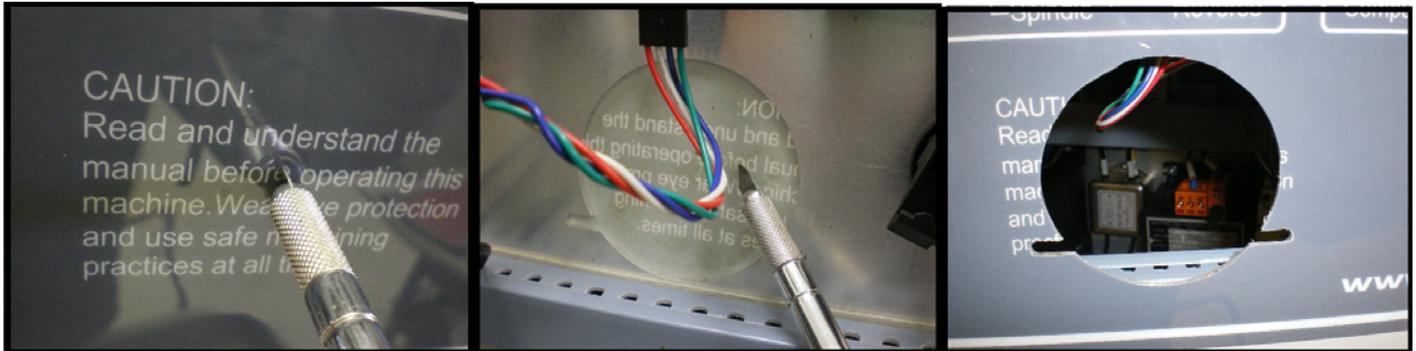
## CAUTION!!

Working around electricity can be dangerous. High voltage is present! Use caution and be safe. NEVER touch a bare wire or other electrical component with any body part or with any tool unless power is cut from the machine.

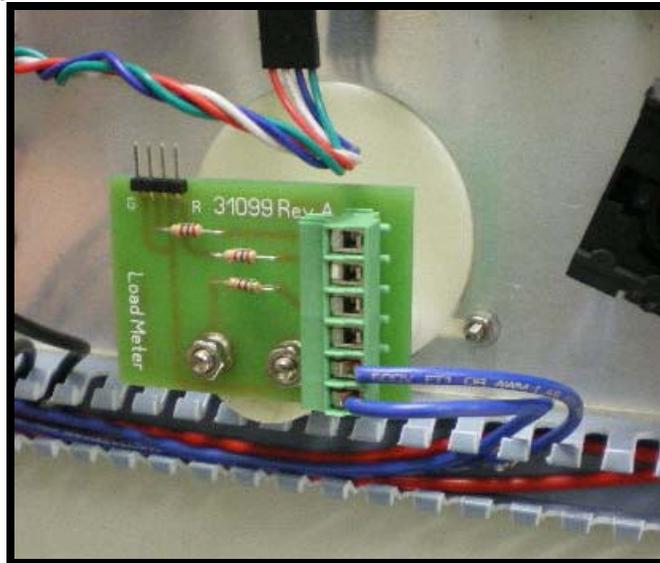


## Instructions:

1. Cut away the part of the Operator Panel covering the Load Meter Access hole using a sharp utility knife or similar.



2. Install The Load Meter and tighten the included nuts.



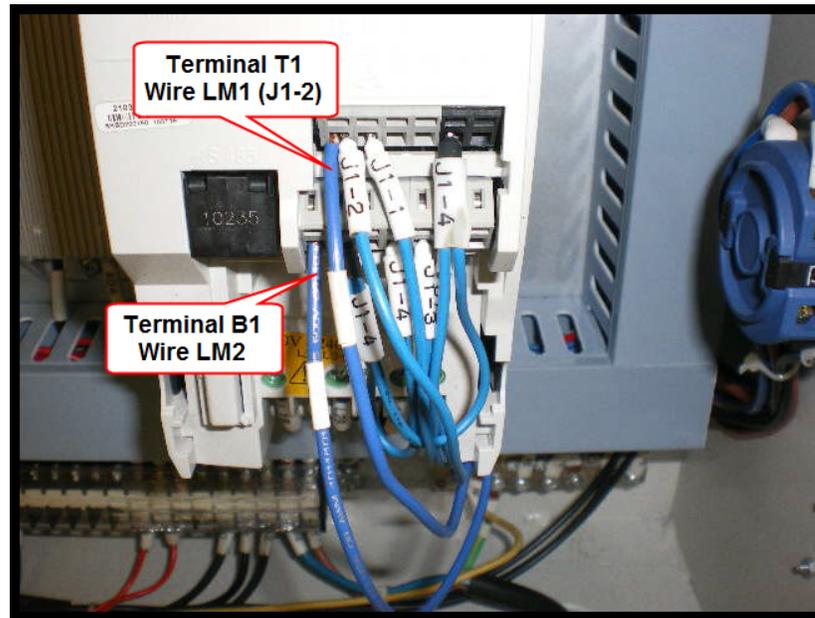
3. Connect the wires

- A) Remove the vertical wire trough cover on the right hand side of the cabinet as well as the one mounted to the back of the cabinet door.
- B) Run the Load meter wires along the cabinet door wire way and over to the vertical wire way, keeping in mind that the wires should not get pinched when the door is closed.
- C) Run the wires in the trough, going in at the top, and out at the bottom.
- D) Re-install the wire trough covers.
- E) Remove the front face cover of the VFD.

F) Following the connections on the wiring schematic D40419, connect the 2 wires to the appropriate terminals on the drive. A small bladed screw driver should be inserted into the slot above the wire and pried upward to allow the bare wire to be inserted, and then removed to make the termination. When finished, reinstall the VFD cover.

-Note that LM1 uses the same terminal as J1-2. Be sure that both wires are secure in the T1 terminal of the VFD.

-Check your work. Look for wire hairs that might make a short at the terminal blocks and that all connections are secure.



**Completed Install:**





Enabling Your Ideas

# Technical Document

## Tips for using your new Load Meter:

The colored scale on the meter is meant mostly as a reference. Actual numbers here would be meaningless. When turning on the spindle, the needle on your new Load Meter will spike a bit as the spindle accelerates, and then back off a bit after the spindle speed stabilizes. It is normal to see this surge when accelerating or decelerating the spindle.

When cutting, if the meter's needle is in the red zone, then this indicates that the drive is pushing 100% current and is in "*fold-back*" mode. Tormach's *fold-back* logic prevents spindle faults and avoids cutter stall by internally reducing the commanded speed when the drive is overloaded in exchange for more torque to the cutter. Please note, fold-back logic only applies to the PCNC 1100.

While the Tormach VFD will allow you to run in an otherwise overloaded condition (red zone), it should not be held in this condition for extended operation. It is usually fine to briefly load your system in this manner, but extended running of the spindle in the red zone mode increases the chances of breaking a cutter or causing a thermal fault on the drive. Setting your feeds and speeds so that you are just under this over loaded state is the ideal operating condition.