

Credence Engineering Inc.

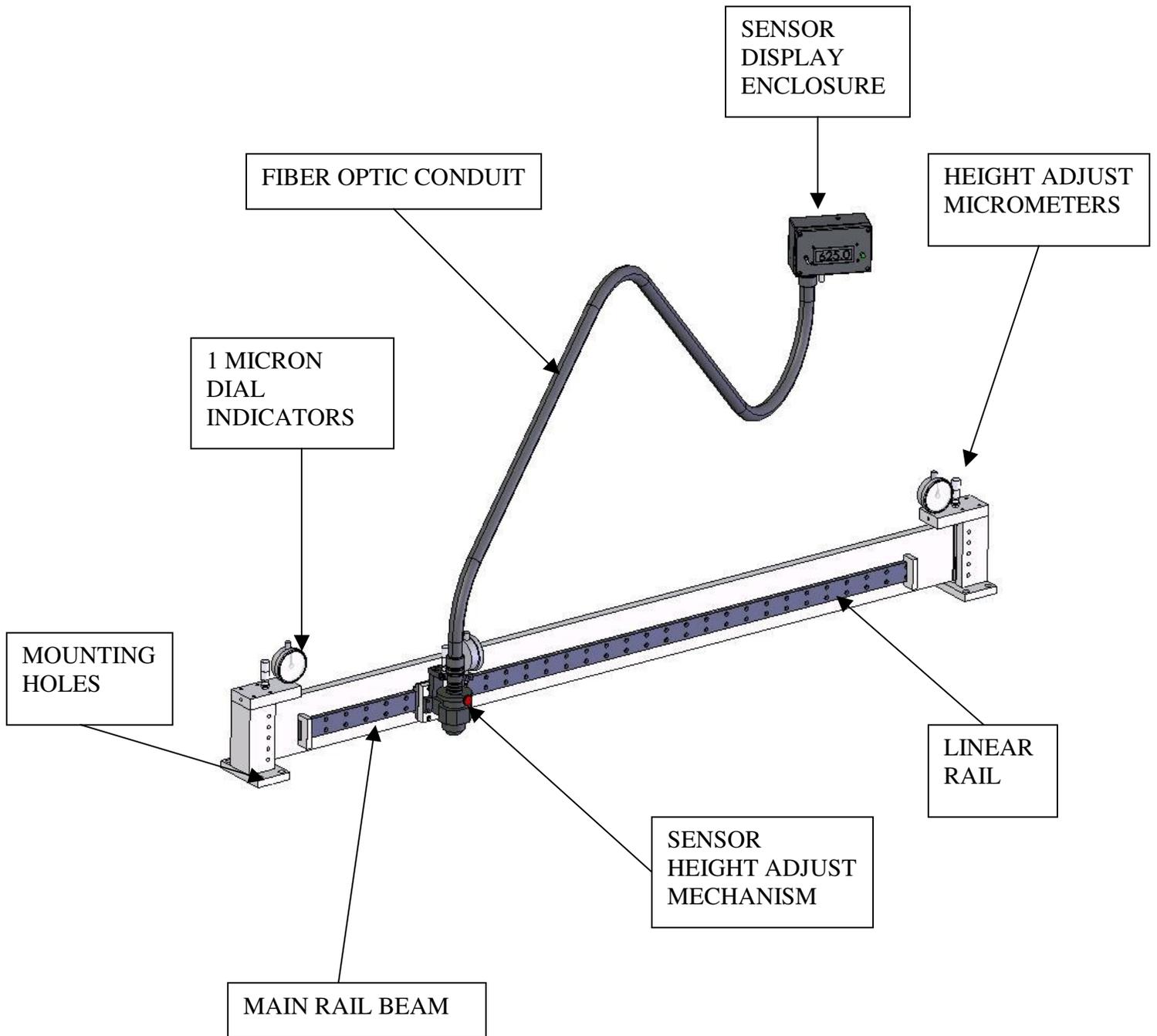
TM 200

# THICKNESS COMPARISON GAGE

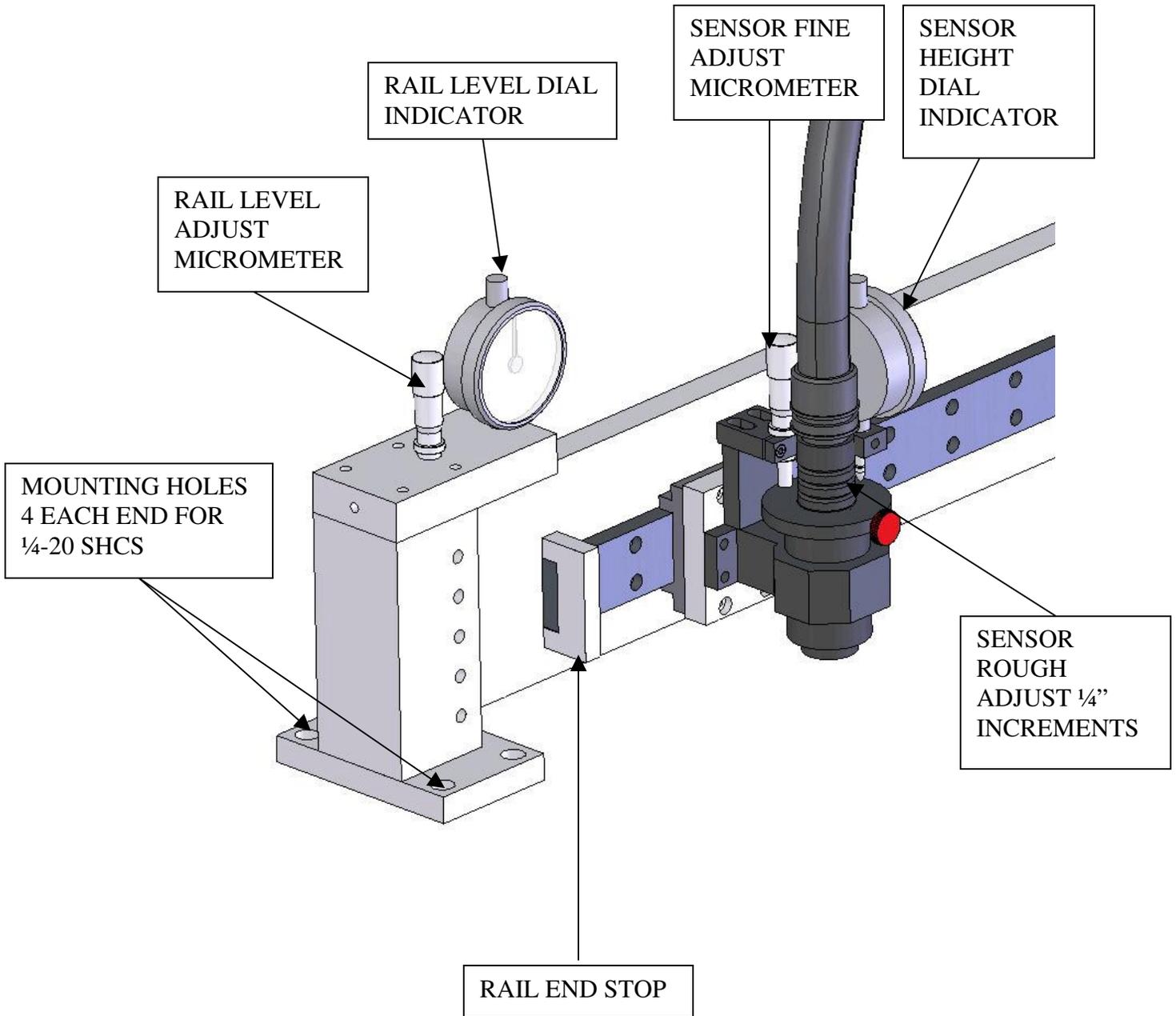
## Operating Instructions

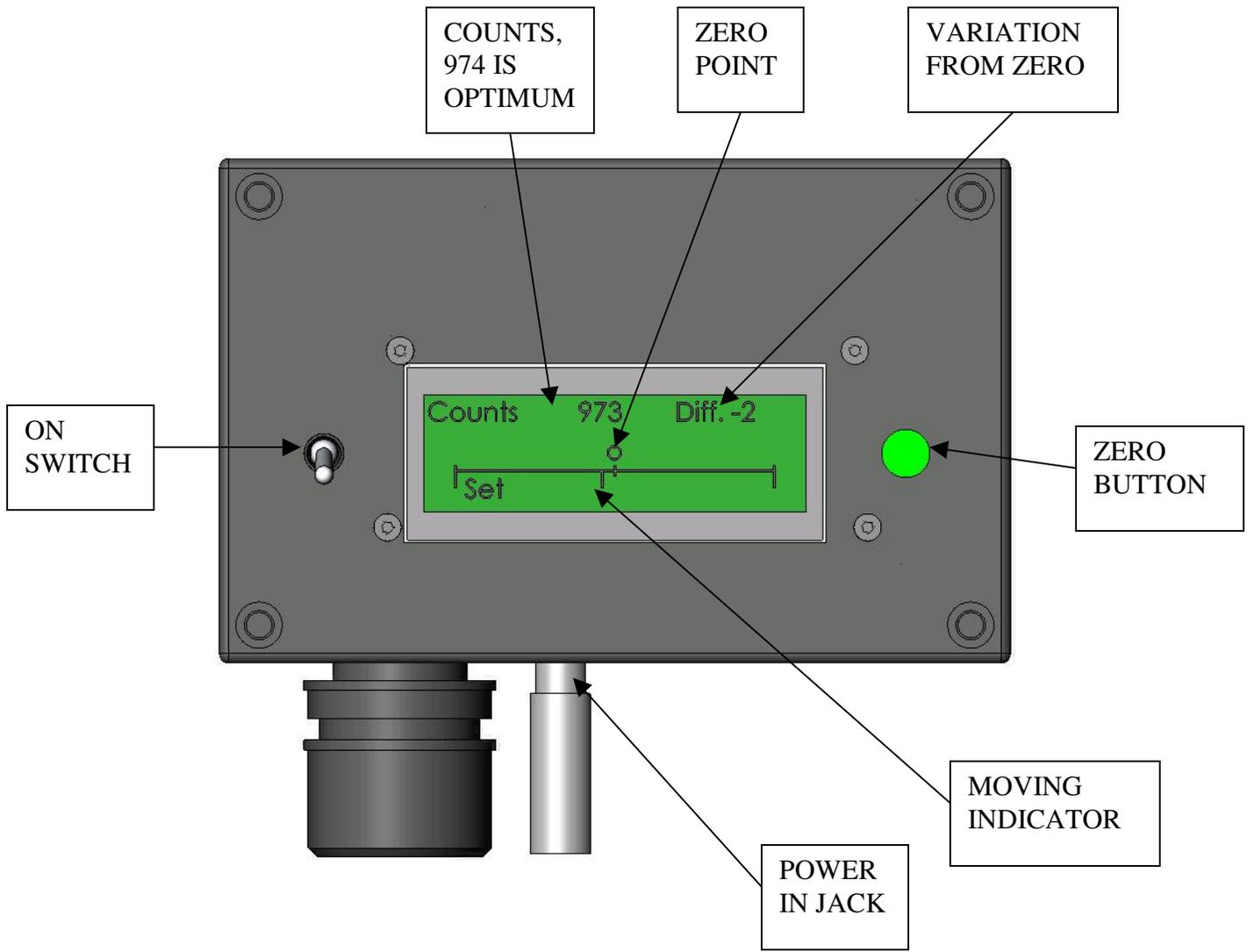


# System Features



# SENSOR ASSEMBLY FEATURES





## UNPACKING THE TM 200

- 1) Remove the crate lid.
- 2) Remove any cross members that retain the TM 200.
- 3) Remove the TM 200 sensor assembly from the crate.
- 4) Remove the remaining restraints and lift the misc. packages from the crate. These contain the 1-micron indicators and micrometers.
- 5) Remove the TM 200 beam assembly from the crate and place on a flat surface covered with cardboard.
- 6) Unpack the misc. items and place all packing materials back into the crate for future use.

## INSTALLING THE TM 200

- 1) Place the TM 200 onto the side wing assemblies of the casting machine with the linear rail toward the up stream end of the caster. Make sure the bottom surfaces of the side post assemblies and the top surfaces of the wings are clean.
- 2) Move the TM 200 into position to align with the holes in the wings.
- 3) Bolt the TM 200 in place using (8)  $\frac{1}{4}$ -20 SHCS x  $\frac{1}{2}$  lg.
- 4) Slide the TM 200 sensor assembly onto the linear rail being very careful not to cause any ball bearings to fall out.
- 5) Install the two end stops onto the ends of the rail to prevent the sensor assembly from being pushed off the rail.
- 6) Mount the Display assembly as far as practical away from the caster, but close enough so the sensor assembly can be moved from one end of the rail to the other. NOTE: You may need to provide a spring center support for the sensor conduit to keep it from falling into the slurry.
- 7) The gibs in each end post assembly have been tightened at the factory for shipment. They will have to be re-adjusted to allow smooth movement of the beam without looseness. Loosen the setscrews in the end post assemblies that clamp the brass gib to the rail beam.
- 8) Snug each setscrew to provide smooth sliding movement without being too loose.
- 9) Repeat this procedure for the other post assembly.
- 10) Plug the wall transformer into a 110VAC outlet and plug the 12 VDC plug into the jack in the display assembly.
- 11) Install the (2) micrometers and (2) 1-micron dial indicators.

## SETTING UP THE TM 200

- 1) Turn power on with the toggle switch on the display enclosure. The power supply will require 20 minutes to warm up and stabilize.
- 2) Level the beam to the granite surface. Rough level the beam to the granite using a steel ruler and measuring from the granite to the top of the beam on both ends. Adjust the height of each end of the beam using the micrometers to push the beam down against the spring.
- 3) Make each end equal in distance to the granite as close as practical using the steel ruler.
- 4) Preset the digital 1-micron dial indicator to full released by extending the micrometer.
- 5) Back off of the micrometer until the dial indicator shows engagement and has its full travel remaining.
- 6) Zero the dial indicator.
- 7) With the sensor turned on and the sensor assembly near one end of the rail, lower the sensor tube using either the rough adjust (thumb screw) or the micrometer at the sensor assembly. Lower the sensor until you see a reading on the display of 974 counts or greater. This is the center of the sensor's linear range.
- 8) Retract the micrometer until you see the bar indicator show movement and the <Out of Range> message disappears from the display.
- 9) Retract the micrometer until the Counts reading shows 974 and the moving indicator is centered.
- 10) Zero the display by pressing the "zero" button. This makes the offset value appear and it should read "Diff. +0".
- 11) Move the sensor assembly to the other end of the rail and note the display. The display needs to read zero.
- 12) Adjust the height of the beam end using the micrometer at the post assembly. Adjust it either up or down to get the display to read "Diff. +0".
- 13) Move the sensor assembly to the first end of the rail and repeat step 7 above.
- 14) Repeat steps 7 and 8 until the reading is zero or at least the same at both ends of the rail.
- 15) The rail is now level and should not be moved.
- 16) You should check this level condition each time you set up to cast to be sure the system is as accurate as possible. This rail level procedure is essential to having an accurate process monitor.

## USING THE TM 200 TO MONITOR WET THICKNESS

- 1) Once the cast is started and the slurry is uniform across the cast set the zero point of the sensor assembly for the particular material being cast, turn on the TM 200. Note: If the TM 200 is already on, turn it off then back on so the "Diff" note goes away. Place the sensor assembly over one edge of the cast thickness, but in from the edge by an inch or so. Lower (or raise) the sensor tube using the rough (.25" increments) or the fine (micrometer) adjustment until you see a reading on the display of 974 counts. This is the center of the sensor's linear range.
- 2) Zero the display using the "zero" button to get the "Diff. +0" reading to display.
- 3) Zero the 1-micron dial indicator at the sensor assembly.
- 4) Move the sensor assembly to the other edge of the cast, but in from the edge by an inch or so.
- 5) Note the display reading. If it is zero or centered then your cast is perfectly uniform. If it displays a reading other than zero it means that the cast is either thicker or thinner than the initial reading.
- 6) Adjust the sensor up or down using the micrometer at the sensor assembly until the display reads zero or is centered on the bar graph.
- 7) Note the reading on the 1-micron dial indicator. This reading is the actual difference in thickness that the doctor blade is producing.
- 8) Adjust the doctor blade by the micron amount that is displayed on the TM 200 dial indicator (either up or down accordingly).
- 9) Once the new cast has reached the TM 200 readjust the micrometer to acquire a zero reading on the display.
- 10) Move the sensor assembly to the first edge and note the display value. This should be very close to zero. Note: to prevent losing track of where your adjustments have been made, make all adjustments for thickness consistency from the same side of the rail and doctor blade. Be sure to zero the dial indicators prior to making general thickness adjustments. That way your adjustments can be input uniformly.
- 11) Monitor the cast periodically to insure good process control.