



Digital Proving Ring Penetrometer

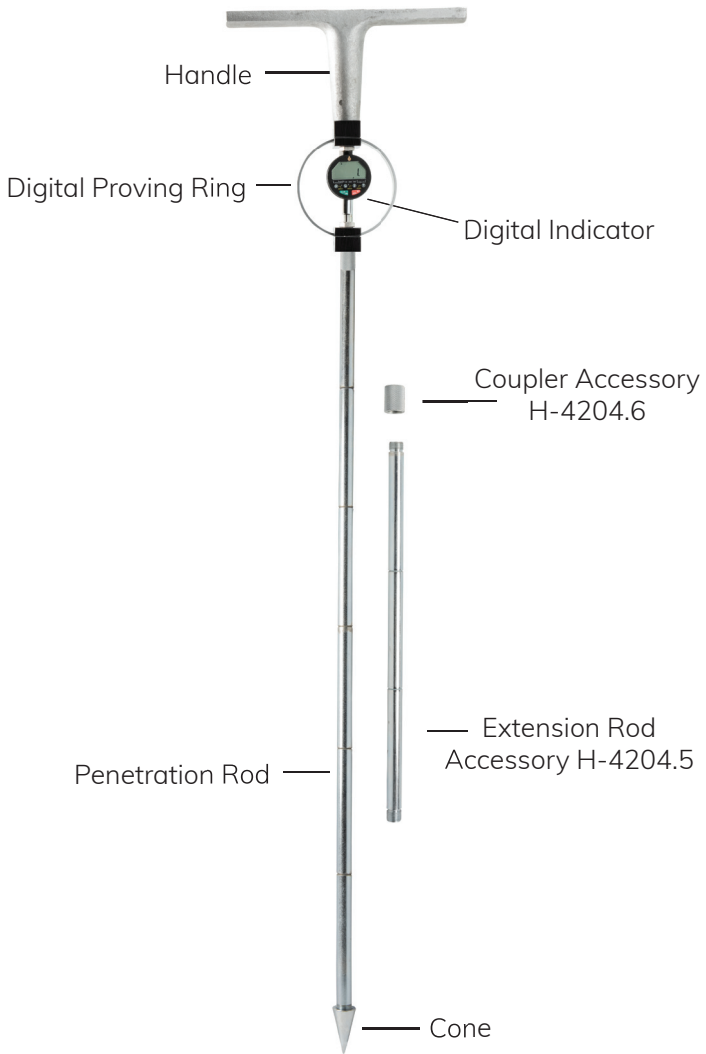


Figure #1

## **General Information**

Used to determine the bearing capacity of sub-grades, or to measure soil compaction. It's light and easy-to-handle in the field, and provides a rapid means of determining the penetration resistance of soil in shallow exploration surveys. This penetrometer features a direct-read, digital gauge that is calibrated

directly to a master load cell with an accuracy of 0.1 psi. This direct-read feature eliminates computations and charts to determine what the psi readings are. The penetrometer comes with a 30°, 1 in<sup>2</sup>. (6.45 cm<sup>2</sup>) cone; a 37.25" x 0.75" (19mm) dia. shaft, graduated at 6" (152mm) intervals, and a cast-aluminum, two-hand-style handle.

## **Assembly (See figure 1)**

Attach the handle to the upper block of the proving ring.

Attach the penetration rod with cone attached to the lower block of the proving ring.

If the extension rod is being used, attach it by means of the coupler to the lower block of the proving ring and attach the penetration rod to it.

## **Preliminary Setting**

Inspection: Inspect the instrument before use to make sure that all nuts, bolts and joints are tight and that the digital gauge tip contacts the proving ring bearing block screw.

## **Zeroing the Instrument**

Allow the penetrometer to hang vertically from its handle while zeroing is carried out. Press the Green/CLR button to zero the indicator.

## **Rezeroing the Instrument**

When reading has changed at any time or if any part is changed in the penetrometer, the instrument should again be zeroed as described in the Zeroing Instrument section above.

## **Operation**

Be certain that the digital indicator has been set to zero position. Select the site to be tested and clear the test location so that a flat and clean surface is available for testing.

Hold the assembly vertically on the test location. Grasping the handle firmly, push the cone point down into the soil at a steady uniform rate until the top of the cone goes just below the surface.

Indicator reading in psi can be directly read from the digital indicator. Use of the HOLD/H button can be used to hold the highest reading on the face of the gauge.

In order to measure the penetration resistance at 6", 12" or other depths, push the cone point down into the soil until the 6", 12" or other marks on the rod just

hit the surface and record the digital indicator reading. Refer to the calibration table to read the pounds force value.

**Note:** An approximate resistance (bearing capacity) is obtained by dividing the penetration load by the cone base area. The cone base area is actually 0.983 square inch. But in order to make correction for the cone soil friction, the base area should be taken as 1 square inch. Hence the penetration load reading in pounds is numerically equal to the penetration resistance or cone index in pounds per square inch.

Return the digital indicator reading to zero position by pressing the release button on the pointer stem housing. Support the release button from behind while pressing.

In soils of very low resistance, it maybe desirable to utilize a deeper penetration. The 6" marks or other marks, which the user may wish to scribe on the extension, may be used as the stopping point rather than the top of the cone. These penetration depths allow correlation with laboratory tests as well as the standard penetration depth.

## **Precautions**

Keep the instrument vertical while taking the measurements.

Do not attempt readings higher than the capacity of the digital indicator since this will overstress the proving ring.

Do not withdraw the instrument by the ring but always by the rod.

## **Care and Adjustment**

### **General Care**

All parts of the penetrometer are plated for resistance to corrosion and should be relatively maintenance free. The penetrometer needs little care beyond keeping the instrument free from dirt & rust, keeping all parts tight and frequently checking and if necessary rezeroing the instrument. Take particular care to see that no grit is caught between the extensometer arm of the digital indicator and the lower mounting block.

### **Digital Indicator**

The digital indicator is a sensitive instrument that should be protected against water and rough usage. Never immersed it in water and wipe it dry as soon as possible after its use in rainy weather. When transported truck, cushion the digital by wrapping it in paper or cloth.

### **Mounting Block Adjustments**

If either or both mounting blocks should become loosened and moved, the entire ring assembly should be returned to the factory for calibration. Merely readjusting and retightening these blocks may or may not return the ring to its initial calibration and a calibration check is necessary in this case.

### **Cone Replacement**

Considerable use of the same cone may result in a rounding of its points. This will not affect the accuracy of the instrument necessarily, but if the base of the cone has had excessive wear or is deformed by hard usage, the cone should be replaced.

### **Proving Ring Recalibration**

If the ring should have need of recalibration, services are available from Humboldt Mfg. Company.

### **Special Note**

In areas where the cone can be driven only through  $1/2$  or  $1/4$  of the cone height (very high penetration resistance) with a force up to 220 pounds (safety limit), the actual penetration resistance can be obtained by multiplying the corresponding load reading by an appropriate factor. For example, if the cone penetration is just  $1/2$  of the cone's height, multiply the corresponding load by 4 to get the actual penetration resistance. (It is not generally recommended to take readings at fractional cone penetrations; do so just when the penetration reaches exactly  $1/4$ ,  $1/2$ , etc., of the cone height).

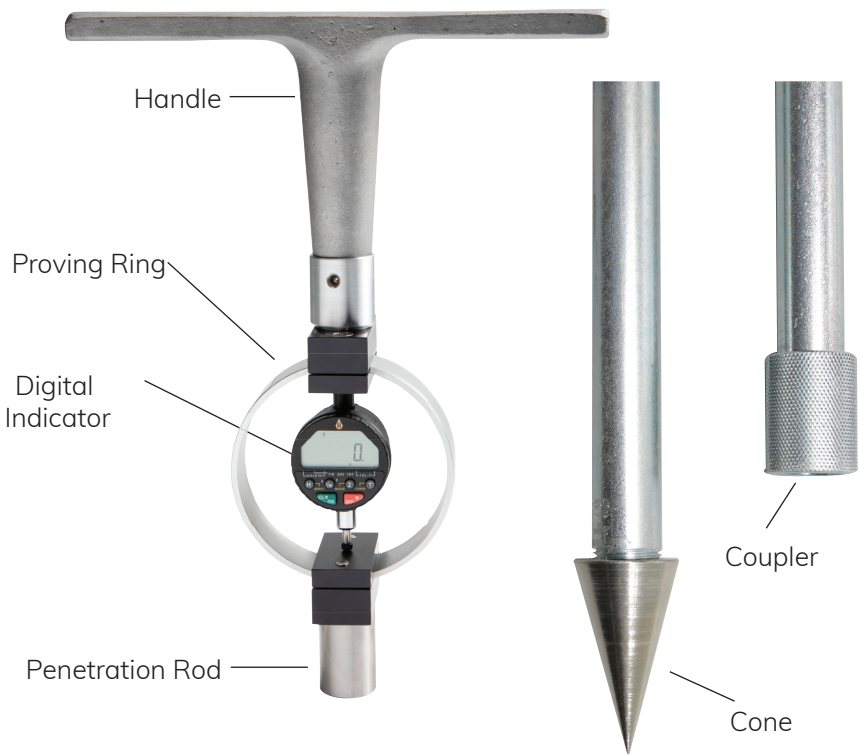
<b>Cone Height</b>	<b>Factor</b>
1/4"	16
1/2"	4
3/4"	1.77
1"	1

### **Specifications:**

Proving Ring:	220 lb. (99.79 kg)
Digital Indicator:	Direct-read digital indicator in psi Counter and brake.
Drive Rod:	3/4" (19mm) dia. x 37.25" LG. (946.15mm) graduated at 6" (152mm) intervals.
Cone:	30 degree; 1 sq. in.; replaceable
Handle:	Cast Aluminum
Weight:	Net 12 lbs. (5.4 kg)

### **Accessories:**

Extension Rod:	3/4" (19mm) dia. x 19" LG. (482.6mm); graduated at 6" (152mm) intervals. <i>Requires: Coupler H-4204.6 sold seperatly.</i>
Coupler:	H-4204.6



## Warranty

Humboldt Mfg. Co. warrants its products to be free from defects in material or workmanship. The exclusive remedy for this warranty is Humboldt Mfg. Co., factory replacement of any part or parts of such product, for the warranty of this product please refer to Humboldt Mfg. Co. catalog on Terms and Conditions of Sale. The purchaser is responsible for the transportation charges. Humboldt Mfg. Co. shall not be responsible under this warranty if the goods have been improperly maintained, installed, operated or the goods have been altered or modified so as to adversely affect the operation, use performance or durability or so as to change their intended use. The Humboldt Mfg. Co. liability under the warranty contained in this clause is limited to the repair or replacement of defective goods and making good, defective workmanship.

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