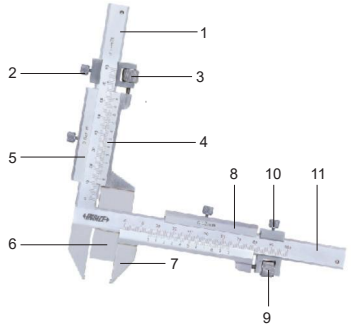
OPERATION INSTRUCTION

GEAR TOOTH VERNIER CALIPER

Code	Range	Graduation	Accuracy of height measurement	Accuracy of thickness measurement	Total accuracy
1281-M26A	M1-26mm	0.02mm	±0.03mm	±0.03mm	±0.04mm



1-Vertical vernier caliper
2-Fine adjustment locking screw 1
3-Fine adjusting wheel 1
4-Tooth height ruler frame
5-Locking screw
6-Horizontal vernier jaws
7-Horizontal vernier jaws
8-Tooth thickness ruler frame
9-Fine adjustment locking screw 2
10-Fine adjusting wheel 2
11-Horizontal vernier caliper

1. The caliper is used to measure the thickness of the fixed chord tooth and the indexing circle tooth thickness of the gear.
2. Check zero:
   Because the tooth thickness caliper is formed by connecting two calipers perpendicularly to each other. When measuring, it is necessary to read the value from two calipers, so the '0' position of the two calipers must be calibrated separately. Only the '0' position of the two calipers are qualified, the '0' position of the entire tooth thickness caliper only qualified.
   (1) The calibration method for the '0' position of the tooth thickness ruler: wipe the measuring surfaces of the two measuring jaws, move the tooth thickness ruler frame to make the two measuring surfaces contact, as shown in Fig.1. After the contact is stable, the '0' engraved line on the vernier ruler body should coincide with the '0' engraved line on the ruler body; the vernier tail engraved line should coincide with the corresponding engraved line on the ruler body.
   (2) The calibration method for the '0' position of the tooth height ruler: take one piece of grade 3 gauge block which size is equal to the lower limit of the measured modulus. Then wipe the surface of the granite surface plate(grade 1), place the gauge block on On the plate, press the tooth thickness caliper with your left hand, so that the two measuring jaws of the tooth thickness ruler are in contact with the plate, as shown in Fig.2, Slowly move the vernier of the tooth height ruler with the right hand, the measuring surface of the tooth height ruler and the measuring block with the right hand After the contact is stabilized, the '0' line and tail line on the vernier should coincide with the corresponding line on the ruler body， respectively.

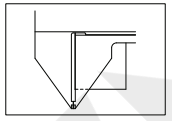


Fig.1

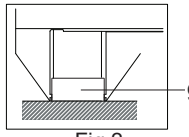


Fig.2

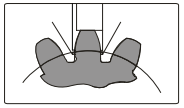
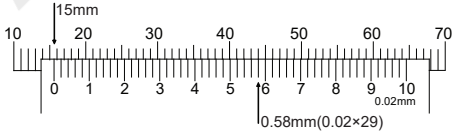


Fig.3

3. Measurement
   ---Calculate the measured gear's chordal addendum. Set calculated addendum figure, tighten the locking screw.
   ---Put caliper on the top of tooth.
   ---Move caliper to make horizontal vernier jaw contact the left side of the measured gear. Rotate fine adjusting wheel to move jaw to make the other jaw contact the right side (Fig.3), tighten the locking screw, take down the caliper, get the chordal thickness.

Note: It is necessary to control the force to move caliper to get accurate result. To avoid deviation, check two jaws contact gear completely.

4. The reading is obtained by adding the reading of the vernier scale to that of the main scale. Read the scale reading on the vernier scale that coincides with the scale line on the main scale. Details please refer to following figures.



Main scale reading:	15 mm
Vernier scale reading:	0.58mm
Reading:	15.58mm

Addition: Calculate pitch circle's chordal thickness and chordal addendum:
Theoretical chordal thickness S:

$$S=mZ\cdot\sin\left(\frac{90^\circ}{Z}+\frac{2x}{Z}\tan\alpha\right)$$

Theoretical chordal addendum h:

$$h=h'+\frac{mZ}{2}\left(1-\cos\frac{90^\circ}{Z}+\frac{2x}{Z}\tan\alpha\right)$$

$$h'=m(f+x-\delta)$$

m: Module
Z: Number of teeth
α: Pressure angle
f: Addendum coefficient
x: Modification coefficient
δ: The addendum reduced coefficient

During measurement, set vertical vernier caliper according to the actual chordal addendum h_a :

$$h_a=h+(d-D)/2$$

d: Actual diameter
D: Theoretical diameter

MN-1281-E
V0