OPERATION INSTRUCTION

3D Tester

Range: ±1mm
Graduation: 0.01mm
Repeatability at zero (one direction): ±0.01mm
X, Y, Z Range: 6mm

1-Spindle
2-Measurement calibration(adjust dial during calibration)
3-dial plate
4-adjustment screw(adjust the concentricity between spindle and probe)
5-Probe disassemble hole
6-Probe with determined breaking point
7-Contact point
8-Hexagon wrench
9-Wrench

1. Shockproof, IP67 waterproof.
2. It is mainly used for milling machine and CNC machine tools.
---determine coordinate point on workpiece.
---find center of holes.
---adjust and position the workpieces.
It can also be used to measure length and depth.

3. Installation and Inspection
---Install the 3D meter on the spindle of machine tool, check if the measuring needle is securely installed, and then check the concentricity between the measuring needle and spindle, if necessary make adjustments.
---Confirm the effective total length TL of the 3D table (Fig.1)
TL=effective total length of the 3D tester in contact state (with pointer points “0”);
When pointer points “0”, the length of the 3D tester should be taken by a compensation value of V=2mm;
The effective total length (TL) =total length (L) - compensation value (V=2mm);
Enter the effective total length (TL) into the machine tools as the tool length.

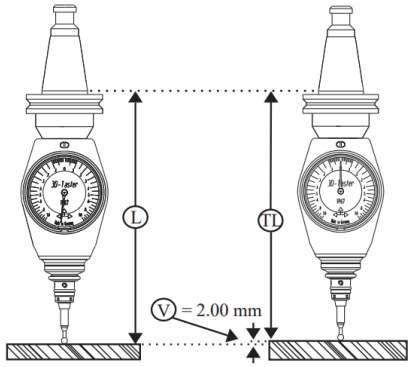

Fig. 1

4. measuring needle
---In order to protect workpiece and 3D tester, all the probe have preset determined breaking point.
---Replacement of probe:
Insert a wrench into the probe disassemble hole 5 for disassembling;
Install a new probe and tight it with a wrench;
---Check the concentricity between the probe and spindle.

After replacing the probe, the effective total length of the 3D tester needs to be reconfirmed and re-entered into the machine tool.

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5. Check and adjust the concentricity between the probe and the spindle.
The concentricity between the probe and spindle needs to be adjusted in the following situations:
1. The machine tool has replaced 3D tester.
2. Replace probe.
3. The probe is damaged.
4. when a collision happend.

X-axis adjustment
---Turn spindle until the X-axis of 3D tester probe and the X-axis of the machine tool coincide.
---Move the indicator towards the cantact point until the value of the indicator changes.
---Set the indicator to zero (Fig. 2)
---Turn spindle with 3D tester by 180°, and the dial gage shows the deviation of X axis (Fig. 3, as shown in the figure, the indicator reading is 0.12mm).
---Use Hexagon wrench and rotate the adjusting screw by half the value of the deviation (the figure shows that the reading is 0.06mm), and the X-axis adjustment is completed.

Y-axis adjustment
---Turn spindle with 3D tester by another 90° (the dial of 3D tester is now facing to the direction of indicator)
---Set the indicator to zero (Fig. 4)
---Turn spindle with 3D tester by another 180°, and now the dial gage shows the deviation of the Y-axis. (as shown in Figure 5, the indicator reading is 0.08mm)
---Use Hexagon wrench and rotate the adjusting screw by half the value of the deviation (the figure shows that the reading is 0.04mm), and the Y-axis adjustment is completed.

It can be checked again, if there are any issues, adjust again according to the above description.

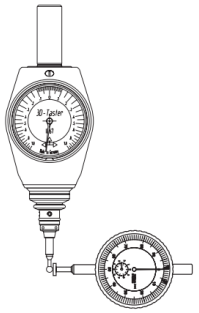

Fig. 2

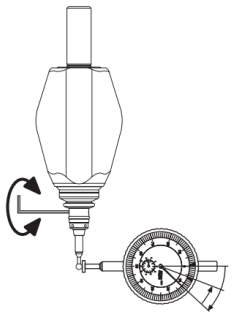

Fig. 3

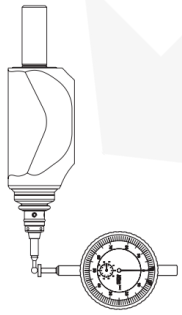

Fig. 4

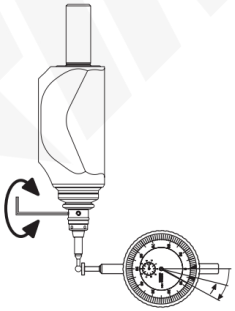

Fig. 5

6. Calibration for measurement
---Clamp 3D tester into machine tool spindle.
---Approach gage block at first side until the pointer points “0” (Fig. 6).
---Set machine tool in X-axis to “ZERO”.
---Approach the other side of the gage block,enter the value of the X-axis into the machine tool=the length of the gage block (as is shown in the figure, the length is 20mm).
---Read the deviation between the pointer and “0” scale of 3D tester (Fig. 7).
---Adjust by “half the difference” using the adjustment screw.and complete calibration (Fig.8)

It can be checked again, if there are any issues, adjust again according to the above description.

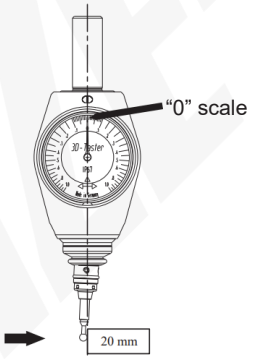

Fig. 6

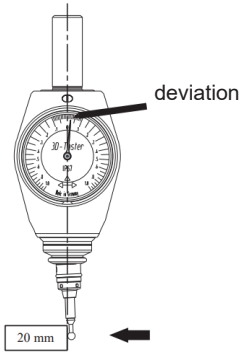

Fig. 7

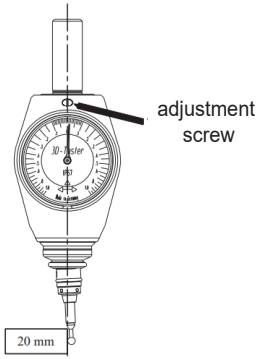

Fig. 8

7. measurement
7.1 How to avoid measuring errors,the following factors should be considered:
---Check if the 3D tester is installed tightly.
---Check if the contact pont of 3D tester is in touch with the effective surface.
---Check the concentricity between the 3D tester probe and the spindle.
---After replacing the probe, the effective total length of the 3D tester needs to be reconfirmed and re-entered into the machine tool.
---When in touch with the workpiece, the probe of 3D tester cannot move along the edge of the workpiece.

Before it contact the workpiece for measurement, the dial plate must be in the operator's sight.
If by mistake the probe is turned, when the whole procedure must be repeated.

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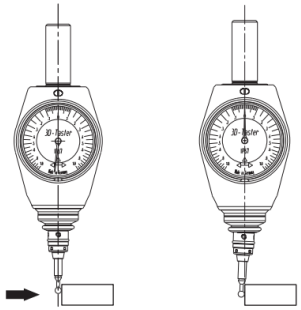
7.2 Contacting a workpiece (determing the positions of X, Y, Z)
Stop the machinespindle and turns off the supply of coolant
---Traval at a right angle to the contact surface.
---Once contact has be made, proceed slowly, until the3D tester pointer points “0”.
---The X-axis of the machine tool corresponds to the edge of the workpiece.



7.3 Find the center of the hole
Confirm X-coordinate
---Place the 3D tester probe into the bore and proceed along the X-axis until the probe contact with workpiece and the pointer points “0” (Fig. 9).
---Set the machine tool X-axis value to 0.000.
---Then the probe moves in the opposite direction along the X-axis until the 3D tester probe contact workpiece and the pointer points “0” .
---Record the value of the machine tool’s X-axis, move half of the distance along X-axis, and set the value of the machine tool’s X-axis to 0 at this time.

Confirm X-coordinate using the same way like X-coordinate (Fig. 10). And then we can find the hole center on the machine tool.

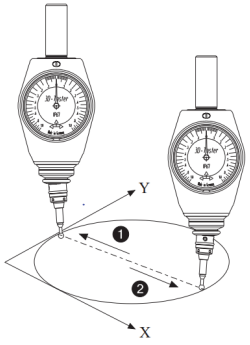


Fig. 9

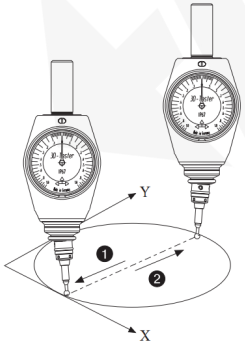
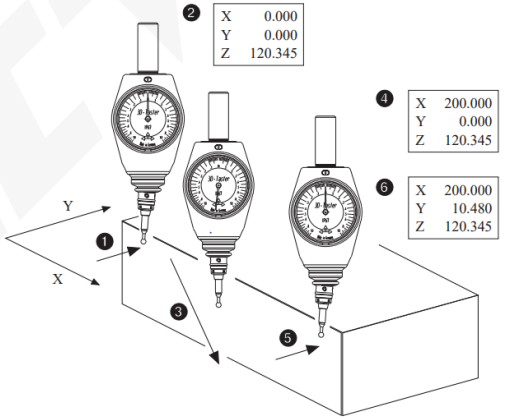
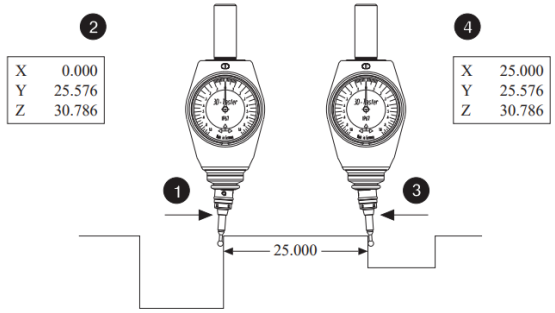


Fig. 10

7.4 Confirm and correct the alignment of a workpiece
---The probe proceed along Y-axis until it contact with workpiece, and 3D tester pointer points “0”.
---Set diaplay value of machine tool for both X-axis and Y-axis to “0.000”.
---The probe must proceed along the X-axis, eg for 200 mm (dx).
---The probe moves along the Y-axis until it contacts with workpiece, and the 3D testerpointer points “0”.
---Read off the displayed value of the machine tool (Y-axis), eg for 10.48 mm (dy).
---Determine the correction angle (angle = arctan dy / dx = 3°) and realign the workpiece accordingly. The alignment of the workpiece is now correct.



7.5 length measurement
---The probe moves along the X-axis until it contact workpiece and pointer points “0”.
---Set X-axis of the machine tool to “0.000”.
---Contact the other side of workpiece and proceed along the X-axis until the pointer points “0”.
---Read off the determined length shown in the display (X-axis) of the machine tool.



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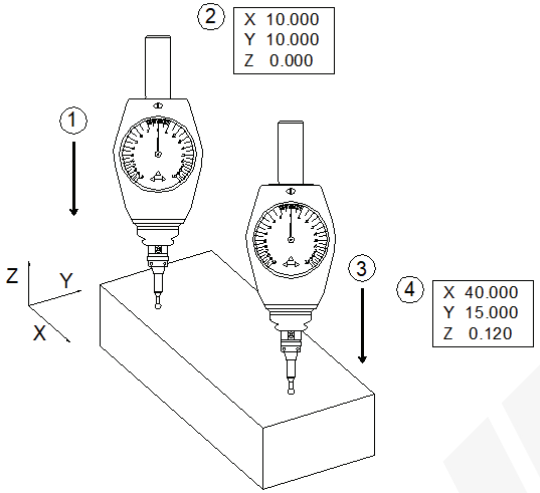
7.6 Height difference measurement

---The probe proceeds along the Z-axis until 3D tester probe contact the workpiece and the pointer points “0”.

---Set Z-axis of the machine tool to “0.000”.

---Contact with another point on the same side of workpiece and proceed along the Z-axis until the 3D tester pointer points “0”.

---This time, the Z-axis value on the machine tool (as shown in the figure, the Z-axis value is 0.12mm) is the height difference between the two points on the measured surface



8. Attention:

---Avoid collisions and bumps during use, and do not operate excessively. Disassemble the measuring needle and oil it if not using the 3D tester for a long time.

---If the probe is not in the start position, briefly lift the bellows for an air exchangebefore using (Fig. 11, vacuum effect)

---When the probe is subjected to excessive force, the fracture point of the measuring needle breaks, so that can protect the main body (Fig. 12)

---When using a standard probe, the pointer displays the movement value of the probe, but when using an extended probe, the pointer display does not match the movement value of the probe.

Fig. 11

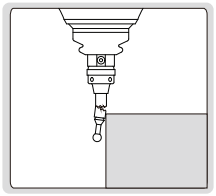


Fig. 12

9. Optional accessories(please see the table below.):
You can take down and replace them by wrench.

Code	Description	L	D	Remark
2840-N1	standard probe	31mm	SØ4mm	reading shows movement value of probe
2840-N2	extended probe	56.6mm	SØ6mm	reading does not show movement value of probe
2840-N3	cone probe	31mm	Ø4.2mm	position turning tools in the lathe