

TV2600 Vibration Pen

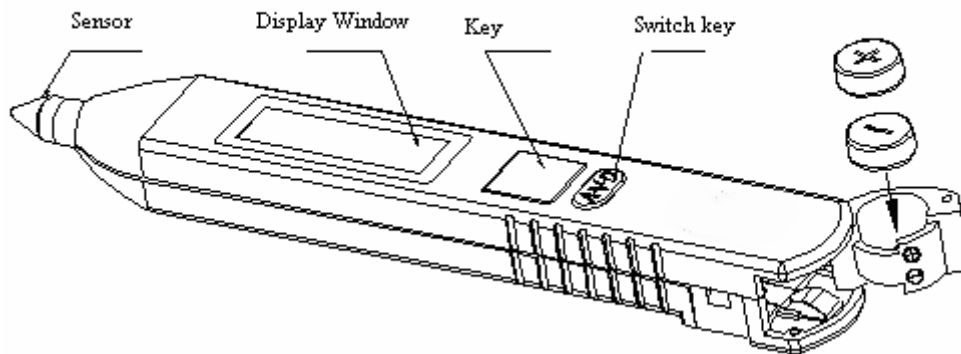
Instruction Manual

AMTAST USA INC.

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1. Structure



2. Features

- Full-scale function, three parameters displacement, velocity and acceleration can be tested.
- Small size, light weight and portability.
- Easy using, two-keys control
- Automatically switched off, power saved.

3. Operation

Principles:

Push the sensor on the plane being tested while keep TV260A perpendicular to it. Make sure the sensor to touch the tested surface tightly with force of about 5~20N in order to make the vibration of tested object transmitted to the pen completely. Testing points should be on bearing, bearing support or any parts which have obvious response to driving force or show the vibration of the machine accurately. For the accurate testing of vibration, it is necessary to test at three different directions which are vertical with each other. The pen doesn't have the function of data memory, so you need to record them by writing.

Usage:

Press key to switch on the tester and it directly go to the interface of displacement measurement.

According to the above principle, push the sensor on the plane being tested and press key, the tester will start measure the displacement. If you release the button now, the testing value will be kept for 40s, then the pen turns off automatically.

The measurement of speed and acceleration is similar to that of displacement. And the switch between the three parameters can be completed by press switch key.

"Over" will be displayed in the screen when the testing values go over the permitted range.

4. Capability

Testing parameter:	Acceleration Velocity Displacement
Testing range:	Acceleration: $0.01\text{m/s}^2 \sim 199.9\text{m/s}^2$ (peak value) Velocity: $0.01\text{mm/s} \sim 199.9\text{mm/s}$ (virtual value) Displacement: $0.001\text{mm} \sim 1.999\text{mm}$ (peak ~ peak value)
Frequency range:	acceleration: $10\text{Hz} \sim 1\text{KHz}$ Velocity: $10\text{Hz} \sim 1\text{KHz}$ Displacement: $10\text{Hz} \sim 500\text{Hz}$
Relative error:	Indeterminacy of sensitivity: $\leq 3\%$ Linear relative error of amplitude: $\pm 5\% \pm 2$ Relative error of frequency response: $-20\% \sim +10\%$ (frequency is $10\text{Hz} \leq f < 20\text{Hz}$), 5% (frequency is $20\text{Hz} \leq f \leq 1000\text{Hz}$)
Display:	3 digital LCD, display cycle is about 1s
Power supply:	2 button battery (LR44 or SR44)
Life of battery:	continuous working 5 h, resting time is about 1 year
Environment:	temperature: $0^\circ\text{C} \sim 40^\circ\text{C}$ Humidity: $< 85\%$
Dimension:	$150\text{mm} \times 22\text{mm} \times 18\text{mm}$
Weight:	approx 55g(including 2 batteries)

5. Maintenance:

- TV260A is a close gauge, and should be seriously protected from collision, damp, strong electromagnetic field, smear and dust.
- Pay attention to and make sure the anode towards “ $\oplus$ ” while changing the battery.
- Please take the battery off when the pen will not be used for a long time.
- Please do not dismantle the pen optionally in case of damaging the circuit.
- Polish the screen with clean water only, not alcohol or diluent which will corrode the screen.

-----Appendix-----

a. ISO2372 Machine vibration grades(NEMA MG1-12.05)

Notes:

- Class I is small motor (less than 15Kw) , class II is medium motor(15Kw~75Kw), class III is big motor(hard base), class IV is big motor(soft base).
- The result should be gotten from three perpendicular directions of the bearing shell.

Velocity (RMS) mm/s	I	II	III	IV
0.28	excellent	excellent	excellent	excellent
0.45				
0.71				
1.12	good	good	good	Good
1.8				
2.8	bad	bad	bad	Bad
4.5				
7.1	forbidden	forbidden	forbidden	forbidden
11.2				
18				
28				
45				

b. The max. vibration permitted of motor with power more than 1 hp. (NEMA MG₁-12.05)

Rotate speed(rpm)	Peak-peak displacement amplitude value(μm)
3000~4000	25.4
1500~2999	38.1
1000~1499	50.8
999 and less than this	63.6

Note: for AC motor, it is for the highest isochronous rotating speed, for the DC motor, it is for the highest power rotating speed, for the series and multi-purpose motor, it is for working speed.

c. The max. vibration permitted of large induction-motor (NEMA MG₁-20.52)

Rotate speed(rpm)	Peak-peak displacement amplitude value(μm)
3000 and more than this	25.4
1500~2999	50.8
1000~1499	63.6
999 and less than this	76.2

The two **standards** above are established by National Electric Manufacture Association (NEMA).

d. Max. vibration permitted of squirrel-cage induction-motor(API STD541)

	Peak-peak displacement amplitude value(μm)
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	Elastic support	Rigid support
720~1499	50.8	63.6
1500~2999	38.1	50.8
3000 and more than this	25.4	25.4

The **standard** above is established by American Petroleum Institute.

E. ISO./IS2373 quality standard of motor according to swing of vibration speed.

Quality Grade	Rotating speed	Height of axis H(mm) Swing of Max. speed rms(mm/s)		
		80<H<132	132<H<225	225<H<400
N(normal)	600~3600	1.8	2.8	4.5
R(excellent)	600~1800	0.71	1.12	1.8
	1800~3600	1.12	1.8	2.8
S (special)	600~1800	0.45	0.71	1.12
	1800~3600	0.71	1.12	1.8

Note: in the table above, N grade is suitable for normal motor. When we need a machine in higher grade than that in the table, we can get the limited value by dividing limited value of S grade with 1.6 or its multiple.

F. Non-warranty parts

- Sheath
- Transducer
- Battery
- Accessories