

TV260 Vibration Pen

Instruction Manual

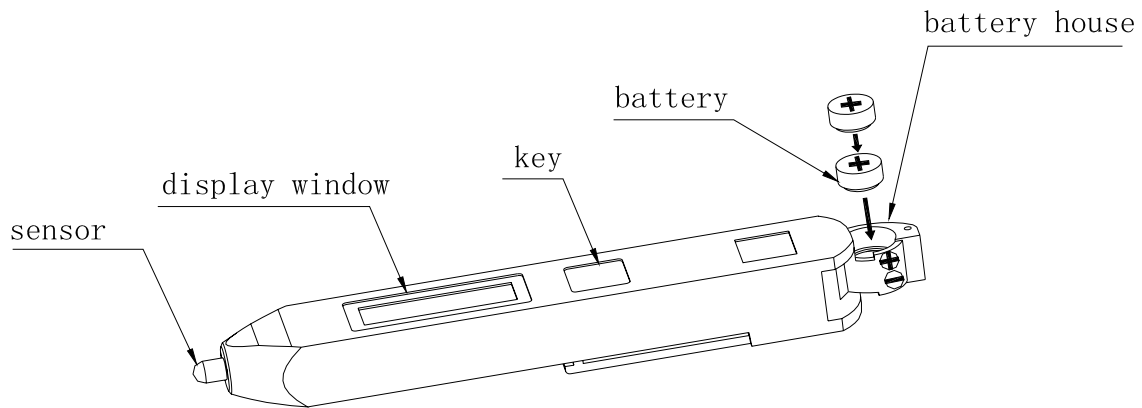
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1. Structure



2. Features

- Full-scale function, three parameters displacement, velocity and acceleration can be tested.
- Small size, lightness and portability.
- Easy using, single-key control
- Automatically switched off, power saved.

3. Operation

Principles:

Push the sensor on the plane being tested while keep TV260 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:

Push the sensor on the tested surface. Press the button, the pen get into the function of acceleration testing. If release the button now, the testing value will be kept for 40s, then the pen turns off automatically. The same as acceleration testing, displacement and velocity testing can also be performed as above, they can be switched by double-hitting on the button (press the button twice continuously within 200 ms). "Over" will be displayed on the screen when the testing values go over the permitted range.

4. Capability

| | |
|--------------------|---|
| Testing parameter: | Acceleration Velocity Displacement |
| Testing range: | Acceleration: 0.1m/s ² ~199.9m/s ² (peak value) Velocity: 0.1mm/s~199.9mm/s (virtual value) Displacement: 0.01mm~1.999mm (peak ~ peak value) |
| Frequency range: | acceleration: 10Hz~1KHz Velocity: 10Hz~1KHz Displacement: 10Hz~500Hz |
| Relative error: | Indeterminacy of sensitivity: $\leq 3\%$ Linear relative error of amplitude: $\pm 5\% \pm 2$ Relative error of frequency response: -20%~+10% (frequency is 10Hz $\leq f < 20\text{Hz}$), 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° C~40° C Humidity: <85% |
| Dimension: | 150mm×22mm×18mm |
| Weight: | approx 55g(including 2 batteries) |

5. Maintenance:

- TV260 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 “” 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)

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

Notes:

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

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)

| Isochronous rotating speed | Peak-peak displacement amplitude value(μm) | |
|----------------------------|---|---------------|
| | 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 axisH(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