***Battery power, LED array***

# STROBOSCOPE

## Model : DT-2199


Your purchase of this STROBOSCOPE marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

# OPERATION MANUAL

# 1. FEATURES

* Battery power Stroboscope, flash light use high intensity LED array, long life.
* Stroboscope, wide measuring range up to 99,999 RPM.
* The Digital Stroboscope is used the microprocessor circuit design, high accuracy, digital readout, light duty, that is ideal for inspecting and measuring the speed of moving gears, fans, centrifuges, pumps, motors and other equipment used in general industrial maintenance, production, quality control, laboratories and as well as for schools and colleges for demonstrating strobe action.
* Back light high visible LCD display gives exact reading with no guessing or error and saves battery energy.
* High precision both for Stroboscope. measurement.
* Use an exclusive one chip MICRO-PROCESSOR LSI-circuit and crystal time base to offer high accuracy measurement & fast measuring time.
* Compact and heavy duty housing case.

# 2. SPECIFICATIONS

### *2-1 General Specifications*

| | |
|---|---|
| Display | 5 digits ( 0 to 99999 ) LCD display. |
| Circuit | Exclusive one-chip design microprocessor LSI circuit. |
| Measurement | Unit : FPM ( rotation per minute ). |
| Sampling Time | Approx. 1 second. |

| | |
|---|---|
| Calibration | Crystal time base and microprocessor circuit, no external calibration process required. |
| Operating Temperature | 0 to 50 ℃ ( 32 to 122℉ ) |
| Humidity | Less than 80% R.H. |
| Power Supply | DC 1.5 V, UM-1 (D type) battery x 4 PCs<br>** DC 9V adapter input is built, AC/DC adapter is opional, not in included.* |
| Power Consumption | *Stroboscope ( 3600 FPM ) :*<br>DC 160 mA. |
| Weight | 800 g ( 1.76 LB ). |
| Dimensions | 21 cmx12 cmx12 cm (8.3"x4.8"x4.8"). |
| Accessories Included | Operation manual.....1 PC. |
| Optional Accessories | ACV 110V, 220/230V to DC 9V adapter. |

## *2-2 Electrical Specifications*

| | |
|---|---|
| Stroboscopic Flash Rate | 100 to 99,999 flashes per minute (FPM).<br>Low range : 100 to 1,000 RPM/FPM.<br>High range : 1000 to 99,999 RPM/FPM. |
| Accuracy | ± ( 0.05% + 1 digit ). |
| Resolution | 0.1 FPM/RPM (less than 1,000 FPM/RPM)<br>1 FPM/RPM ( > 1,000 FPM/RPM ). |
| Light Source | Long life high intensity LED array. |

# 3. FRONT PANEL & LAYOUT DESCRIPTION

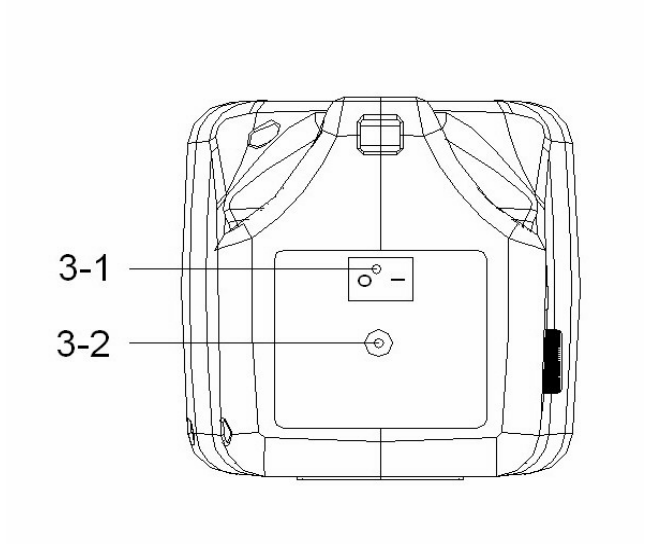
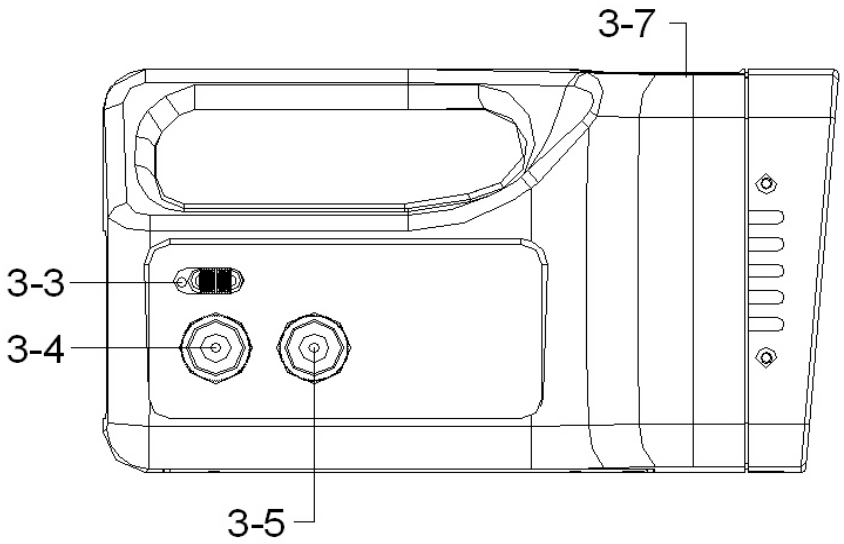



Fig. 1



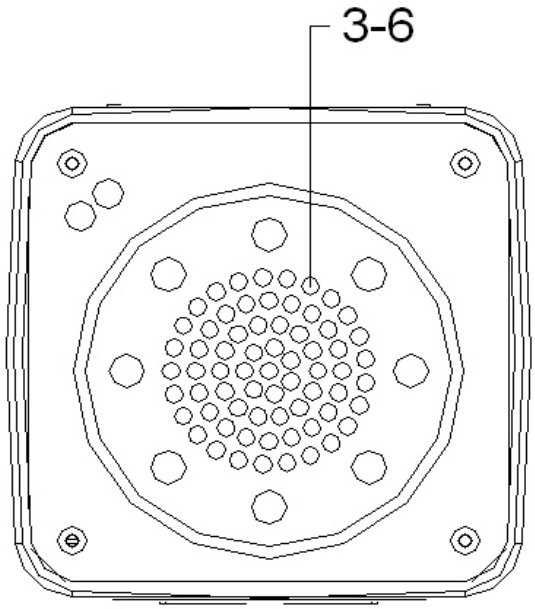
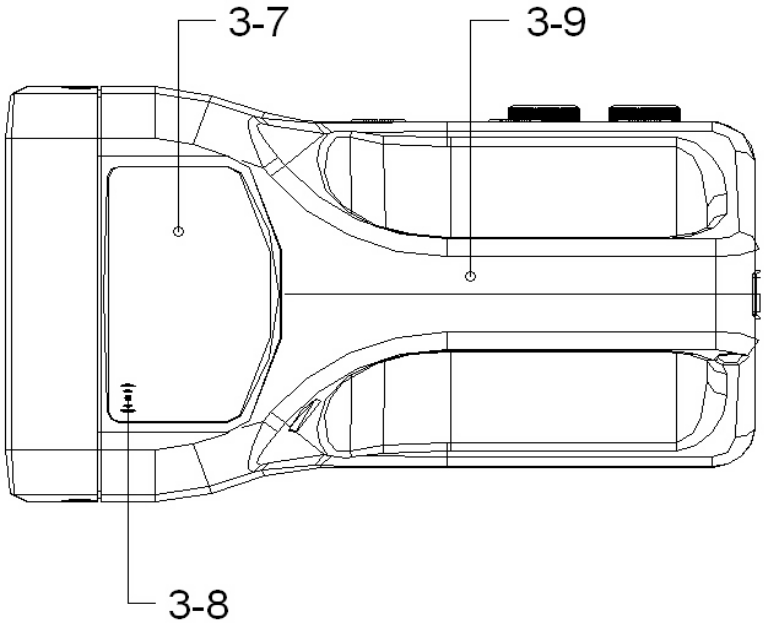



Fig. 1



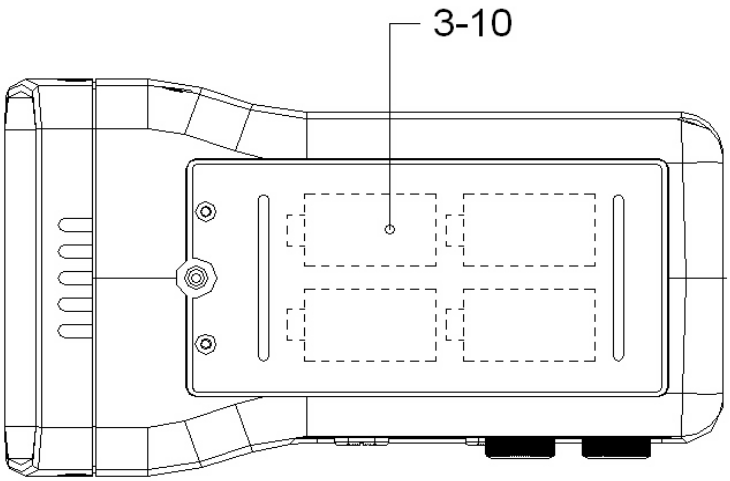



Fig. 1

3-1 Power On/Off Switch
3-2 DC 9V Power Adapter Input Socket
3-3 High, Low Range Switch
3-4 Coarse Adjust Knob
3-5 Fine Adjust Knob
3-6 High Intensity LED array
3-7 Display
3-8 Target Indicator
3-9 Handle
3-10 Battery Cover/Battery Compartment

# 4. MEASURING PROCEDURES

### *4-1 Preparation*

1) Install the batteries ( UM1/D type, 4 PCs ) into the Battery Compartment ( 3-10, Fig. 1 )
   ** Please make attention the polarity of the battery.*
2) Turn the power switch to " Power On/Off Switch " ( 3-1, Fig. 1 ) to the " On " position.
3) Determine the " High, Low Range Switch " ( 3-3, Fig. 1 ) to "Low" or "High" position.
   ** If the measured FPM ( flashes per minute ) is < 1,000, then set the " Range Switch " to Low ( Lo ) position.*
   ** If the measured FPM ( flashes per minute ) is ≧1,000, then set the " Range Switch " to High ( Hi) position.*

### *4-2 Checking Speed (RPM/FPM)*

1) Power off the installation to be measured, make a " mark " on the rotation area where it is intended to measure the RPM. Then power on the installation to be measured.
2) When checking the speed, care must be taken to ensure that the strobe is flashing in unison ( one to one ) with the object being monitored. Turn the " Fine Adjust Knob " ( 3-5, Fig. 1 ) or " Coarse Adjust Knob " ( 3-4, Fig. 1 ) until the mark look like " Stop " ( synchronize ).

***Consideration :***

* During the measurement, If the object mark look like rotating as the counterclockwise direction, the stroboscope's flash speed is higher than the object' s RPM typically. It should decrease the Stroboscope's FPM value will get synchronize ( mark stop ).
* During the measurement, If the object mark look like rotating as the clockwise direction, the stroboscope's flash speed is lower than the object's RPM. It should increase the Stroboscope's FPM value will get synchronize ( mark stop ).
* If intend to tune the stroboscopesingle to make the synchronize ( mark stop ) with the object quickly, it recommend to know the measured RPM approximately at first, then tune the stroboscope FPM start from the object RPM value nearly. For example if the measured RPM is 1792 RPM, then start the stroboscope's signal from the 1500 FPM. For the unknown object's RPM, then start from the lower FPM signal, increase the FPM value until the object mark is synchronized.

3) The Stroboscope will also stop motion at 2:1, 3:1, 4:1 et., this is normally referred to as harmonics. To ensure unison, turn the dial until two images appear - this will double the actual speed. Then lower the flashing rate until a single and stationary image appears - this is the actual true speed.

### *4-3 Checking Motion*

For motion analysis, simply locate the actual speed as mentioned above and then turn the dial slowly up or down. This will give a slow motion effect allowing complete inspection.

# 5. BATTERY REPLACEMENT

1) When the LCD display ( 3-7, Fig. 1 ) show " LO ", it is necessary to replace the battery. However, in-spec measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
2) Open the " Battery Cover " ( 3-10, Fig. 1 ) away from the instrument and remove the battery.
3) Install the 4 PCs batteries ( UM1/D type, Akaline or heavy duty ) and replace the cover.
   ** When change batteries, it should make attention the polarity of the battery.*