DT-326
LED Stroboscope

Operation Manual

Read manual thoroughly prior to operation.

Use instrument only after reading the complete manual.

Follow all safety precautions.

Safety Precautions

Please be sure to closely follow all safety precautions.

Be sure to read the entire instruction manual thoroughly before initial set-up, operation and maintenance.
The instruction manual provides two grades of safety warnings: "Danger" and "Caution".
Follow these precautions.

⚠ Danger

"Danger" marking indicates possible death, severe injury or fire if the user disregarded.

⚠ Caution

"Caution" marking indicates possibility of severe bodily injury or object damage if operated improperly.

🚫

This warning indicates a prohibited operation.

❗

Execute this warning.

⚠ Danger			
🚫	Never use in flammable environments. May result in fire or explosive.	🚫	Never look directly into the LED light source. May result in eye injury.

⚠ Caution			
🚫	Do not drop. May cause damage or injury.	🚫	Avoid the following. Direct sunshine, condensation, dust or caustic Chemicals, combustible gases Oils, water, salts
🚫	Do not alter, modify or dispose of improperly. May cause damage, accidents and void warranty.	❗	Operate within 0-35°C(32-95°F), 35-85%RH May alter operation of the unit.
🚫	To clean, gently wipe with a soft cloth. No volatile chemicals such as usage Benzene, Thinner, or Alcohol.	🚫	Hot! Use a tripod or other fixed device for over 2 hour of continuous operation.

- Contents -

1 Summary

The DT-326 LED Stroboscope is a portable, AC/DC powered precision instrument used to illuminate and measure the rotational speeds of objects with a certain speed and a constant period.　By illuminating the rotating object with the DT-326, the moving object appears to remain still when the flashing rate of the DT-326 is equals the rotational speed of the target object. This allows inspection of rotating and moving parts, gears, shafts and others. Additionally, the target object can appear to rotate back or forth (frequency) by utilizing the phase shift function.

Main features

Two units of measure- FPM (flashes per minute) and Hz.
=>**refer to 4.3.2 unit conversion**

Wide flash range- 60 to 120,000 FPM
=> **refer to 4.3.4 Flash rate setting**

Multiply or Divide by 2- function to quickly adjust flash rate
=>**refer to 4.3.5 Multiply/Divide the flash rate by 2**

Phase Shift function - "+3°", "-3°"
=> **refers to 4.3.6 Phase shift by degrees**

Adjustable flash duration – (RATIO) Time can change for 0.1° each time as in the range of 0.1° / 360° - 2.5° / 360°
=> **refer to 4.3.7 Flash duration (ratio) setting**

External input/output port-Synchronization of flash rate with external pulse, or flash rate pulse signal output
=>**refer to 4.4 External trigger model, 4.7 External input/output connector**

2 Product Inspection and Preparation

2.1 Confirmation of product packaging

Confirm the following five parts in your DT-326 packaging:

1. One (1) LED stroboscope

2. Four (4) alkaline batteries (AA)
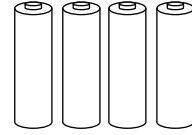
3. One (1) AC Adapter (120V/240V, 50/60Hz)
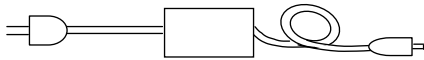
5. Operation Manual

4. One (1) set of External input/output connector 3240-10P-C   [HIROSE ELECTRIC CO., LTD.]
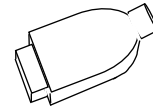
6. One (1) Option Cable- Input/ Output cable adapter if you ordered

2.2 Removal of protective sheet

Remove both protective sheets covering the operation panel and light source as shown below.

Operation panel

Protective sheet

Light source
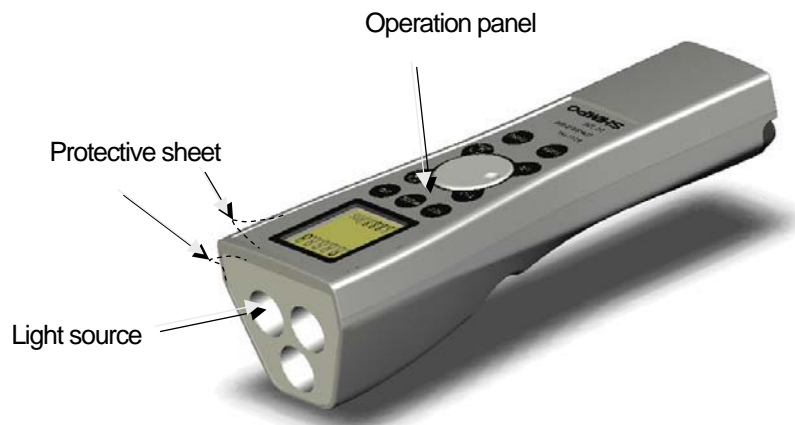
2.3 Installation of Battery

Turn coin screws counter-clockwise to remove battery cover, and insert batteries in proper polarities as shown below:

Coin screw

Battery cover
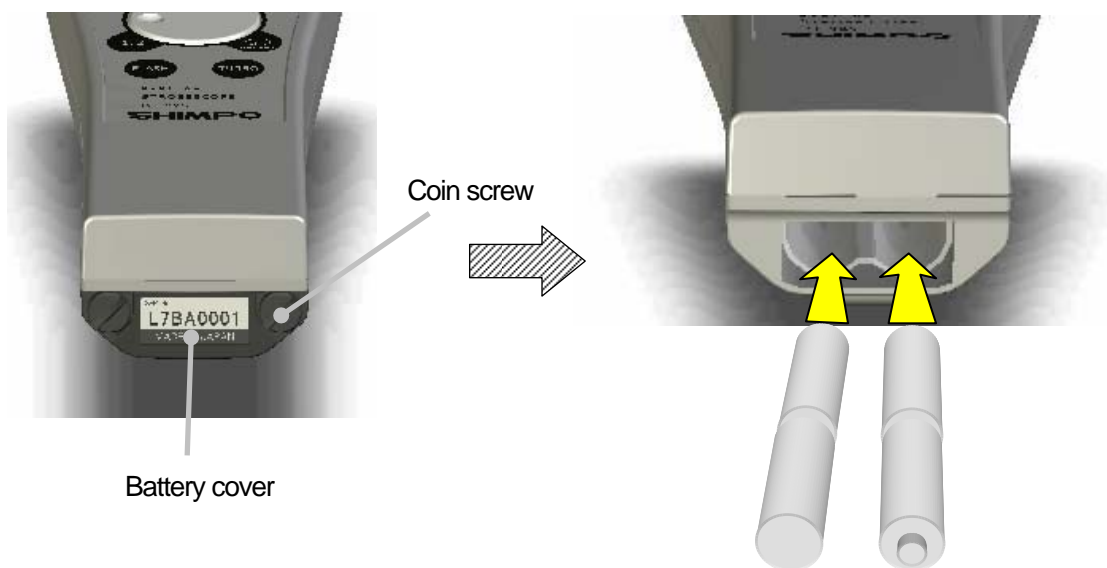
* <u>Avoid battery leakage/ corrosion when not in use for extended period of time.</u>

3   Names and functions of the components
3.1   DT-326 Unit

Flash rate/frequency
setting dial

Operation keys (9 totals)

LCD indicator display

LED light source (3 totals)
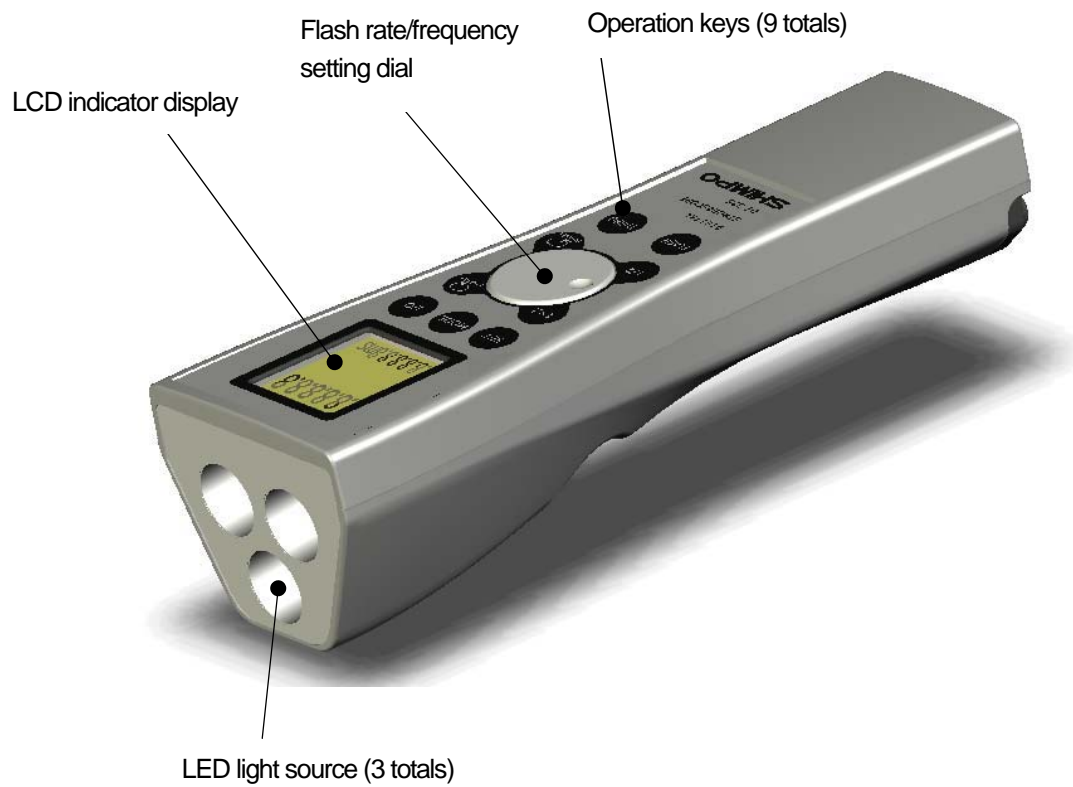
3.2 Operation panel
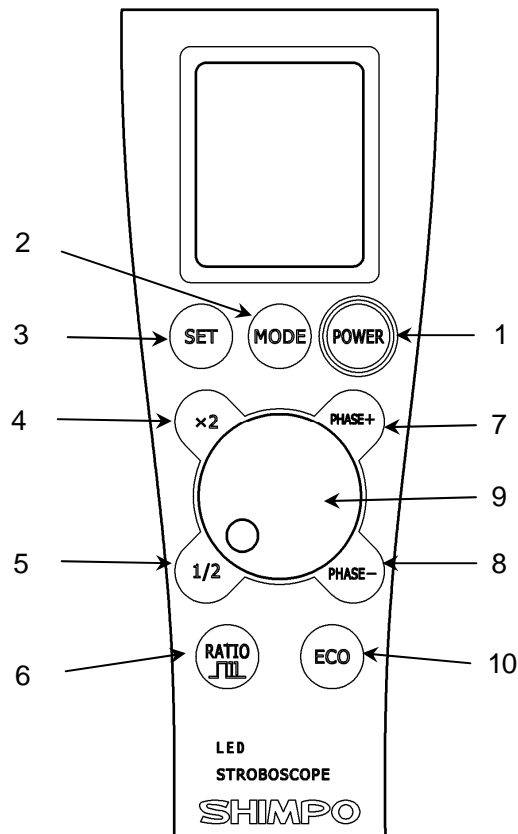
No.	Key	Function Instructions
1	POWER	Power the unit on or off
2	MODE	Select Internal/ External/ Parameter mode of operation instruction
3	SET	Unit change, Select parameter setting item, Store setting value.
4	×2	Multiplies the flash rate/frequency by a factor of 2.
5	1/2	Divides the flash rate/frequency by a factor of 2.
6	RATIO	Adjusts the flash duration (flash pulse width) in Internal/External mode.
7	PHASE "+"	Advance image forwards 3 degrees at a time in internal mode. In parameter setting mode, change setting value.
8	PHASE "-"	Retard image backwards 3 degree at a time in internal mode. In parameter setting mode, change setting value.
9	Dial	Set flash rate or frequency. CW; Increase flash rate/frequency. CCW; Decrease flash rate/frequency. (Turn dial "quickly" to drastically change value. Turn dial "slowly" to change value 1 digit.) In parameter setting mode, CW or CCW rotating changes the setting value.
10	ECO	Push once to reduce LED brightness (Economy mode). Push again to return back (Normal mode).

3.3 LCD Display
3.3.1 Display Names and Descriptions

Battery indicator · Main data display · Setting project · Unit · Sub data

Auto Range
Trigger
Edge Delay Deg
Flash Time Mem
AveLastMinMax

min
sec
Hz
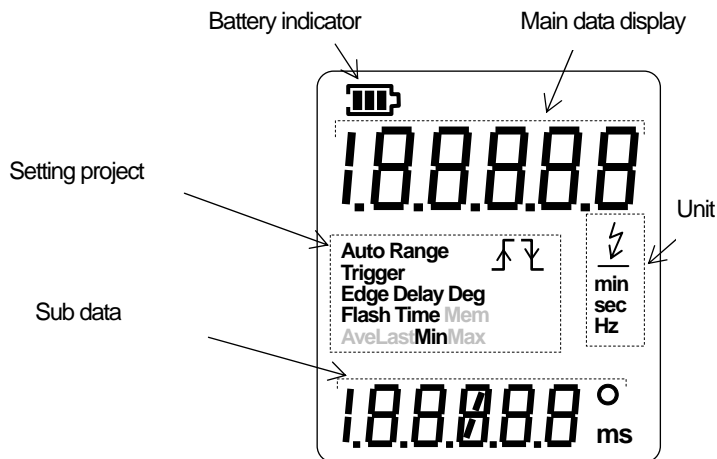
3.3.2 Main data display
- Internal flashing mode: Displays flash rate.
- External trigger mode: Display external trigger frequency.
-Display will indicate "P" or "LCD" (in ON/OFF setting of LCD backlight) in *Parameter setting mode.

*Parameter setting mode: Display LCD backlight setting ("P" or "LCD")

3.3.3 Sub data display
Internal Flash Mode Display
-To change the degrees of phase shift, press PHASE + or PHASE - keys. The display will reflect the cumulative angle of phase shift.
-"Flash Time" will be displayed when RATIO key is pressed. The flash time (pulse flash duration) can then be set using the dial to increase or decrease the flash time from 0 to 2.5 (0 - 2.5°) degrees.
External Trigger Mode Display
-Displays delay time setting. Refer to section 4.4.2 for detail.
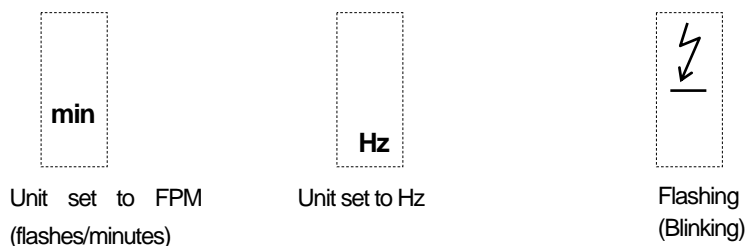***Parameter Mode Display**
- Displays the following:
 -Selected measuring range
 -Delay time (in ms)
 -Backlit LCD (ON or OFF)

*Refer to 4.5 "Parameter setting mode" for detail.

3.3.4 Units of Measure: Display
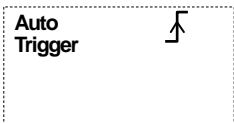Digital display will show the following according to the unit of measure setting.

min

Hz

Unit set to FPM
(flashes/minutes)

Unit set to Hz

Flashing
(Blinking)

3.3.5 Setting project display

The following will be displayed, according to the mode of measure and *parameter settings

		Auto Trigger	Auto Trigger
Flash	**Min**		
Internal flashing mode	ECO mode	Positive auto trigger	Negative auto trigger

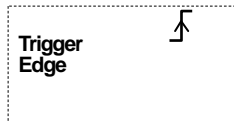|		Trigger Edge	Trigger Edge
Range	**Flash Time**		
Set the measuring range in Parameter setting mode*	Set the flash time (duration)	Choose positive when set trigger edge in *Parameter setting mode	Choose negative when set trigger edge in *Parameter setting mode

	Delay Deg	Delay Time
	Choose angle setting when delay set in *Parameter setting mode	Choose delay time when delay set in *Parameter setting mode

* Please see section 4.5 for Parameter setting data.

3.3.6 Battery Indication

Indicates remaining battery charge capacity in flashing operation mode.

Battery full	Battery diminished	Near zero

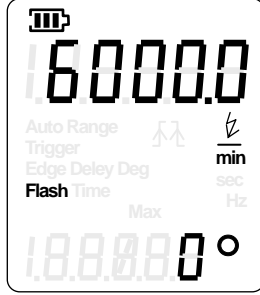No battery indication while AC powered.

4　Function Instructions
4.1　Power on/off

Press "POWER" key to turn on unit. The unit will begin to flash in internal mode and the display will indicate the flash rate (FPM = flashes per minute).
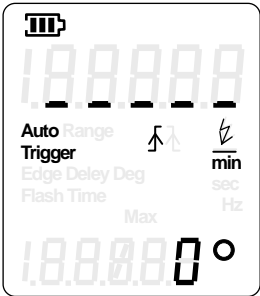
Operation	Indication
Power off **POWER** Press and release	Display will indicate the flash rate in internal mode, and the LED light source will begin flashing.

Press "POWER" key again to turn off unit.　The display will turn off, and the device will stop flashing.

Operation	Indication
Power on **POWER** Press and release	Display will turn off and unit will stop flashing.

4.2　Mode Selection

Press and release "MODE" key to toggle between INTERNAL, EXTERNAL and PARAMETER mode.
*Refer to 4.5 "Parameter setting mode" for details.

Operation	Indication
MODE Press and release to switch modes	 Internal flashing mode　　External trigger mode　　Parameter setting mode

4.3 Internal flashing mode
4.3.1 Instruction for Internal flashing mode

Battery power indication

Flashing time (Hz shown) setting

Flash indicator

Unit (min or Hz)

Internal flashing mode

"Min" means Eco mode

Total phase shift angle
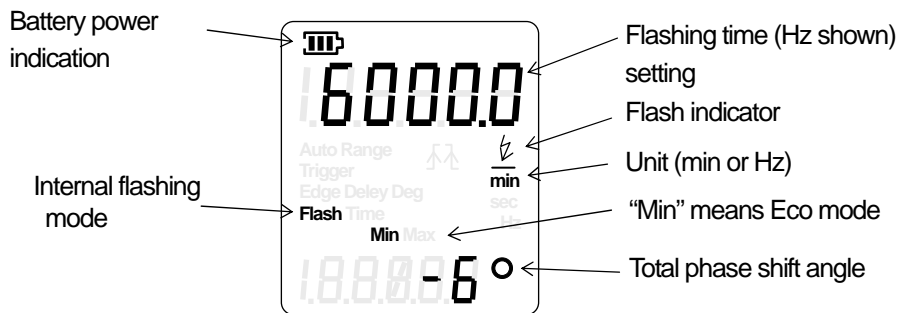
4.3.2 Changing Units of Measure in Internal Mode

Press and release "SET" key to toggle between FPM and Hz measuring unit.

Operation	Indication		
SET Press and release	Measuring unit "FPM"	Measuring unit "Hz"	Measuring unit "FPM"

4.3.3 ECO function

Press and release "ECO" key to toggle between Normal and ECOnomy power save mode.

Operation	Indication		
ECO Press and release	Normal mode	ECO mode	Normal mode

4.3.4 Flash rate and frequency "Internal Mode"

Set the flash rate (frequency) by turning the center dial.

Clockwise: Increase

Counter-clockwise: Decrease

For small adjustments, turn the dial slowly. For large adjustments, rotate the dial quickly.

The flash rate and resolution differs according to measuring range. Refer to section 4.5.1 for details.

Notes for setting the flash rate

One function of a stroboscope is to provide a "Frozen" virtual image of a rotating target once the flash rate of the stroboscope matches the rotational speed of the target object (FPM=RPM). The stroboscope will also show a single image when the flash rate or frequency is set to a lesser multiple of the RPM (1/2, 1/3, etc.) When the flash rate is increased to a high multiple (2, 3, etc.), multiple images will appear. To find the true RPM of the target object, begin by lowering the FPM to lower multiples until only a single image appears. For more information regarding the multiply/divide by 2 function, please see 4.3.5.

"Frozen" virtual image

Pattern   Motor

2 times   3 times   4 times

1

1/2 times   1/3 times
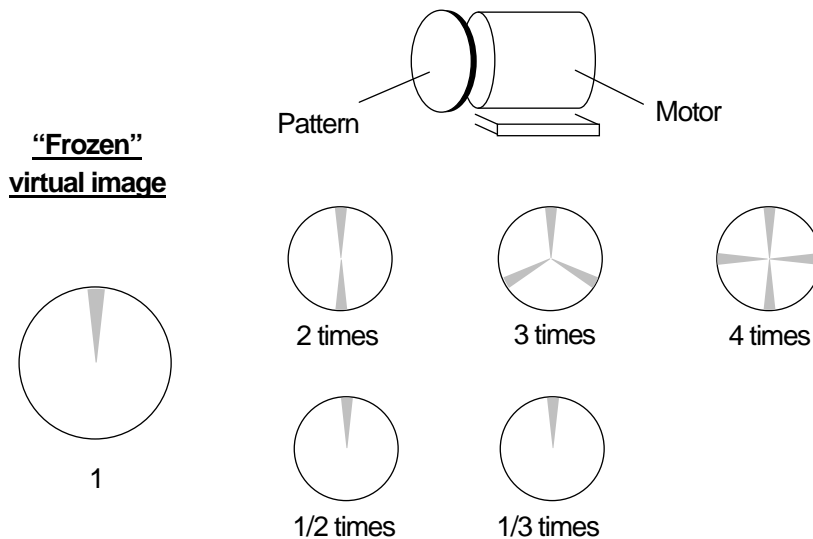
True rotational speed of target object (rpm)	Flash rate of stroboscope (FPM)	Multiple of true rotational speed	Number of stopped images
900	3600	4 times	4
	2700	3 times	3
	1800	2 times	2
	900	**1 times**	**1**
	450	1/2 times	1
	300	1/3 times	1

4.3.5 Multiply / Divide by 2 Function
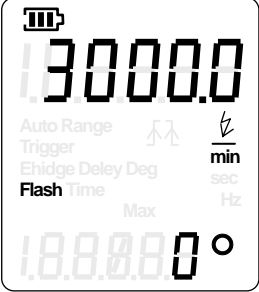
The flash rate or frequency can be doubled or halved by the"x2" and "½" keys on the operation panel.

1) Doubling the flash rate (x2)

Press "x2" key to multiply the current flash rate by a factor 2 until the max flash rate is reached.

Operation	Indication
x2 Press and release	 Ex. Flash rate 1,500 FPM Double the rate 3,000 FPM Double the rate 6,000 FPM

After the flash rate (frequency) changes, it becomes the new value based on the set display resolution. (See section 5. Specifications) Therefore, the frequency is not to return to the original frequency, even if "½"key is pressed after pressing "x2" key.

2) Halving the flash rate (½)

Press "½" key to divide the current flash rate by a factor of 2 until the min flash rate is reached.

Operation	Indication
1/2 Press and release	 Ex. Flash rate 1,500 FPM Half the rate 750 FPM Half the rate 375 FPM

After the flash rate (frequency) changes, it becomes the value based on the set display resolution. (See section 5. Specifications) Therefore, the frequency is likely not to return to the original frequency even if "x2"key is pressed after pressing "½" key.

4.3.6　Phase Shift (Angle)

Once "Frozen" virtual image is achieved via FPM=RPM, the phase shift function can advance or delay the flash so that the image appears to be slowly rotating CW or CCW incrementally.

Press "PHASE+" key or "PHASE-" key to increment or decrement the phase shift angle by 3°.

The display will show the cumulative angle of the phase shift.

Operation	Indication
PHASE+ Press and release	

Ex. Flash rate 6,000 FPM — Phase shift at 0°　Increment phase shift by 3°　Increment phase shift by 3° — Final phase shift of 6°

If "PHASE +" key is pressed at 357°, it becomes 0°.

Operation	Indication
PHASE- Press and release	

Ex. Flash rate 6,000 FPM — Phase shift at 0°　Decrement phase shift by 3°　Decrement phase shift by 3° — Final phase shift of -6°

If "PHASE -" key is pressed at -357°, it becomes 0°.

4.3.7　Flash Pulse Duration (RATIO) setting
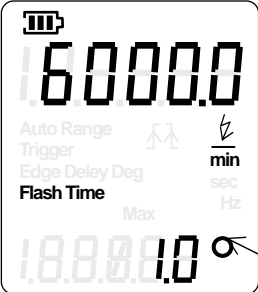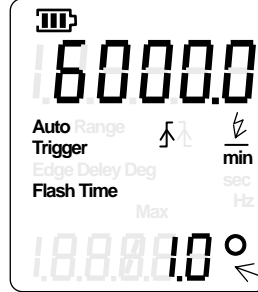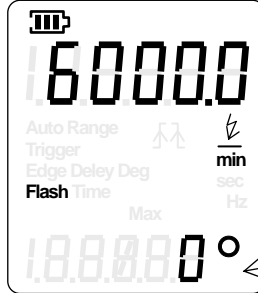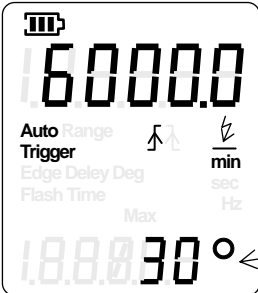
The RATIO can be set within the range of 0.1°/360° - 2.5°/360°, with a resolution of 0.1°.

Period of flashing = 360°.
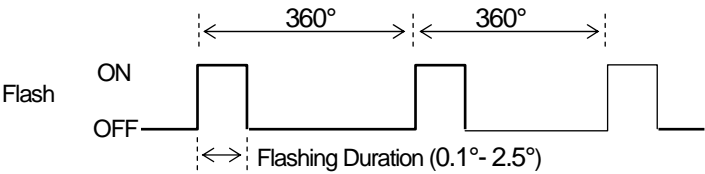
The Flash Pulse Duration (RATIO) is directly proportional to the LED brightness, which in turn, is inversely related to the target image focus.
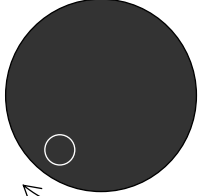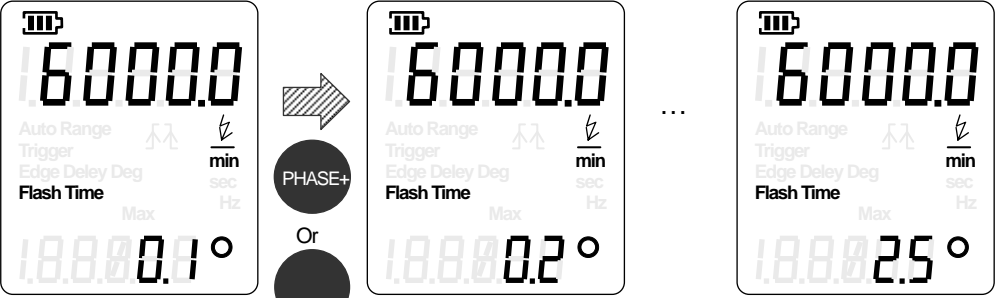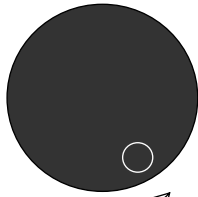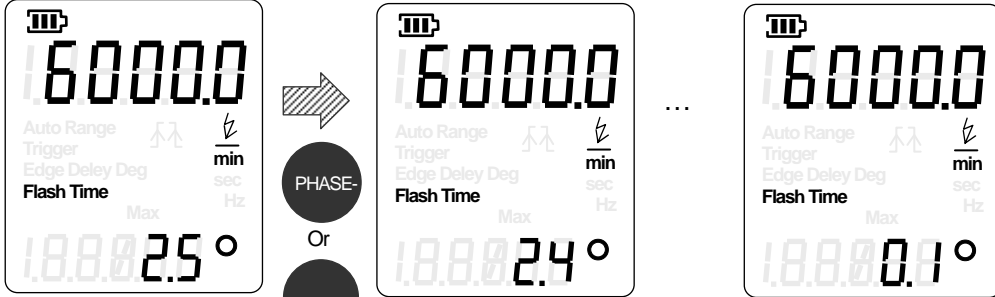
Press the "RATIO" key. The current mode will start blinking for 5 seconds allowing modification at this point.

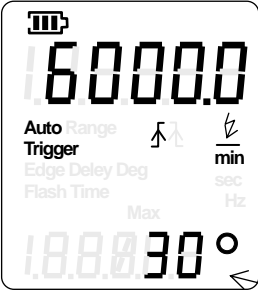| Operation	Indication	
	Internal flashing mode	External trigger mode
RATIO Press and release	6000.0 Auto Range Trigger Edge Deley Deg **Flash** Time Max min sec Hz 0° — Phase shift angle	6000.0 **Auto** Range **Trigger** Edge Deley Deg Flash Time Max min sec Hz 30° — Flash delay angle
	⬇ RATIO	⬇ RATIO
	6000.0 Auto Range Trigger Edge Deley Deg **Flash Time** Max min sec Hz 1.0° — Flash pulse duration (blinking) When blinking, flash duration can be modified (see next section for directions on this step)	6000.0 **Auto** Range **Trigger** Edge Deley Deg **Flash Time** Max min sec Hz 1.0° — Flash pulse duration (blinking) When blinking, flash duration can be modified (see next section for directions on this step)
	** ⬇ RATIO	** ⬇ RATIO
	6000.0 Auto Range Trigger Edge Deley Deg **Flash** Time Max min sec Hz 0° — Phase shift angle Return to normal internal flashing mode and display	6000.0 **Auto** Range **Trigger** Edge Deley Deg Flash Time Max min sec Hz 30° — Flash delay angle Return to normal external triggering mode and display

** While in the flash pulse duration setting mode, a 5 second timer will bring the unit back to default normal mode, if no manual changes are made.

Press "PHASE+" key, or turn the dial clockwise direction to increment the Focus by 0.1°.
Press "PHASE-" key, or turn the dial counter clockwise direction to decrement the Focus by 0.1°.

Operation	Expression
PHASE+ Press and release OR (dial) Turn clockwise	**6000.0** Auto Range Trigger Edge Deley Deg min **Flash Time** sec Hz Max *I.8.8.8.8.* **0.1** ° Flash duration (RATIO) 0.1°/ 360° ⟹ PHASE+ Or (dial) **6000.0** Auto Range Trigger Edge Deley Deg min **Flash Time** sec Hz Max *I.8.8.8.8.* **0.2** ° Incremented 0.2°/ 360 ° … **6000.0** Auto Range Trigger Edge Deley Deg min **Flash Time** sec Hz Max *I.8.8.8.* **2.5** ° Maximum 2.5°/ 360 °
PHASE- Press and release OR (dial) Turn counter clockwise	**6000.0** Auto Range Trigger Edge Deley Deg min **Flash Time** sec Hz Max *I.8.8.8.8.* **2.5** ° Current (RATIO) 2.5°/ 360 ° ⟹ PHASE- Or (dial) **6000.0** Auto Range Trigger Edge Deley Deg min **Flash Time** sec Hz Max *I.8.8.8.* **2.4** ° Decremented 2.4°/360° … **6000.0** Auto Range Trigger Edge Deley Deg min **Flash Time** sec Hz Max *I.8.8.8.8.* **0.1** ° Minimum 0.1°/ 360°

4.4　External Trigger Mode

This mode allows synchronization of the FPM with external signal input such as a sensor.

See section 4.7 for details.

Parameter settings are possible, like phase shift, delay time, flash duration, edge trigger.

4.4.1　External trigger mode: LCD display information

Battery Indicator

External　Trigger
Mode Indicator

Frequency of external trigger input

Light off

Flash rate unit of measure: "min" or "Hz"
displayed ("min" = FPM flashes per minute)

"Min" in Eco-mode = lowest brightness setting

Flash delay time/angle display
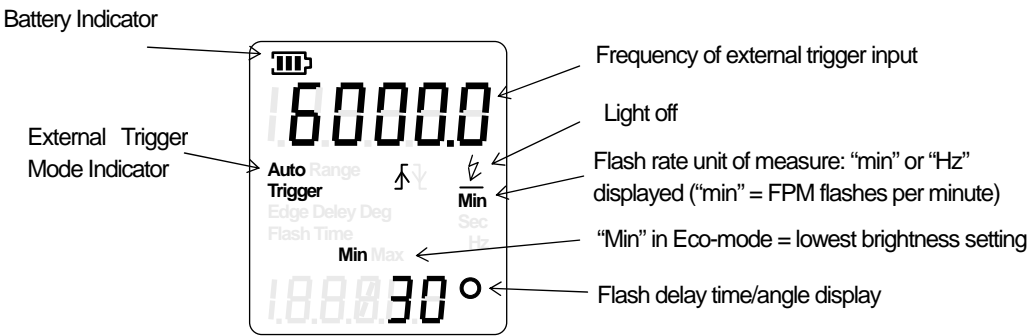
The frequency of the external signal is measured each period, while the latest external frequency measurement is updated every 50ms.

For an out of range external input signal, the display will appear as follows:

External signal < 60FPM/1Hz.　　　　　　　External signal > 10,000FPM/166Hz.

4.4.2　Flash Delay Setting

This mode allows for delayed flashing once an external signal is triggered.

The unit of delay is time (msec) or degree (°).

Press "PHASE+" or "PHASE-" key to toggle between two settings of "delay time" or "delay angle".

Operation button	Indication
PHASE+　PHASE- Press and release	 "delay angle" in deg　　　　　　　"delay time" in ms

4.4.2.1 "Delay time" setting

This can be set to 0~999 msec with a resolution of 1 ms.

The internal calculation time of the unit is 60us, which results in the actual delay time being (Setting delay time) + 60us.

The unit will begin flashing after the 1st trigger pulse as detected per timing chart below.

[Example]

　Trigger: Positive edge (The instant where the delay time)
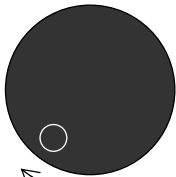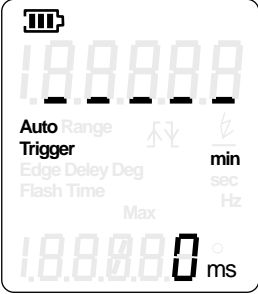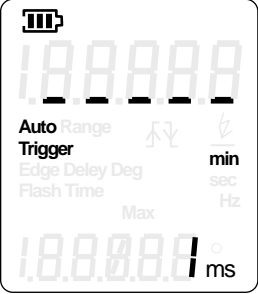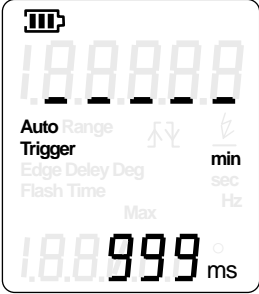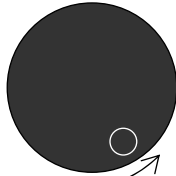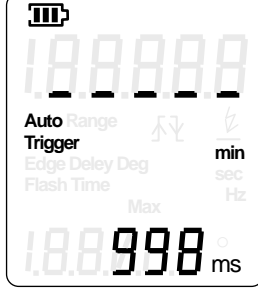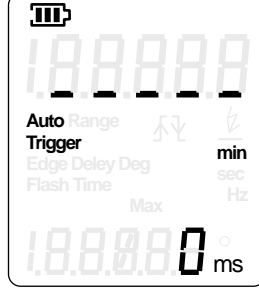
　Delay time: 10ms　　(Independent of external input frequency)
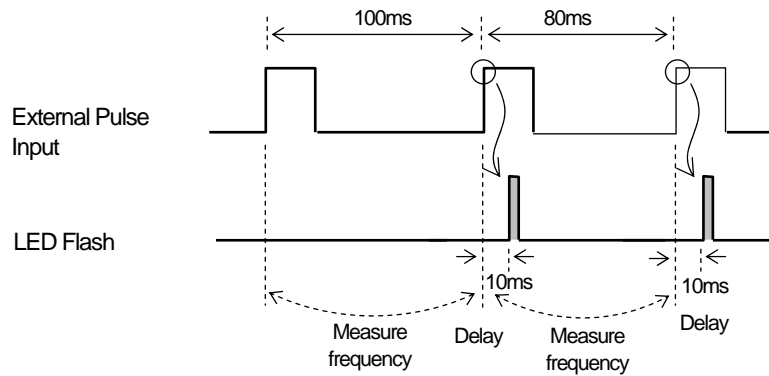
If external signal period < delay time, then the delay time value = 0.

Please note the built in 60us internal delay on top of the external signal input.

Press "PHASE+" key to select the delay time setting. Turn dial CW to increase and CCW to decrease.

Button operation	Expression

Turn clockwise

Auto	Range
Trigger	min
Edge Deley Deg	sec
Flash Time	Hz
Max	

0 ms ➡ **1** ms ➡ **999** ms

PHASE- Go to delay angle setting

Turn counter clockwise

Auto	Range
Trigger	min
Edge Deley Deg	sec
Flash Time	Hz
Max	

999 ms ➡ **998** ms ➡ **0** ms

PHASE- Go to delay angle setting

4.4.2.2 "Delay angle" setting

Set the delay angle from 0° to 360° in 1° increments.

The actual delay time is as follows:

$$\frac{\text{Delay angle setting}}{360°} \times \text{Period of External Input} + \text{approx. 60us (Built-in)}$$

While the DT-326 does not flash at the 1st trigger pulse as shown below in the timing chart.

[Example]

Trigger: Positive edge

Delay angle: 36°
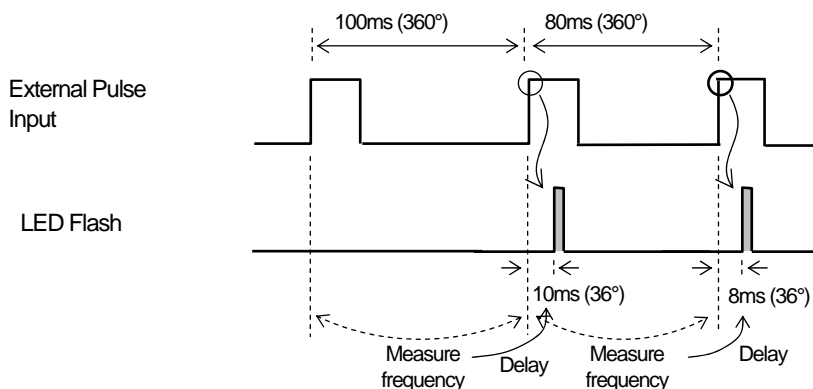
If the frequency of the external trigger input changes, the timing of the flash is inaccurate, because the timing is calculated based on the previous measured period.

If the current period of external trigger input is less than the previous period and the next trigger input occurs before the flash time, the delay angle setting is ignored and the unit flashes at delay angle = 0°.

Delay angle increases as the dial is rotated to the right. The angle settings will go to 0° when angle is past 359°.

Operation	Expression
Turn clockwise	
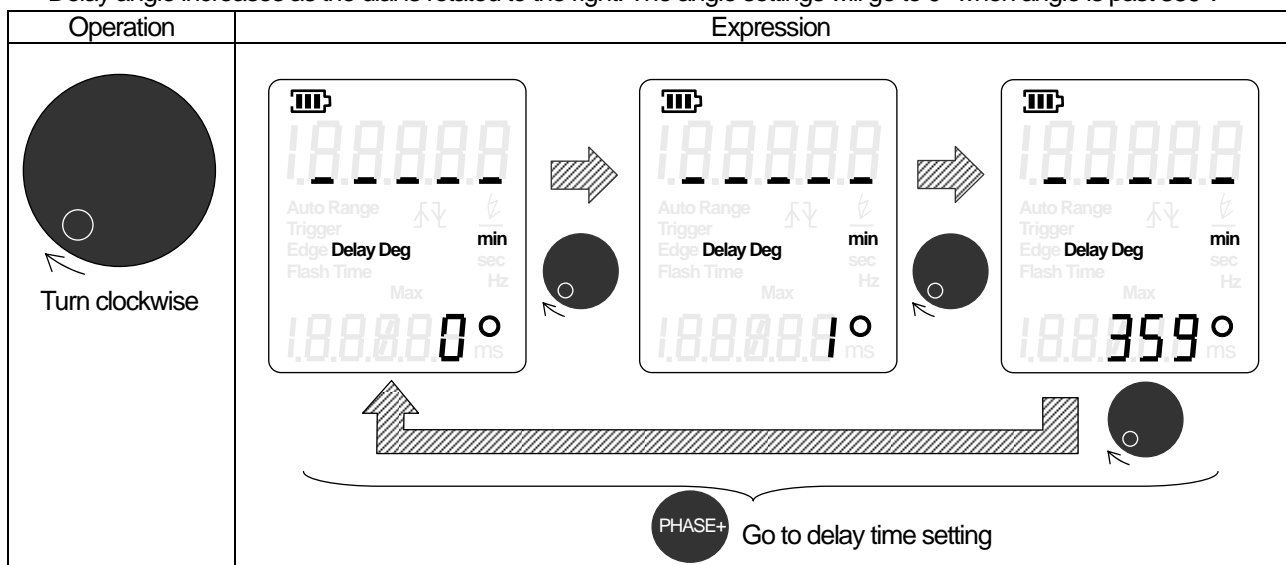
Delay Angle setting will decrease from 359° (Max) to 0° (Min) value for counter clockwise. The settings will eventually go to 0°as when angle decreases from 359°.

Turn counter clockwise	**Delay Deg** min sec Hz Max 359° ms	**Delay Deg** min sec Hz Max 358° ms	....	**Delay Deg** min sec Hz Max 0° ms

PHASE+ Go to delay time setting
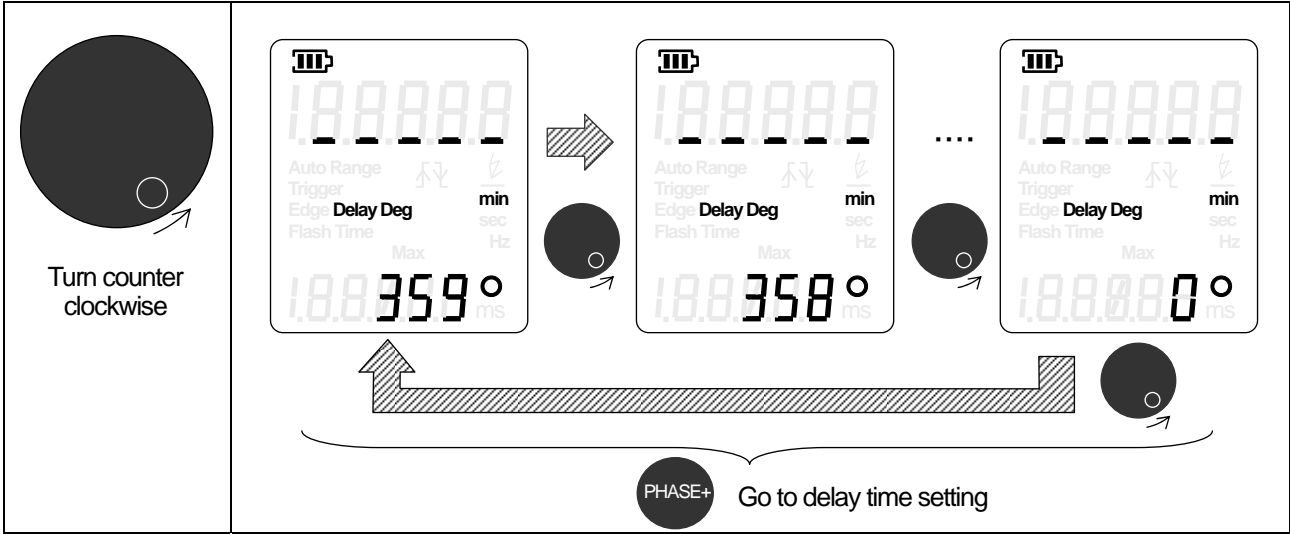
4.4.3 Units of Measure- Changing from FPM to Hz

Press and release the "SET" key to toggle between "FPM" to "Hz".

Operation	Expression		
SET Press and release	6000.0 **Auto** Range **Trigger** min sec Hz Max 0° Measuring unit "FPM"	100.000 **Auto** Range **Trigger** min sec **Hz** Max 0° Measuring unit "Hz"	6000.0 **Auto** Range **Trigger** min sec Hz Max 0° Measuring unit "FPM"
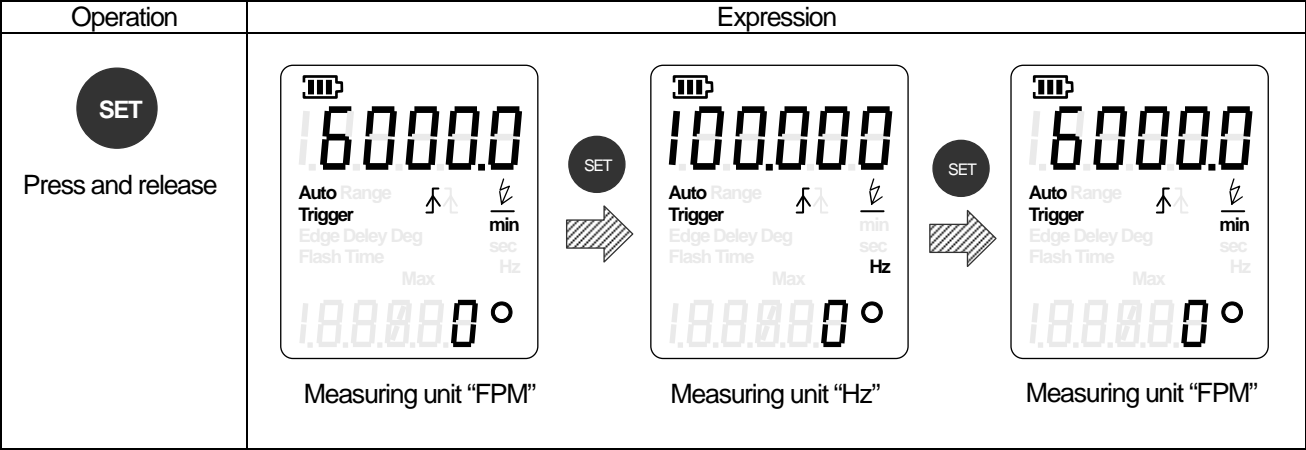
NOTE: Fraction values are rounded down.

4.4.4 ECO feature

Press and release the ECO key to reduce the brightness and conserve battery power. To return to original brightness, press and release the ECO key again.

Operation	Expression		
ECO Press and release	6000.0 **Auto** Range **Trigger** min sec Hz Max 0° Normal flashing mode	6000.0 **Auto** Range **Trigger** min sec Hz **Min** Max 0° ECO flashing mode	6000.0 **Auto** Range **Trigger** min sec Hz Max 0° Return to normal flashing mode
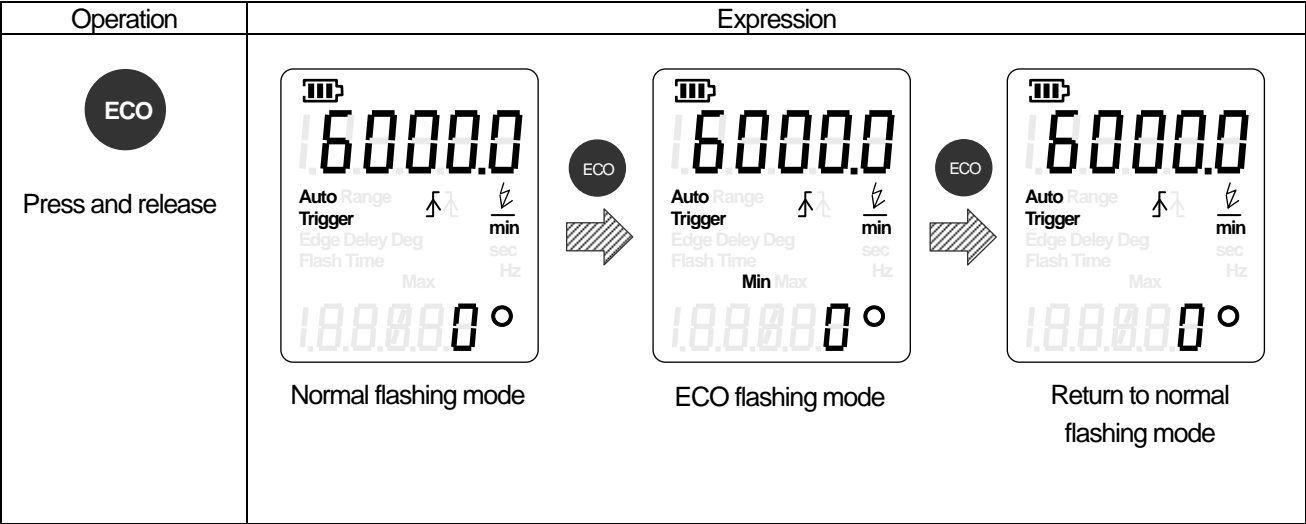
4.5 Parameter Setting Instruction

Press "MODE" until the LCD displays "P" (Parameter setting mode).

Press the "SET" key to cycle between the various parameter settings available (range, trigger edge, delay time, and LCD backlight). For more information regarding the various parameter settings, please refer to sections 4.5.2 through 4.5.4 below. Press the "MODE" key again to store the settings and return to measuring modes.

Note: "MODE" key must be pressed to store settings.

Operation	Expression
SET Press to cycle between parameters **PHASE+** **PHASE-** Press to change the selected parameter setting OR (dial) Rotate the dial to change the selected parameter setting	Measuring range setting (Press "+", "-" key or turn the dial to switch the measuring range) → Trigger edge setting (Press "+", "-" key or turn the dial to change the trigger edge setting) → Delay time setting (Use dial or PHASE keys to change settings) LCD backlight (Press "+", "-" key or turn the dial to change the backlight settings) ← Delay angle setting (use dial or PHASE keys to change settings) **MODE** Set and store parameter settings

4.5.1 Measurement range setting

The DT-326 has a selectable measuring range, which can be set in the Parameter mode setting. The range and resolution of this setting will be different for each measuring range, as indicated in the table below.

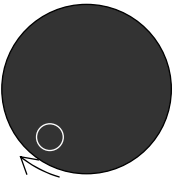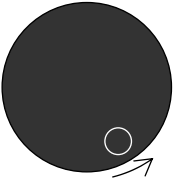| Test unit	Measuring range as Indicated in Parameter Settings	
FPM	12,000 (range 60.0 - 12,000.0)	120,000 (range 60 - 120,000)
Hz	200 (range 1.000 - 200.00)	2,000 (range 1.00 - 2000.0)

*Note that if the flash range is changed to a lower range, the current flash rate, if larger than 12,000 FPM or 200 Hz, will decrease to the maximum allowable value of the range.
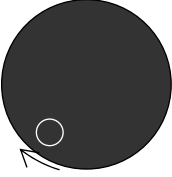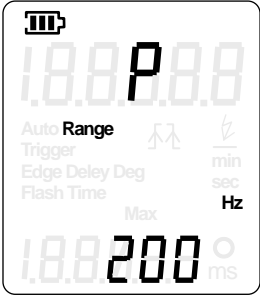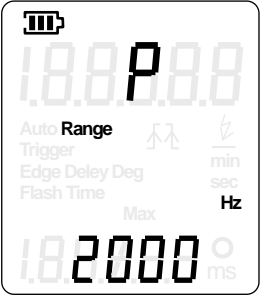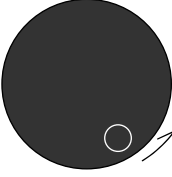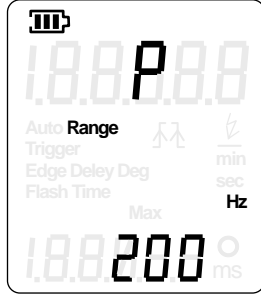
Ex: If flash rate is set to 60,000 FPM in the range of 60 – 120,000 FPM, it will automatically switch to 12,000 FPM when the flash measuring range parameter is changed to 60.0 – 12,000.0 FPM. The max value is limited if the Flashing time (frequency) setting is greater than the range in the test range switch.

To adjust the measuring range parameter, press "PHASE +" or turn the dial clockwise to set the range as "120,000 FPM" or "2000 Hz"
Press "PHASE -" or turn the dial counter clockwise to set the range as "12,000 FPM" or "200 Hz".

Operation	Expression
PHASE+ Press and release Turn clockwise	Measuring range set to "60.0 - 12,000.0 FPM" → Measuring range set to "60 - 120,000 FPM"
PHASE- Press and release Turn counter clockwise	Measuring range set to "60 - 120,000 FPM" → Measuring range set to "60.0 - 12,000.0 FPM"

Operation	Expression
PHASE+ Press and release / Turn clockwise	Auto **Range** Trigger / Edge Deley Deg / Flash Time / Max / Hz / **200** ms — Measuring range set to "1 – 200 Hz" **PHASE+** Or — Auto **Range** Trigger / Edge Deley Deg / Flash Time / Max / Hz / **2000** ms — Measuring range set to "1 – 2000 Hz"
PHASE- Press and release / Turn counter clockwise	Auto **Range** Trigger / Edge Deley Deg / Flash Time / Max / Hz / **2000** ms — Measuring range set to "1 – 2000 Hz" **PHASE-** Or — Auto **Range** Trigger / Edge Deley Deg / Flash Time / Max / Hz / **200** ms — Measuring range set to "1 – 200 Hz"

4.5.2 Trigger Edge setting (External Mode)

Select Positive or Negative edge.

Examples:

-When trigger edge setting is set to "Positive Edge", the flash will occur on the leading edge of the input pulse (when delay setting is zero).

*Delay time (based on the delay settings of parameter)
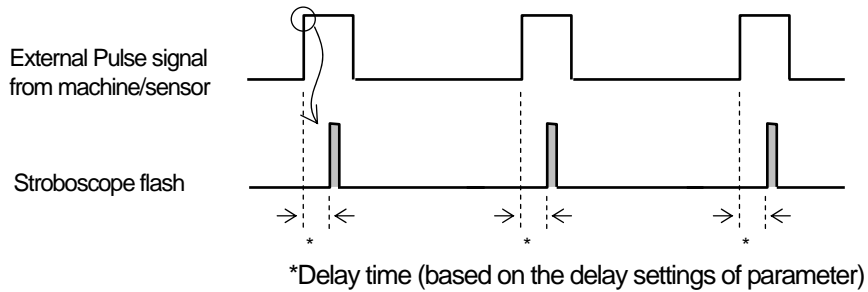
-When the trigger edge setting is set to "Negative Edge", the flash will occur on the trailing edge of the input pulse (when delay setting is zero).

:*Delay time (based on the delay settings of parameter)
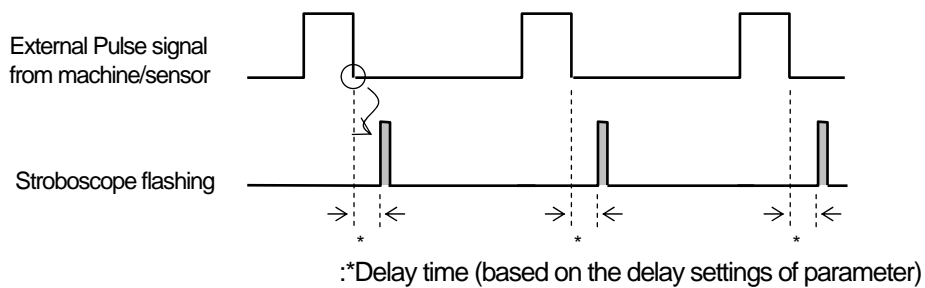
Press the "SET" key to cycle to the Trigger Edge setting parameter mode.

To set the trigger edge as "Down edge", press "PHASE -"key or turn the dial clockwise.

To set the trigger edge as "Up edge", press "PHASE +" key or turn the dial counter clockwise.

Operation	Expression
PHASE- Press and release Turn clockwise	Trigger edge set as "Positive edge" → **PHASE-** Or — Trigger edge set as "Negative edge"
PHASE+ Press and release Turn counter clockwise	Trigger edge set as "Negative edge" → **PHASE+** Or — Trigger edge set as "Positive edge"

4.5.3 Delay setting

Delay time and angle setting will allow the flash to be delayed after an external pulse is sensed by the unit.

The Parameter setting mode:
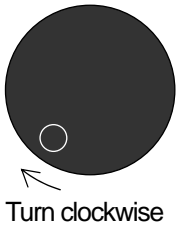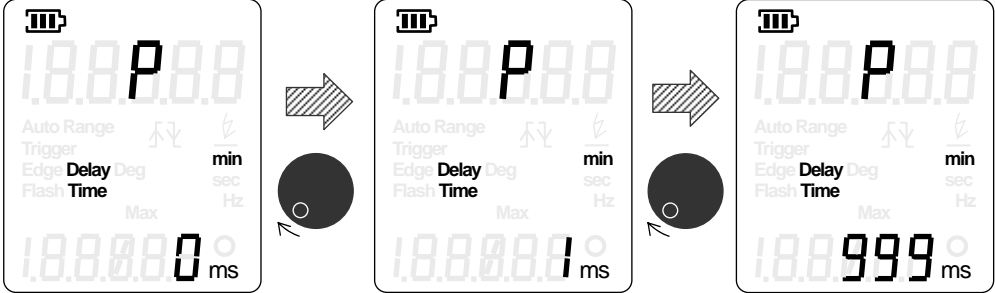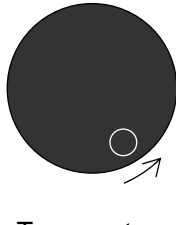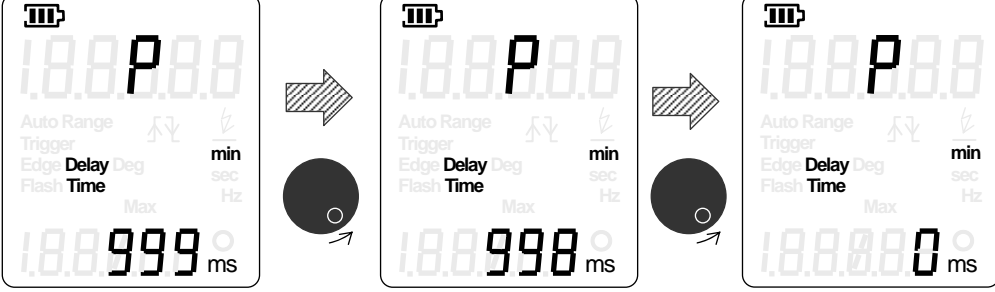
Press "PHASE +" and "PHASE -" key, to select between delay time and delay angle.

4.5.3.1 Delay time setting

Selecting Delay time from an external pulse input to LED flashing can be set in the range of 0 – 999 msec, with a resolution of 1msec.
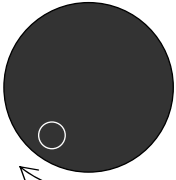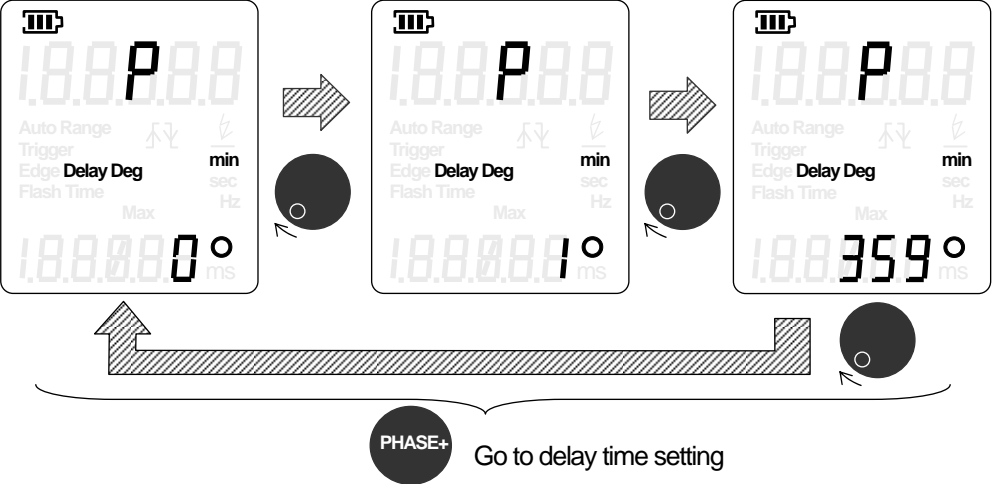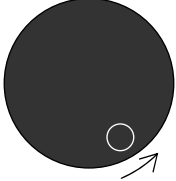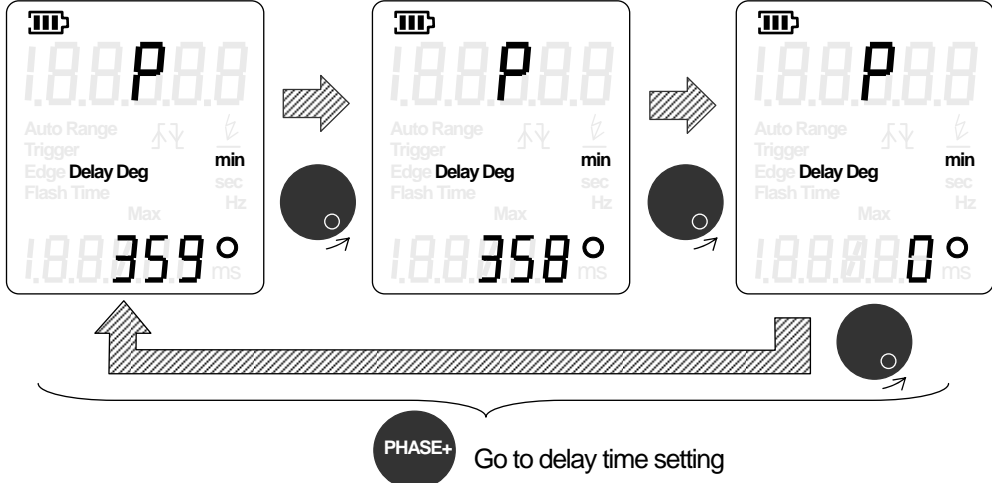
For details, please refers to "4.4.2 delay time setting"

Rotate the dial clockwise to increase delay time setting or counter clockwise to decrease the delay time.

Operation	Expression
Turn clockwise	
Turn counter clockwise	

4.5.3.2 **Delay angle setting**

The delay angle can be set from 0° to 360° by 1° increments.

Delay angle setting increases as the dial turns right, and decreases as it turns left.

Delay angle events to zero when set below 0° (min) or 360° (max).
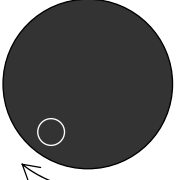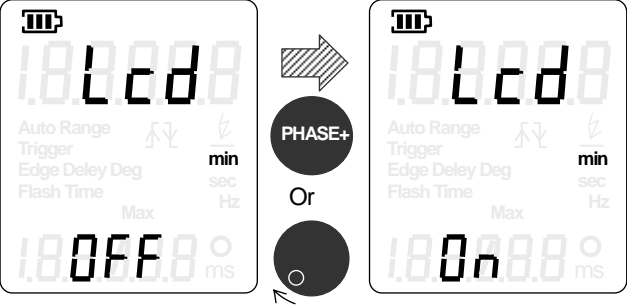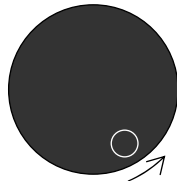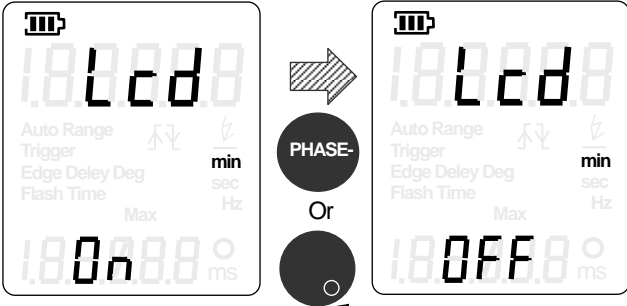
Operation	Expression
Turn clockwise	
Turn counter clockwise	

4.5.4 Back light setting

Press "SET" key in Parameter mode to enable this mode.

Turning off the backlight will conserve battery power.   For more information regarding the automatic settings of the backlight, see section 4.6.

Press "PHASE +" key to turn on the backlight. Press "PHASE -" key to turn off the backlight

Button operation	Expression
PHASE+ Press and release OR Turn clockwise	Lcd / OFF LCD backlight OFF → PHASE+ Or → Lcd / On LCD backlight ON
PHASE− Press and release OR Turn counter clockwise	Lcd / On LCD backlight ON → PHASE- Or → Lcd / OFF LCD backlight OFF

4.6 Power-saving settings

4.6.1 LED flashing auto off

The LED flashing will automatically cease after 2 minutes of no keypad or dial operation when using battery power. Flashing will resume with either a dial (rotation) movement or a keypad operation.

The auto LED shutoff is disabled in External trigger mode, while a signal is being received by the unit.

The LED flashing will automatically cease after 2 minutes of missing pulse input.

4.6.2 Auto Power off

The power automatically shut off after 5 minutes of no keypad or dial operation when in battery power.

To resume operation, press "POWER" key.

The auto Power shutoff is disabled in External trigger mode, while a signal is being received by the unit.

The power will automatically shut off after 2 minutes of missing pulse input.

4.6.3 LCD back light off

The LCD backlight will automatically shut off after 2 minutes of no keypad or dial operation when using battery power. (With LCD parameter setting is "ON")

The LCD backlight will light again with keypad or dial operation.

4.7 Connector of External input/output

4.7.1 Connector specs and pin type

Pin No	Single name	Remarks
1	+12V	+12V power supply output
2	G12	Ground power supply output
3	TRG_IN	External pulse input
4	IN_COM	Universal interface of External pulse input
5	NC	(no connection)
6	NC	(no connection)
7	OUT	External pulse output
8	OUT_COM	Universal interface of External pulse output
9	NC	(no connection)
10	FG	Ground electrode of frame work

Connector type DT-326 side: 3260-10S3 (55) [HIROSE ELECTRIC CO., LTD.]

Accessory: 3240-10P-C   [HIROSE ELECTRIC CO., LTD.]

4.7.2 External Pulse Input

The unit can be operated and controlled by an external signal, from either a sensor or a machine signal like an output from a printing press, re-winder or others. This will allow the stroboscope to flash in sync with the target object's rotational speed.

The input signal will have the following characteristics.

Input frequency: 60 - 10,000 FPM (1 – 160 Hz)

Input pulse width: over 50us

Delay angle: 0 - 359°（every 1°)

Delay time: 0 - 999ms (every 1ms)

Please connect with open collector output (below 1V (ON voltage)) or no-voltage contact output (approx. 11mA current)

[Input circuit]
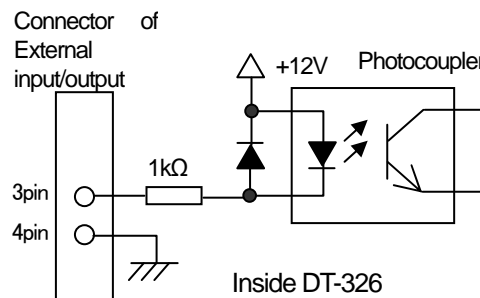
4.7.3 External pulse output

The unit will also output a signal that is related to the flash rate of the unit.   This signal can be used to control additional stroboscopes so that each flashes at the same rate or to send a pulse to data collectors.

External circuit: Open collector output, Voltage below DC30V, Current below 30mA

Output pulse width: Approx. 200us

[Output circuit]   [Output time]

28
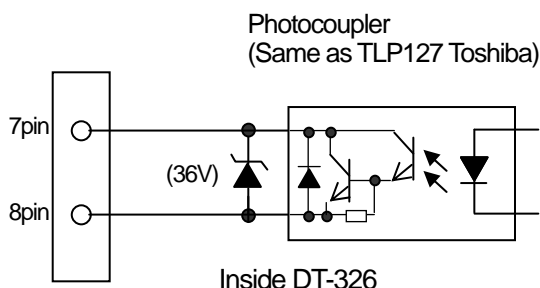
4.7.4 Option Cable- Input/ Output cable adaptor

Because the connector of the unit is not separate from input and output signal, the option cable adapter separated I/O is provided for easy connection.

5   Specifications

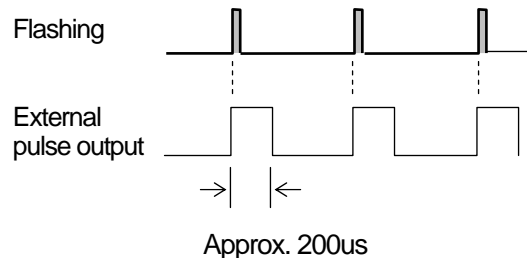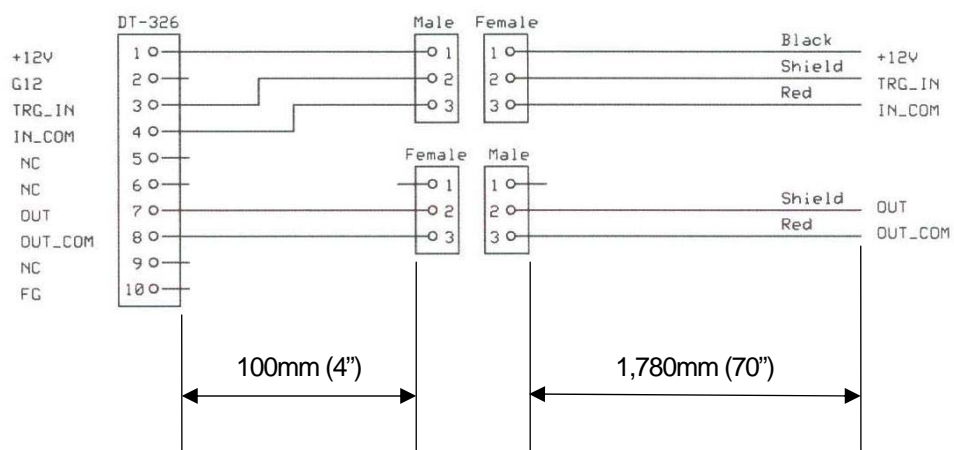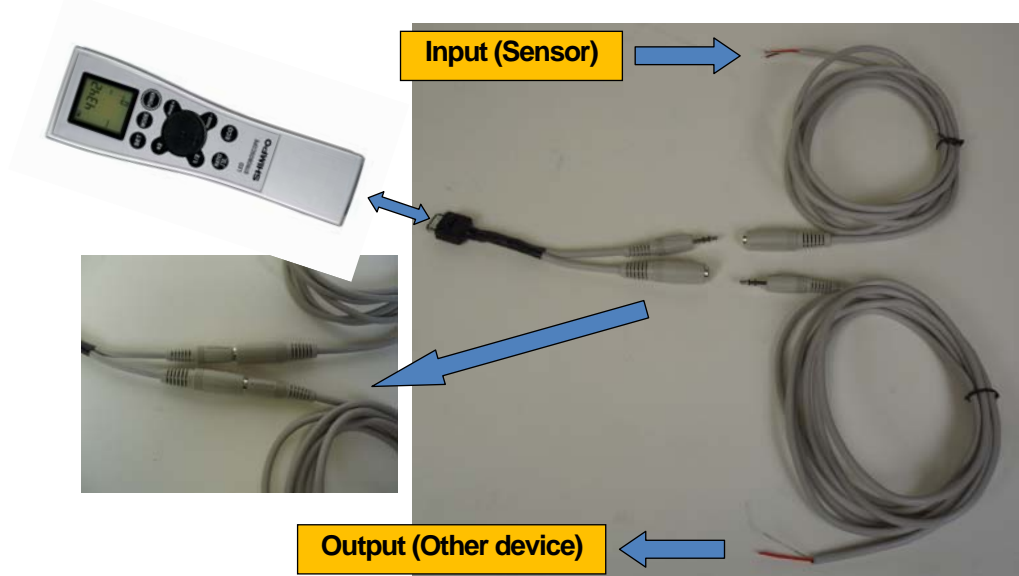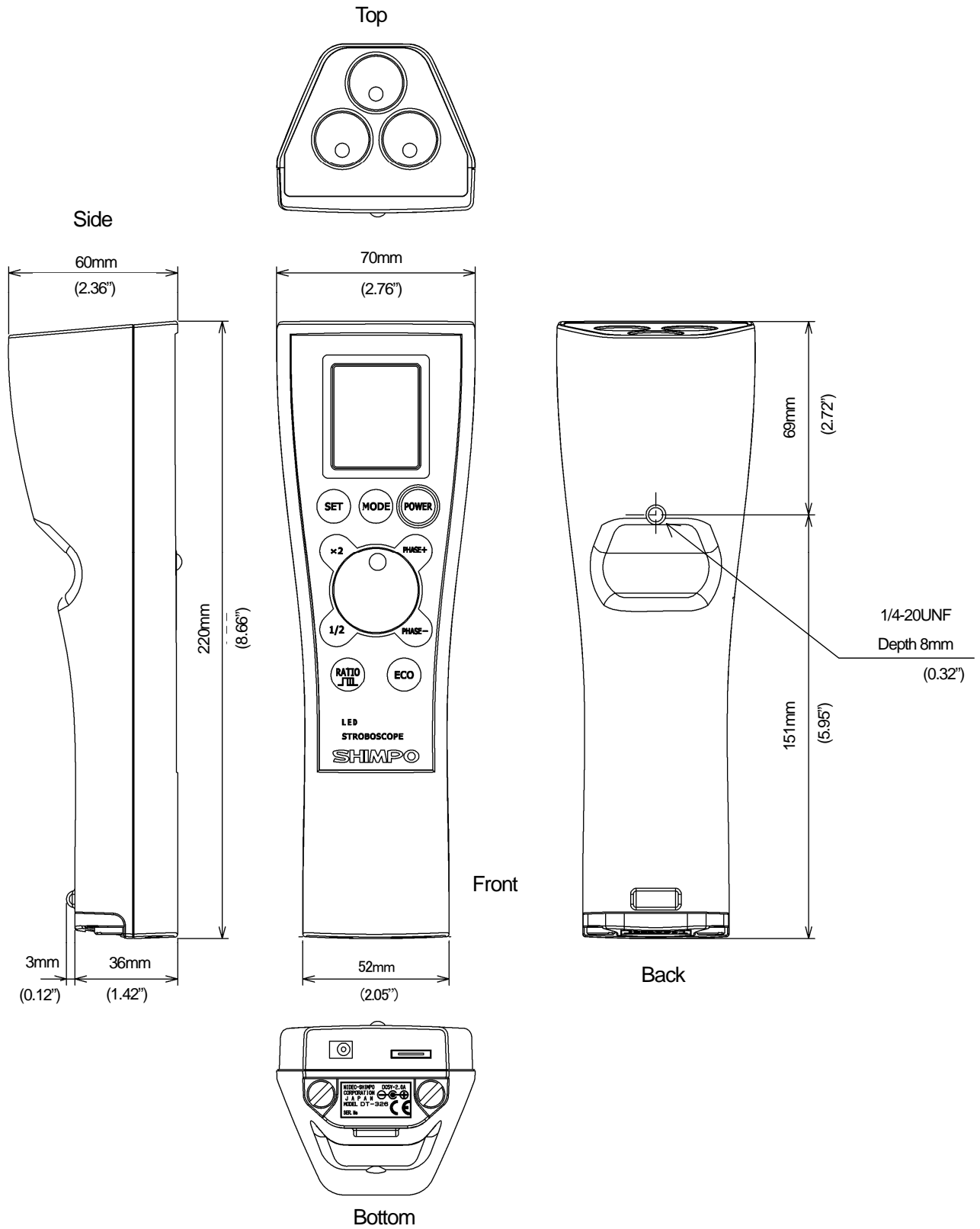| Model Number			DT-326
Units of measure			FPM (flashes per minute) or Hz (frequency)
Measuring range			1 - 2,000Hz
			60 - 120,000 FPM
Accuracy			+/-0.02% (at 73°F [23°C])
Resolution of flash rate setting in internal mode	Unit; Hz	Measuring range: 1-200 Hz	0.01Hz
		Measuring range: 1-2000 Hz	0.1Hz
	Unit; FPM	Measuring range: 60 - 12,000 FPM	60.0 - 3,000.0 : 0.1 FPM 3,000.2 - 6,000.0 : 0.2 FPM 6,000.5 - 12,000.0 : 0.5 FPM
		Measuring range: 60 - 120,000 FPM	60 - 30,000 : 1 FPM 30,002 - 60,000 : 2 FPM 60,005 - 100,000 : 5 FPM 100,010 - 120,000 : 10 FPM
Flashing time (Duty)			0.1° - 2.5°/360° setting can be changed by 0.1° increments
Mode	Internal	Set and change flashing rate	Change flash rate by using dial, or "×2" and "1/2" key
		Phase Shift	Forward/backward by 3° increments
		Unit change	"FPM" or "Hz"
	External trigger	Flash rate (Input frequency)	1 – 166 Hz 60 – 10,000 FPM
		Input pulse width	More than 50 us
		Unit change	"FPM" or "Hz
	Parameter setting	Measuring range	1 - 2000Hz (60 - 120,000 FPM) range or 1 - 200Hz (60 - 12,000 FPM)
		Trigger Edge	Positive or Negative edge
		Delay time/angle	Delayed time : 0 - 999ms *1 Delayed angle : 0 - 359° *1
		Back light	Selectable- ON or OFF
Power Saving Function	Flash (Auto off)		Stop flashing automatically after 2 min.
	Back light (Auto off)		Turn off after 2 minutes of inactivity.
	Power (Auto off)		Power off unit after approx. 5 minutes in stand-by mode
Input/Output (I/F)	External Trigger Input		Photo Coupler Input, Current 12mA (approx.)
	External Trigger output		Photo Coupler (Open collector) Output Voltage: DC30V or less, Current: 30mA or less, Pulse width: approx.200us
	Sensor Power Supply		DC12V/max.40mA

*1   Built-in delay time = 60us

Display		LCD	6 digits (main), 5 digits (sub)
			"LOW BAT", "Setting item", "Unit"
		Back light	Yellow green LED
Flashing part		Flash Source	Super High Brightness White LED 5500K (typ)
		Life time	More than 1500 hours (approx. 5×10^8 times at 6000 FPM)
Luminance (typ value) *2	Normal mode	20cm | 6,000FPM	About 1300 lx
		50cm | 6,000FPM	About 200 lx
	ECO mode	20cm | 6,000FPM	About 400 lx
		50cm | 6,000FPM	About 100 lx
Power supply		Battery	Alkaline AA battery (1.5V×4pcs) *3
		AC adapter	DC5V / 2.0A
		Charge function	None
		Continuous Flashing *2	Approx. 20 minutes (Flashing with AA battery in normal mode) Approx. 80 minutes (Flashing with AA battery in ECO mode)
Temperature Range			32 - 95°F [0 - 35°C]
Operating humidity limits			35 – 38 % RH
Use Environment			No dust, No corrosive gas
Resistance of Environment			No water-proof/explosion protection and non-RoHS
Standards			CE
Weight			About 500g (include batteries)
Housing Material			Aluminum
Accessories			AC adapter Connection port for External output Carrying case, Alkaline AA battery (1.5V×4pcs)
Option Accessories			Input/ Output cable adaptor

*2. Value of the new alkaline battery

*3. Ni-MH battery (1.2V X 4 pcs) is available.

6   Dimensions

Top

Side

60mm
(2.36")

70mm
(2.76")

220mm
(8.66")

69mm
(2.72")

SET   MODE   POWER

×2   PHASE+

1/2   PHASE−

RATIO   ECO

LED
STROBOSCOPE

SHIMPO

1/4-20UNF
Depth 8mm
(0.32")

151mm
(5.95")

3mm
(0.12")

36mm
(1.42")

52mm
(2.05")

Front

Back

NIDEC-SHIMPO   DC5V 2.0A
CORPORATION
JAPAN
MODEL DT-326
SER No

Bottom

NIDEC DRIVE TECHNOLOGY CORPORATION

Nidec Shimpo Corporation change its company name to Nidec Drive Technology Corporation on April 1, 2023.

NIDEC-SHIMPO CORPORATION