



This manual covers the model shown below

| NA Model | EU Model | Voltage | Description |
|----------|----------|----------|------------------------------|
| 88861027 | N/A | 100~240V | Wave Motion Shaker US plug |
| 88861028 | 15524070 | 100~240V | Wave Motion Shaker Intl plug |



Before using this product, read this entire operation manual carefully. Users should follow all of the operational guidelines contained in this manual and take all necessary safety precautions while using this product. Failure to follow these guidelines could result in potentially irreparable bodily harm and/or property damage.

Caution all internal adjustments and maintenance must be performed by qualified service personnel.

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Section 1 Inspection and Installation


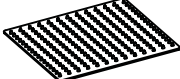







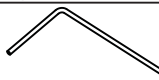

1. Inspect package and contents upon receipt of the instruments. If the package is severely damaged or if there are any missing pieces, please contact the manufacturer immediately.

2. Unpack the instrument, ensure all parts of the instrument and accessories are not missing or damaged. Make sure to take out
- all the components before discarding the packing. If there are any missing or damaged pieces, please contact the manufacturer immediately.

3. Place the instrument on a level and firm surface to avoid vibration and noise.

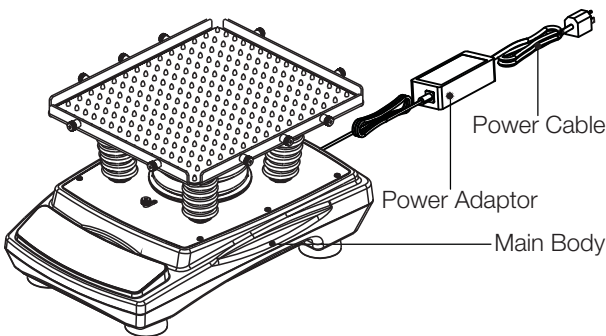
1.1 Packing List

Table -1 Packing List

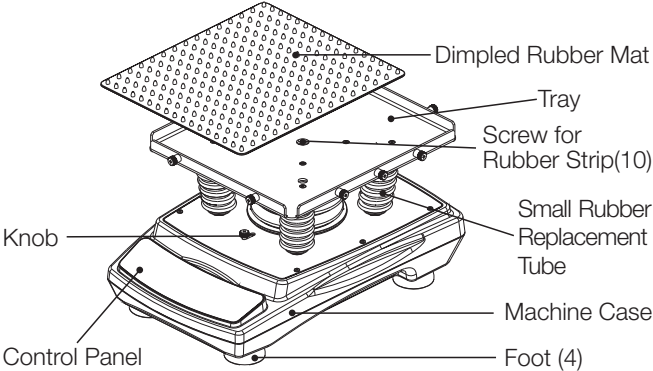
| Description | NA Cat. No. | NA/EU Cat. No. | Figure |
|---------------------------------|---------------------|------------------------------------|---|
| Wave Motion Shaker | 88861027 US plug | 88861028 /15524070 Intl plug |  |
| *Dimpled Rubber Mat | 1 | 1 |  |
| General Power Adaptor | 1 | 1 |  |
| US Plug | 1 | N/A |  |
| CN Plug | N/A | 1 |  |
| EU Plug | N/A | 1 |  |
| UK Plug | N/A | 1 |  |
| *Screw for Rubber Strip | 10 | 10 |  |
| Rubber Strips | 6 | 6 |  |
| Allen Wrench | 1 | 1 |  |
| **Small Rubber Replacement Tube | 2 | 2 |  |

*Has been installed on the instrument
**For replacement purpose

1.2 Connections



1.3 Structure Diagram



Section 2 Overview

2.1 Specifications

Category Number

| Description | NA Cat. No. | NA/EU Cat. No. |
|--------------------|---------------------|------------------------------------|
| Wave Motion Shaker | 88861027 US plug | 88861028 /15524070 Intl plug |

Rotation Speed

| | |
|------------------------------------|--------------------|
| Speed Range | 5~120rpm |
| Display Accuracy | 1rpm |
| Speed Accuracy | ± 1rpm |
| Operation Mode | 3D Circular Motion |
| Carousel Angle Range | 0~12° Adjustable |
| Maximum Load (Centered on tray) | 9.8 kg (22lbs) |

Note: Maximum speed may vary with heavy or unbalanced loads.

Time

| | |
|------------------|---------------|
| Timing Range | 1min~99h59min |
| Display | LED |
| Display Accuracy | 1 min |

Size

| | |
|----------------------|----------------------------------|
| Overall Dimensions | 415×293×216mm(16.3×11.5×8.5in.) |
| Tray Dimensions | 316×276×19mm(12.4×10.9×0.7in.) |
| Packaging Dimensions | 536×501×346mm(21.1×19.7×13.6in.) |

Weight

| | |
|--------------|---------------|
| Net Weight | 14Kg(30.8lbs) |
| Gross Weight | 16Kg(35.2lbs) |

Power Supply

| | |
|-------------|-----------------------------|
| Requirement | AC100-240V, 50Hz/60Hz, 0.2A |
|-------------|-----------------------------|

Others

| | |
|---------------|-----------------------------|
| Certification | ROHS, WEEE, cCSAus, CE Mark |
| Noise Level | ≤55dB with no load |

2.2 Environmental Conditions

Application Environmental Conditions: indoor use

| | |
|---------------------|--|
| Temperature | 5 to 40°C (41 to 104°F) |
| Voltage Fluctuation | ± 10% of the nominal voltage |
| Altitude | ≤2,000 m |
| Humidity | ≤31°C, Relative Humidity ≤80%, non-condensing |

Storage Environmental Conditions

| | |
|-------------|----------------------------|
| Temperature | 0 to 60°C (36 to 124 °F) |
| Humidity | 20% to 90%, non-condensing |

2.3 Safety Instructions

Please read the entire instruction manual before operating the Wave Motion Shaker.



WARNING DO NOT use the Wave Motion Shaker in a hazardous atmosphere or with hazardous materials for which the unit was not designed. Also, the user should be aware that the protection provided by the equipment may be impaired if accessories used are not provided or recommended by the manufacturer, or are used in a manner not specified by the manufacturer.

CAUTION ! To avoid electrical shock, completely cut off power to the unit by disconnecting the power cord from the unit or unplug from the wall outlet. Disconnect unit from the power supply prior to maintenance and service. Any spills should be removed promptly. Bio hazard spills should be cleaned using approved liquid promptly. Solvent spills are a fire hazard. Stop the unit immediately, and DO NOT operate until clean up is complete and vapors have dissipated.

DO NOT immerse the unit for cleaning.

DO NOT operate the unit if it shows signs of electrical or mechanical damage.

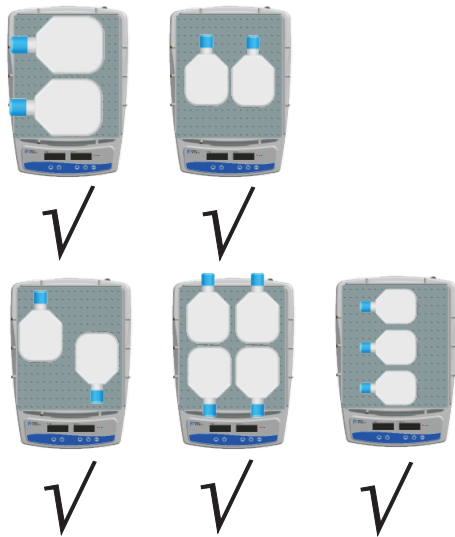
Position of Loads

- Place the loads in the recommended positions below:
- 1. Place load at the center of the tray
 - 2. Place loads symmetrically around the center of the tray
 - 3. Make sure to use rubber strips to fasten containers onto the tray

Centered placement



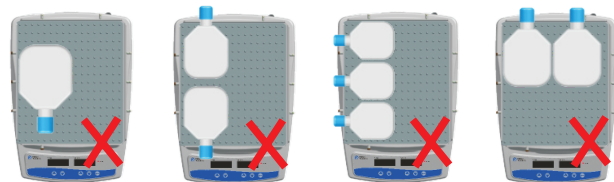
Symmetrical placement



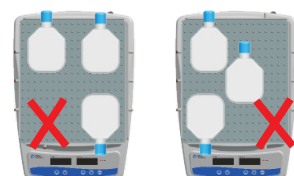
Asymmetrical placement
Cornered placement




Sided placement



Other placement



 Please use rubber strips to fasten containers onto the tray when using this instrument to avoid accidents.

2.4 Relationships between Speed and Load

Tilt Angle 0°

| Load Weight (kg) | Placement of Load | Tilt Angle | Rotation Speed (rpm) |
|------------------|-------------------|------------|----------------------|
| 9.8 | Centered | 0° | 120 |
| 9.8 | Symmetrical | 0° | 120 |

Tilt Angle 12°

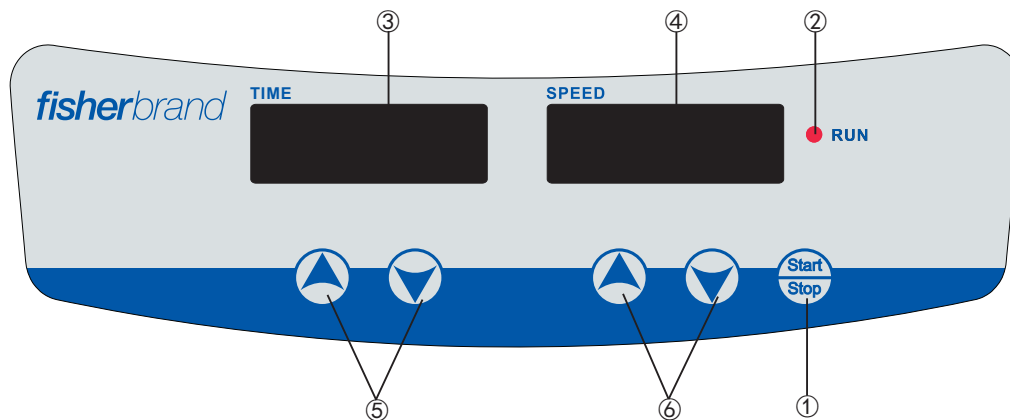
| Load Weight (kg) | Placement of Load | Tilt Angle | Rotation Speed (rpm) |
|------------------|-------------------|------------|----------------------|
| 9.8 | Centered | 12° | 80 |
| 5 | Centered | 12° | 100 |
| 1 | Centered | 12° | 120 |
| 9.8 | Symmetrical | 12° | 80 |
| 5 | Symmetrical | 12° | 100 |
| 1 | Symmetrical | 12° | 120 |

Warning:
The actual maximum rotation speed of the instrument may be affected if the cell culture flask is placed at the corner or one side of the tray. If such placement is needed, please make sure to gradually increase the speed.

Section 3 Operation

This chapter covers the control panel and its operation.

3.1 Control Panel



The front panel of the Wave Motion Shaker contains all the controls needed to operate the unit.

1. Start/Stop button: Start or stop the instrument.
2. RUN indicator light: The light is on when the instrument is running and off when the instrument is in standby.
3. TIME display window: The window shows cumulative time (in continuous mode) or remaining time (in timer mode). The range of time displayed is 0 to 99 hours and 59 minutes. The accuracy is 1 minute.
4. SPEED display window: The window shows set speed (when the instrument is in standby) or current speed (when the instrument is running).
5. Set Time Buttons: UP/DOWN Arrow buttons are used to increase/decrease the set time of the instrument.
6. Set Speed Buttons: UP/DOWN Arrow buttons are used to increase/ decrease the set speed of the instrument.

window. When the number shown on the display window starts flashing, press “▲” or “▼” arrow button to increase or decrease the time value. Release the button when the time shown on the display window reaches the set value. The time setting is finished after the number shown on the display window has flashed twice.

Speed Settings

Press the “▲” or “▼” arrow button below the SPEED display window. When the number shown on the display window starts flashing, press “▲” or “▼” arrow button to increase or decrease the speed value. Release the button when the speed shown on the display window reaches the set value. The speed setting is finished after the number shown on the display window has flashed twice.

Note: press the “▲” or “▼” arrow button for a longer time to accelerate the setting.

3.2 Installation

1. Connect all the components according to the figures shown on page 4 of this manual. Use grounded power outlet.
2. Press down the power switch on the back right side of the instrument and put it to the “I” state and then the instrument is in standby.

3.3 Settings

Time Settings

1. Continuous mode

Press the “▲” or “▼” arrow button below the TIME display window. When the number shown on the display window starts flashing, press “▼” arrow button to decrease the time to 00:00 and then release the button. The time setting is finished after the number shown on the display window has flashed twice.

2. Timer mode

Press the “▲” or “▼” arrow button below the TIME display

Run and Stop

1. Continuous Mode

Press “Start/Stop” button and the instrument will start running with the specified settings and the RUN indicator light will be on. The TIME display window will show the cumulative time and the SPEED display window will show the current speed. Press “Start/Stop” button again and the instrument will slow down until it stops. The instrument will then be in standby and the two display windows will show the set values.

2. Timer Mode

Press “Start/Stop” button and the instrument will start running with the specified settings and the RUN indicator light will be on. The TIME display window will show the remaining time and the SPEED display window will show the current speed. Press “Start/Stop” button again and the instrument will slow down until it stops. The instrument will then be in standby and the two display windows will show the set values.

Note:

To ensure shaking operation smooth and steady, it may take 1 minute for the microprocessor control system to accelerate the tray to the set speed.

Finish Operation

After the operation is finished, press the power switch at the back right side the instrument and put it into the "O" state. Unplug the instrument and store the instrument according to the storage guide.

Alarm Instructions

The instrument will stop running in 2 minutes and alarm if the normal operating is obstructed or the instrument is malfunctioning.

Power Recovery

If the power supply is cut off suddenly while the instrument is in operation, the unit will automatically run at the previously set parameter upon power restoration. The display window will flash. Press any button to stop flashing.

Warning:

1. The instrument should be unloaded and stopped at the specified position when adjusting the angle. It is not allowed to adjust the angle at other positions.
2. The instrument can be started only when the knob is at the "Run" position after the angle adjustment. Otherwise the instrument may be damaged.

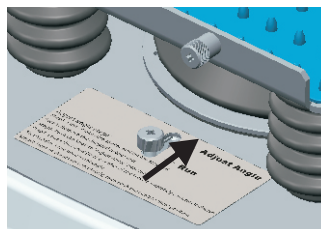


Figure 1

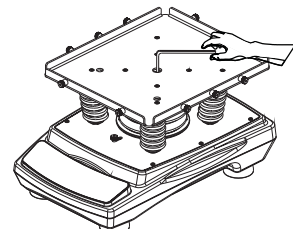


Figure 2

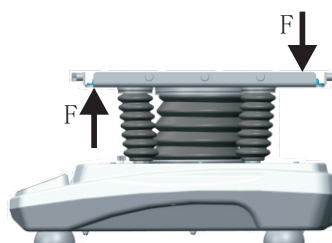


Figure 3

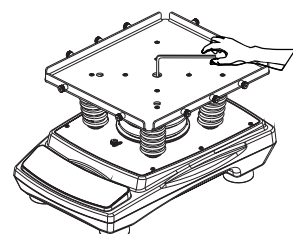


Figure 4

3.4 Tilt Angle Adjustment**Operation Steps**

1. Make sure the instrument is not running while adjusting the tilt angle. Press the Stop button to stop the instrument if it is in running.
 2. Push the knob on the cover plate from "Run" to "Adjust Angle" position as shown in figure 1.
 3. Take off the dimpled rubber mat and put it aside.
 4. Hold the tray with one hand and unscrew the inner hexagon screw at the center of the tray with the angle adjustment wrench to adjust the angle of the tray with the other hand, as shown in figure 2.
 5. Apply upward force at the front of the tray and downward force at the back of the tray to adjust the tray to the desired angle, as shown in figure 3.
 6. Hold the tray with one hand and tighten the inner hexagon screw with the allen wrench at the center of the tray until it's fastened, as shown in figure 4.
 7. Push the knob on the cover plate from "Adjust Angle" to "Run" position as shown in figure 5.
 8. Put on the dimpled rubber mat and complete the angle adjustment, as shown in figure 6.
 9. Follow steps on Section 3 to operate the equipment.
- Now you can start using this Wave Motion Shaker.

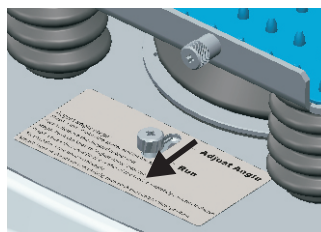


Figure 5

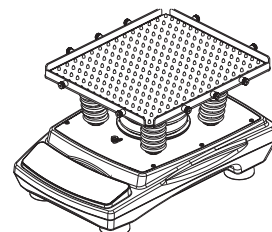
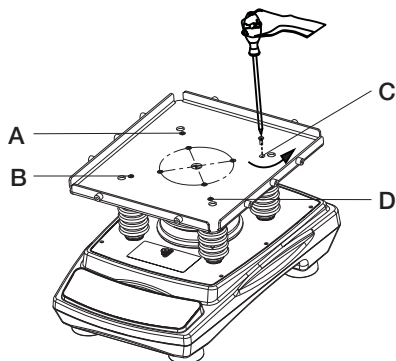


Figure 6

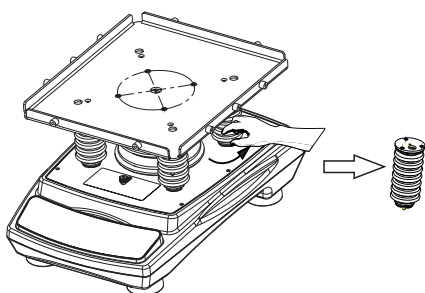
3.5 Replace The Rubber Tube

After prolonged use, the small rubber tubes may be damaged. Please follow the steps below to replace these small rubber tubes.

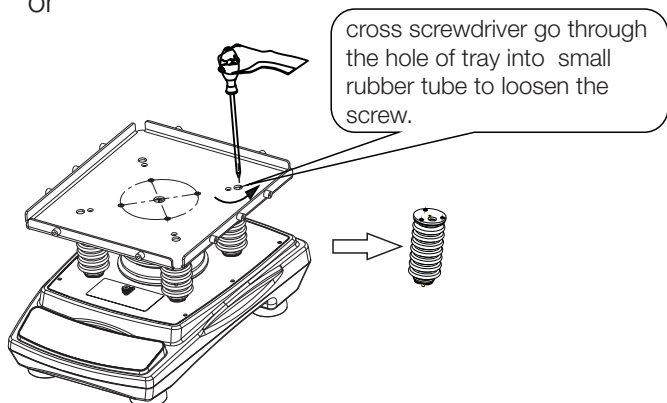
1. Remove the dimpled rubber mat, and then loosen the screws (located at A, B, C, D) of tray with a cross screwdriver.



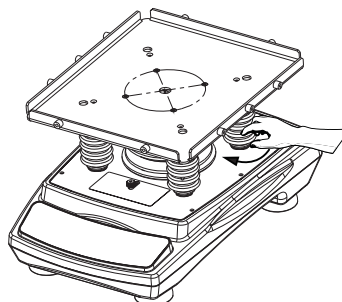
2. Hold the bottom of the small rubber tube to loosen it, or to loosen the screw in the small rubber tube with a cross screwdriver.



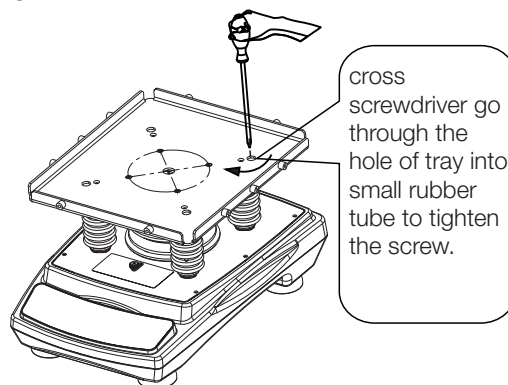
or



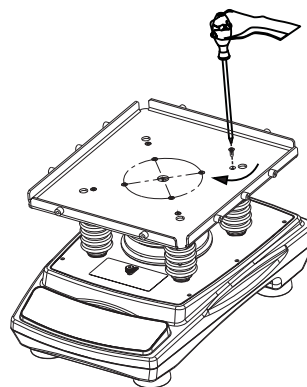
3. Place the new small rubber tube in place and tighten it just with hand or tighten the screw in the small rubber tube with a cross screwdriver.



or



4. Tighten the screws of the tray and put back the dimpled rubber mat onto the tray.



Section 4 Safety Tips and Maintenance

Safety Tips

1. Use independent power supply.
2. Check if the local power supply voltage is suitable for use.
3. Do not drag the power supply cable when unplugging.
4. Do not use non-specified power cable or damage cable.
5. Service should only be performed by a qualified professional.
6. The power supply must be unplugged under the following situations:
 - a. When the unit is moved
 - b. When the electrical cabinet or the moving component is opened
 - c. When the equipment is malfunctioning
 - d. When the equipment is not in use

Maintenance

Instrument case and tray surface can be cleaned with cloth with mild detergent and water.

Surface of the dimpled rubber mat can be cleaned with mild detergent or water and then wiped with clean cloth.

Warning: Avoid dripping detergent or water into the inside of the instrument during cleaning.

Clean Spill

If accidental spillage of liquids caused by mishandling or contained breakage occurs on the surface of the instrument, please shut down the instrument and clean up the liquid immediately.

If the liquid has already spilled into the unit, cut off the power supply first and immediately clean up the liquid at the surface of the instrument. Place the instrument in a ventilated and dry environment for 24 hours before reuse. If the instrument is not functioning after drying for 24 hours, please contact the manufacturer.

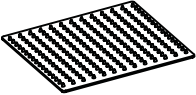

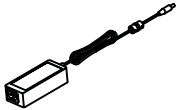
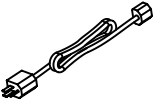
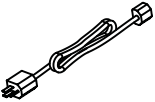
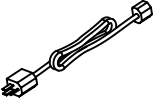
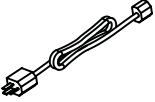
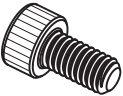


Warning: Disassembling/Assembling without a qualified professional's guidance may cause malfunctioning of the instrument.

Section 5 Troubleshooting

Please refer to the following table to troubleshoot if any malfunction occurs. If the problem still exists, contact your local sales representative.

| Error | Cause | Solution |
|---|---|--|
| Cannot start machine, LED display window off | Power disconnected | Connect the power |
| | Power switch off | Turn power switch on |
| | Power adaptor failure | Replace power adaptor |
| No shaking of the tray | Over-weighted or unbalanced load | Adjust the weight and position of load, decrease rotation speed |
| | Push the knob to "Adjust Angle" position | Push the knob to "Run" position |
| | Electrical malfunction | Contact Fisher Scientific |
| | Mechanical malfunction | Contact Fisher Scientific |
| Loud noise | Platform shaking | Place Instrument on a firm surface |
| | Tray loose | Fasten screws |
| | Over-weighted or unbalanced load | Adjust the weight and position of load, decrease rotation speed |
| Other | Keep record for maintenance | |

Section 6 Optional Accessories/Spare Parts

| Description | NA Cat. No. | EU Cat. No. | Dimensions | Max. Qty | Figure |
|--|-------------|-------------|----------------------|----------|---|
| Dimpled Rubber Mat (Spare Part) | 88861198 | 15594130 | 298×258mm | 1 |  |
| Rubber Strips (Spare Part) | 88861178 | 15594120 | 180×7mm (6pcs/pack) | 5 |  |
| General Power Adaptor (Spare Part) | 88861154 | 15554120 | AC 100~240V, 50/60HZ | 1 |  |
| Power Cable US Plug (Spare Part) | 88861155 | N/A | 125VAC, 10A, 1.8m | 1 |  |
| Power Cable CN Plug (Spare Part) | 88861156 | N/A | 250VAC, 10A, 1.8m | 1 |  |
| Power Cable EU Plug (Spare Part) | 88861157 | 15564120 | 250VAC, 16A, 1.8m | 1 |  |
| Power Cable UK Plug (Spare Part) | 88861158 | 15564120 | 250VAC, 13A, 1.8m | 1 |  |
| Screw for Rubber Strip (Spare Part) | 88861199 | 15504140 | M4×8 (8pcs/pack) | 10 |  |
| Small Rubber Replacement Tube (Spare Part) | 88861212 | N/A | Φ44×108 | 4 |  |
| Rubber Mat | 88861200 | 15514140 | 298×258×5mm | 1 |  |

Section 7 Warranty

When used in laboratory conditions and according to these operation instructions and maintenance, this product is warranted for 24 months against defective materials or workmanship. The 24 month warranty period begins from the delivery date of this product.

For product quality or performance issues, contact Fisher Scientific Customer Service.

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