

# 12.5 mm Modular High Torque Panel Potentiometer


**RoHS**  
COMPLIANT

## FEATURES

- Keep the setting under high mechanical constraints (vibrations, shocks, ...)
- High torque (8 Ncm) with smooth feeling during all potentiometer life
- Torque stability under high environmental constraints
- 12.5 mm square single turn panel control with 6.35 mm shaft diameters
- Custom designs upon request
- Compact, versatile, modular, and robust
- Tests according to CECC 41000 or IEC 60393-1
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

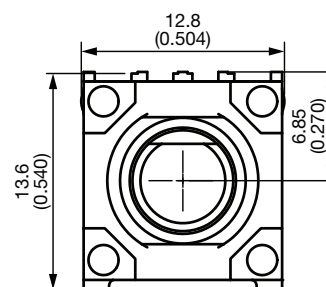
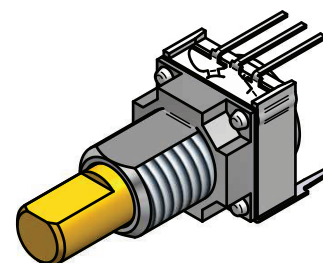
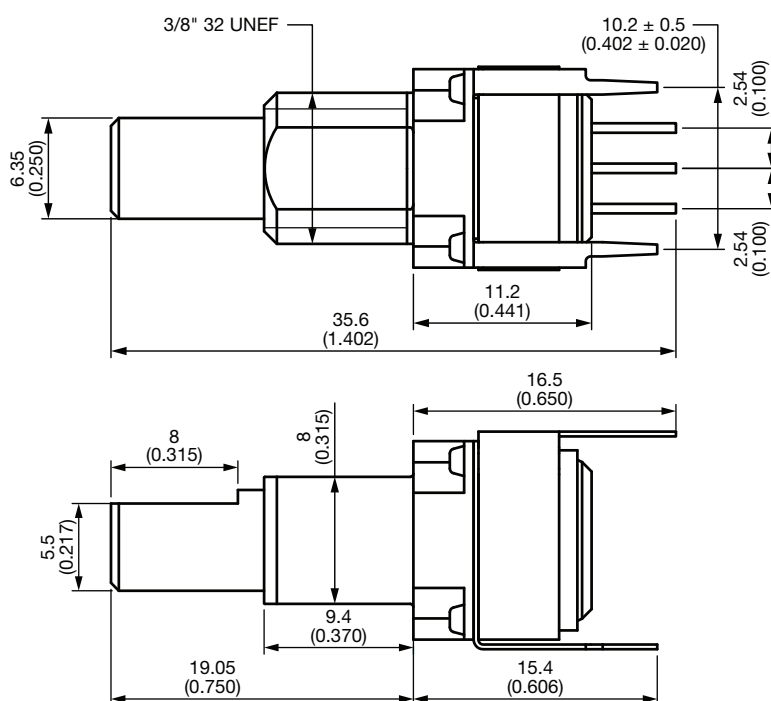
## LINKS TO ADDITIONAL RESOURCES



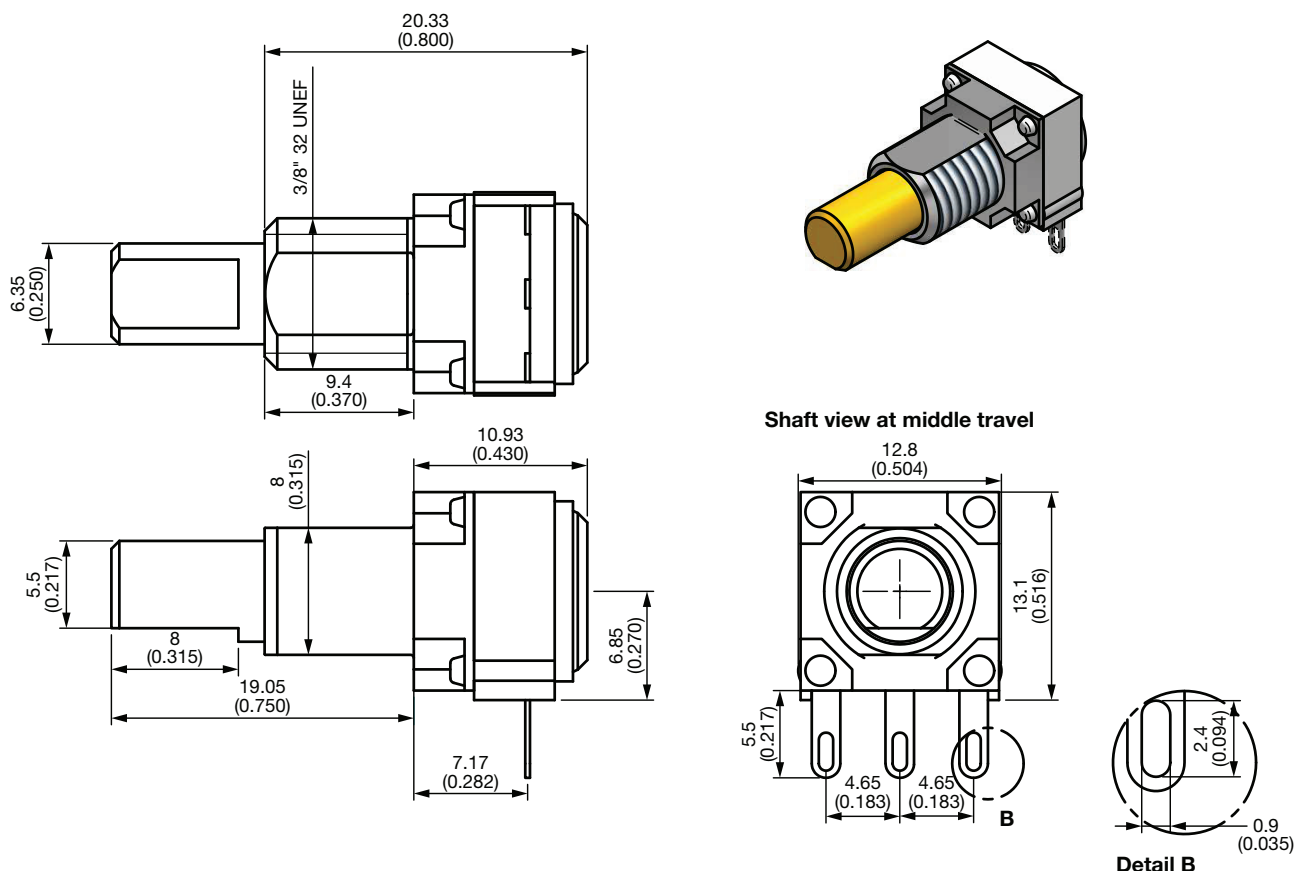
## QUICK REFERENCE DATA

|                         |                 |
|-------------------------|-----------------|
| Multiple module         | Up to 7 modules |
| Switch module           | Yes             |
| Detent module           | n/a             |
| Special electrical laws | A: linear       |
| Sealing level           | IP 64           |
| Lifespan                | 50K cycles      |

## CONFIGURATION EXAMPLE - Dimensions in millimeters (inches) $\pm 0.5$ mm ( $\pm 0.02$ " )

**EXAMPLE: P11H1F0GHFW10102KA**

**Shaft view at middle travel**

**CONFIGURATION EXAMPLE** - Dimensions in millimeters (inches)  $\pm 0.5$  mm ( $\pm 0.02$ ")

**EXAMPLE: P11H1F0GHFY00102KA**

**CUSTOM CAPABILITIES**

P11H model can be fully customized:

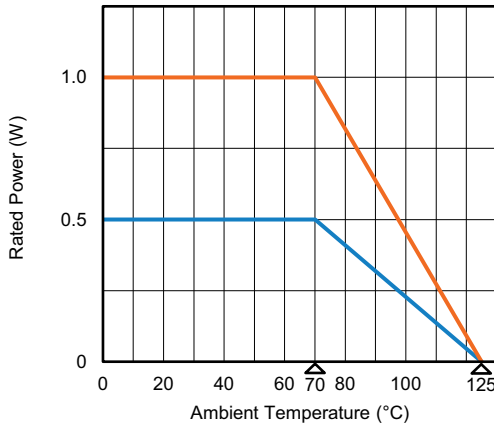
- Custom shafts
- Switch option
- Connector and wire
- Special leads
- Special taper
- One to 7 modules
- ...

When special shafts are required (special shaft lengths, diameter etc.) a drawing is required.

Hardware supplied in separate bags.



## GENERAL SPECIFICATIONS

| ELECTRICAL (initial)                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resistive element                      | Cermet element                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Electrical travel                      | $270^\circ \pm 10^\circ$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Resistance range <sup>(1)</sup>        | 1 k $\Omega$ , 4.7 k $\Omega$ , 10 k $\Omega$ , 47 k $\Omega$ , 100 k $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Tolerance                              | $\pm 10\%$ , $\pm 20\%$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Taper                                  | Linear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Power rating at 70 °C                  | <p>1 W for single module or 0.5 W per module</p>  <p>Detailed description: The graph plots Rated Power (W) on the y-axis (0 to 1.0) against Ambient Temperature (°C) on the x-axis (0 to 125). An orange line represents the 1 W rating, staying constant until 70 °C and then decreasing linearly to 0 at 125 °C. A blue line represents the 0.5 W rating, staying constant until 70 °C and then decreasing linearly to 0 at 125 °C. A small triangle on the x-axis marks the 70 °C point.</p> |
| Temperature coefficient (typical)      | $\pm 150$ ppm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Limiting element voltage               | 350 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| End resistance (typical)               | 2 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Contact resistance variation (typical) | 2 % or 3 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Independent linearity (typical)        | $\pm 5\%$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Insulation resistance                  | 10 <sup>6</sup> M $\Omega$ min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Dielectric strength                    | 1500 V <sub>RMS</sub> min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Mechanical endurance                   | 50 000 cycles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Note

<sup>(1)</sup> Consult Vishay Sfernice for other ohmic values

| MECHANICAL (initial)       |                                                     |
|----------------------------|-----------------------------------------------------|
| Mechanical travel          | $300^\circ \pm 5^\circ$                             |
| Operating torque (typical) | 8 Ncm $\pm$ 2 Ncm (8.49 oz.-inch to 14.16 oz.-inch) |
| End stop torque            | 80 Ncm max. (6.8 lb-inch max.)                      |
| Tightening torque          | 250 Ncm max. (21 lb-inch max.)                      |
| Weight                     | 7 g to 9 g per module (0.25 oz. to 0.32 oz.)        |

| ENVIRONMENTAL               |                   |
|-----------------------------|-------------------|
| Operating temperature range | -55 °C to +125 °C |
| Climatic category           | 55 / 125 / 56     |
| Sealing                     | IP64              |

| MARKING                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Potentiometer module Vishay logo, SAP code of ohmic value and tolerance in %, variation law, manufacturing date (four digits), "3" for the lead 3 |

| PACKAGING |
|-----------|
| • Box     |

## PERFORMANCES

| TESTS                   | CONDITIONS                                                   | TYPICAL VALUE AND DRIFTS                                                                   |                                           |
|-------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------|
| Electrical endurance    | 1000 h at rated power<br>90°/30° at ambient temp. 70 °C      | $\Delta R_T/R_T$<br>Contact resistance variation                                           | $\pm 2 \%$<br>$\pm 4 \%$                  |
| Change of temperature   | 5 cycles, -55 °C to +125 °C, 30' per cycle                   | $\Delta R_T/R_T$<br>Operating torque                                                       | $\pm 0.2 \%$<br>> 2 Ncm (2.8 oz.-inch)    |
|                         | Severe stress: 90 cycles, -40 °C to +80 °C,<br>4 h per cycle | $\Delta$ Operating torque / torque (%)                                                     | < 35 %                                    |
| Damp heat, steady state | +40 °C, 93 % relative humidity, 56 days                      | $\Delta R_T/R_T$<br>Insulation resistance<br>$\Delta$ Operating torque / torque (%)        | $\pm 2 \%$<br>> 1000 M $\Omega$<br>< 20 % |
| Mechanical endurance    | 50 000 cycles                                                | $\Delta R_T/R_T$<br>Contact resistance variation<br>$\Delta$ Operating torque / torque (%) | $\pm 5 \%$<br>$\pm 5 \%$<br>< 20 %        |
| Shock                   | 50 g, 11 ms<br>3 shocks - 3 directions                       | $\Delta R_T/R_T$<br>$\Delta R_{1-2}/R_{1-2}$<br>$\Delta$ Operating torque / torque (%)     | $\pm 0.2 \%$<br>$\pm 0.5 \%$<br>< 11 %    |
| Vibration               | 10 Hz to 55 Hz<br>0.75 mm or 10 g, 6 h                       | $\Delta R_T/R_T$<br>$\Delta V_{1-2}/V_{1-3}$<br>$\Delta$ Operating torque / torque (%)     | $\pm 0.2 \%$<br>$\pm 0.5 \%$<br>< 11 %    |

### Note

- Nothing stated herein shall be construed as a guarantee of quality or durability

### ORDERING INFORMATION (part number)

|       |                                 |         |                                                                  |                                 |             |                                           |                                                                          |                          |                           |   |   |   |   |   |   |   |   |
|-------|---------------------------------|---------|------------------------------------------------------------------|---------------------------------|-------------|-------------------------------------------|--------------------------------------------------------------------------|--------------------------|---------------------------|---|---|---|---|---|---|---|---|
| P     | 1                               | 1       | H                                                                | 1                               | F           | 0                                         | G                                                                        | H                        | F                         | W | 1 | 0 | 1 | 0 | 3 | K | A |
| MODEL | NUMBER OF MODULES               | BUSHING | LOCATION PEG                                                     | SHAFT                           | SHAFT STYLE | LEADS                                     | RESISTANCE CODE                                                          | TOLERANCE                | TAPER OR SPECIAL          |   |   |   |   |   |   |   |   |
| P11H  | 1<br>2<br>3<br>4<br>5<br>6<br>7 | F       | A, B, C, D = see<br>"Location Pegs" table<br><br>0 = without peg | GH<br><br>AP = particular shaft | F           | W10<br>Y00<br><br>Other styles on request | 102 = 1 kΩ<br>472 = 4.7 kΩ<br>103 = 10 kΩ<br>473 = 47 kΩ<br>104 = 100 kΩ | M = ± 20 %<br>K = ± 10 % | A<br><br>Other on request |   |   |   |   |   |   |   |   |
|       |                                 |         |                                                                  |                                 |             |                                           | OR SPECIAL CODE                                                          |                          |                           |   |   |   |   |   |   |   |   |

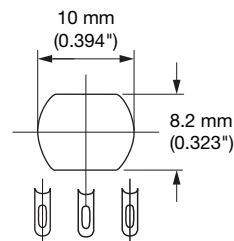
### SPECIAL CODES GIVEN BY VISHAY

Options available:

- Custom shaft
- Specific linearity, interlinearity, taper
- Multiple assemblies with various modules
- Wires, connectors
- Switch modules
- PCB adding
- Custom design on request

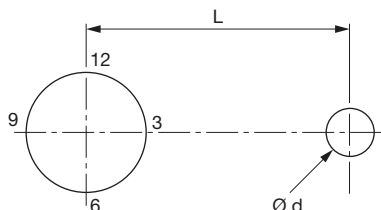
**STANDARD RESISTANCE ELEMENT DATA**

| STANDARD RESISTANCE VALUES | MAX. POWER AT 70 °C | MAX. WORKING VOLTAGE | MAX. WIPER CURRENT |
|----------------------------|---------------------|----------------------|--------------------|
| $\Omega$                   | W                   | V                    | mA                 |
| 1K                         | 1                   | 31.6                 | 31.6               |
| 4.7K                       | 1                   | 69                   | 14.5               |
| 10K                        | 1                   | 100                  | 10                 |
| 47K                        | 1                   | 217                  | 4.61               |
| 100K                       | 1                   | 316                  | 3.16               |

**PANEL CUT OUT ( $\pm 0.5$  mm)**

**LOCATING PEGS (anti-rotation lug)**

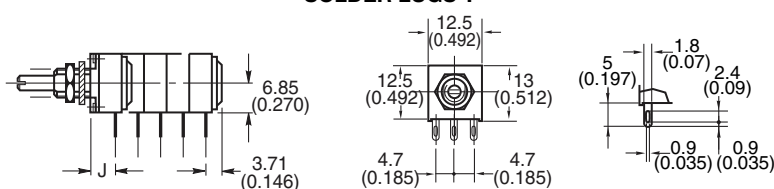
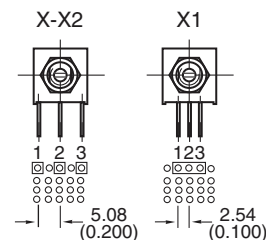
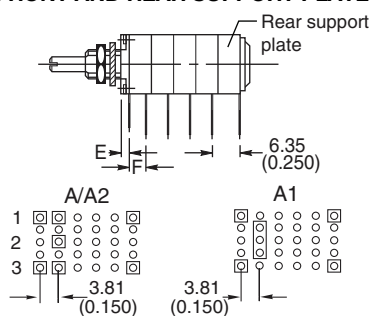
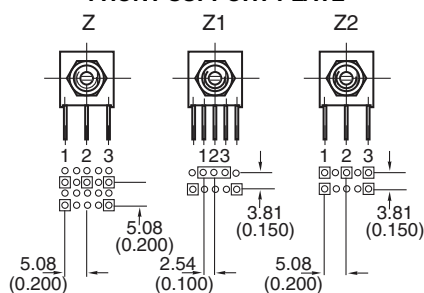
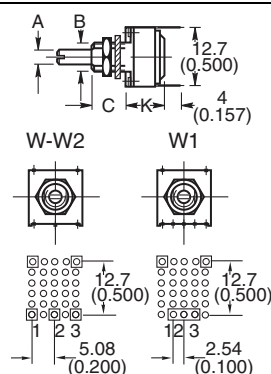
The locating peg is provided by a plate mounted on the bushing and positioned by the module sides. Four set positions are available, clock face orientation: 12, 3, 6, 9.

All P11 bushings have a double flat. When panel mounting holes have been punched accordingly, an anti-rotation lug is not necessary.

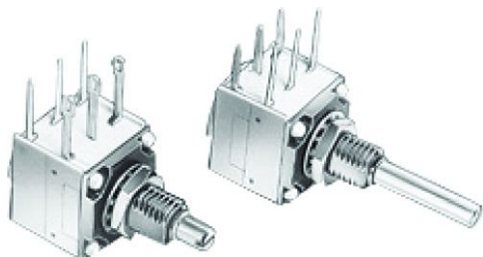


| CODE | VERSION            | BUSHING | EFFECTIVE HIGH PEG |
|------|--------------------|---------|--------------------|
| A    | $\varnothing d$ mm | 2       | 0.7                |
|      | L mm               | 6.2     |                    |
| B    | $\varnothing d$ mm | 2       | 0.7                |
|      | L mm               | 7.75    |                    |
| C    | $\varnothing d$ mm | 3.5     | 1.1                |
|      | L mm               | 13.5    |                    |

Locating pegs are supplied in separate bags with nuts and washers.

**LEADS CONFIGURATION EXAMPLES (on request) - Dimensions in millimeters (inches)**
**SOLDER LUGS Y**

**PCB PIN OUT**

**HORIZONTAL MOUNTING**
**FRONT AND REAR SUPPORT PLATES**

**FRONT SUPPORT PLATE**

**VERTICAL MOUNTING**

**Note**

- Standard version: Y00 W10. Other styles on request

**P11 OPTION: ROTARY SWITCH MODULES**


- Rotary switches
- Current up to 2 A
- Actuation CW or CCW position
- Sealing IP 60

The position of each switch module is free. Leads finish: Gold plated RS and RSI rotary switches are housed in a standard P11 module size 12.7 mm x 12.7 mm x 5.08 mm (0.5" x 0.5" x 0.2"). They have the same terminal styles as the assembled electrical modules. An assembly can comprise one or more switch modules. Switch actuation is described as seen from the shaft end.

D: means actuation in maximum CCW position

F: means actuation in maximum CW position

The switch actuation travel is 25° with a total mechanical travel of 300° ± 5° and electrical travel of electrical modules is 238° ± 10°.

**RDS SINGLE POLE SWITCH, NORMALLY OPEN**

In full CCW position, the contact between 1 and 3 is open. It is made at the beginning of the travel in CW direction.

**RSF SINGLE POLE SWITCH, NORMALLY OPEN**

In full CW position, the contact between 1 and 3 is open. It is made at the beginning of the travel in CCW direction.

**RSID SINGLE POLE CHANGEOVER**

In full CCW position, the contact is made between 3 and 2, and open between 3 and 1. Switch actuation (CW direction) reverses these positions.

**RSIF SINGLE POLE CHANGEOVER**

In full CW position, the contact is made between 1 and 2, and open between 1 and 3. Switch actuation (CCW direction) reverses these positions.

**RSD SPST:** single pole, open switch in CCW position - 2 pins

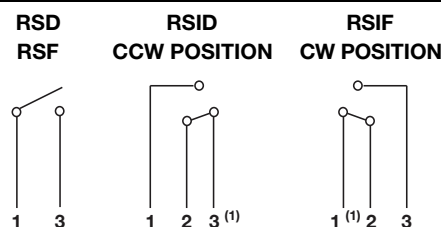
**RSF SPST:** single pole, open switch in CW position - 2 pins

**RSID SPDT:** single pole, changeover switch in CCW position - 3 pins

**RSIF SPDT:** single pole, changeover switch in CW position - 3 pins

**SWITCH SPECIFICATIONS**

|                                        |                      |                                |
|----------------------------------------|----------------------|--------------------------------|
| Switching power maximum                |                      | 62.5 VA v<br>15 VA =           |
| Switching current maximum              |                      | 0.25 A 250 V v<br>0.5 A 30 V = |
| Maximum current through element        |                      | 2 A                            |
| Contact resistance                     |                      | 100 mΩ                         |
| Dielectric strength                    | Terminal to terminal | 1000 V <sub>RMS</sub>          |
|                                        | Terminal to bushing  | 2000 V <sub>RMS</sub>          |
| Maximum voltage operation              |                      | 250 V v<br>30 V =              |
| Insulation resistance between contacts |                      | 10 <sup>6</sup> MΩ             |
| Life at P <sub>max</sub> .             |                      | 10 000 actuations              |
| Minimal travel                         |                      | 25°                            |
| Operating temperature                  |                      | -40 °C to +85 °C               |

**ELECTRICAL DIAGRAM**

**Note**

(1) Common

**RELATED DOCUMENTS**
**APPLICATION NOTES**

|                                                                   |                                                                        |
|-------------------------------------------------------------------|------------------------------------------------------------------------|
| Potentiometers and Trimmers                                       | <a href="http://www.vishay.com/doc?51001">www.vishay.com/doc?51001</a> |
| Guidelines for Vishay Sfernice Resistive and Inductive Components | <a href="http://www.vishay.com/doc?52029">www.vishay.com/doc?52029</a> |



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