




ELECTRA ACTUATORS



Electra Quarter Turn

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Engineered Performance

Electra actuators can be found controlling today's valves in a wide range of applications, from industrial process to temperature control. The proven design is manufactured by the latest technology. The entire composure is comprised of polyamide composite material, precision cut to achieve robust strength. Electra actuators time tested products are balanced by our continued investment in research and development. Through innovation and new, cutting edge technology, the Electra "Multi-Voltage" quarter turn actuator leads the valve automation industry today.

► Multi-Voltage Technology

Innovative design allows for operation with any supply voltage from 24-240 VAC/DC, without the use of internal dip switches.

► Modular Construction

Truly modular design allows the actuator to be easily field modified and serviced if the application changes.

► Guaranteed Minimum Torques

All actuators are torque tested under load before shipment. We guarantee that the output torques meet the rating on the tag.

► NEMA 4 Enclosure

Actuators contain o-rings to ensure no ingress of moisture. The ceramic heater is standard and protects the actuator against condensation.

► Extended Duty Cycle

Electra actuators are rated for extended duty service with extended performance of starts and stops per hour.



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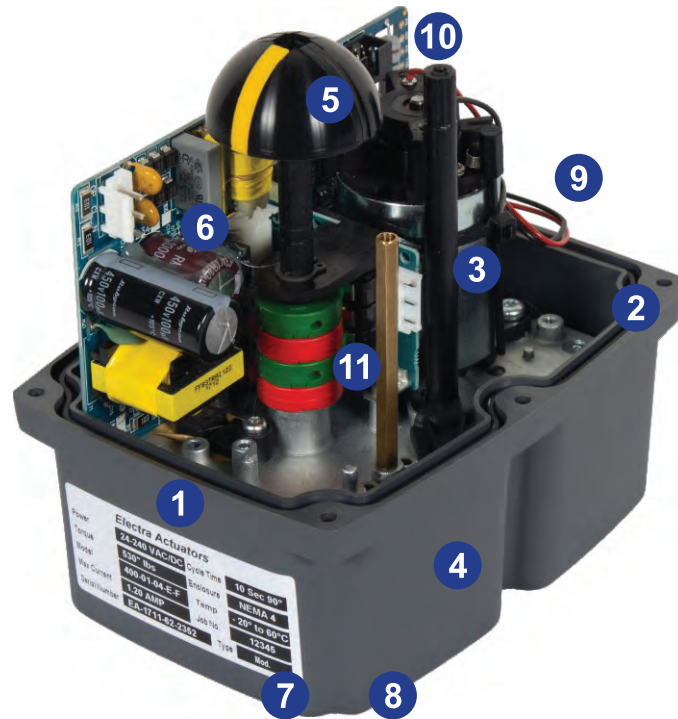


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Construction

▶ 1. Enclosure

Polyamide composite housing is light, compact, and durable. The polyamide housing is weatherproof, corrosion resistant, and UV protected for operation in all types of environments. The polyamide housing is engineered with a lip where the actuator is joined to allow water to shed off the actuator and not enter the housing. The rugged, sealed watertight enclosure is rated NEMA 4, protected from ingress of any dirt or moisture.

▶ 2. Weather Seal

Seals the housing against water ingress and debris.

▶ 3. Motor

Motors are engineered for high-torque, low current amp draw and high duty cycle ratings. Motors are single phase, B class insulated and protected from overload by a thermostat with automatic reset.

▶ 4. Self Locking Gearing

Precision machined cut alloy gearing is self locking and will not back drive. All gearing is greased and lubricated for the service life of the actuator.

▶ 5. Position Indicator

The position indicator is mechanically driven by the output drive shaft for reliable opening and closing status of the valve. The movement of the valve can be easily viewed with the extending viewing angle available with the dome indicator.

▶ 6. Heater

The pre-wired space heater is installed in every actuator to prevent condensation from collecting inside of the actuator and causing irreparable damage to the internal components of the actuator. The heater is equipped with a thermostat to prevent overheating.

▶ 7. Actuator Mounting

Drilling is in accordance with the ISO 5211 standard, allowing easy installation of the actuator directly to small ISO ball and butterfly valves.

▶ 8. Output Drive

The female output drive allows for direct mounting to the shaft of small ball and butterfly valves. The star drive is machined to conform to DIN 3337 standards.

▶ 9. Dual Conduit Entrance

All electrical connections are terminated in the external conduit connection plugs.
(See page 4 for additional details)

▶ 10. Manual Override

For manual cycling of the valve with or without power.
(See page 4 for additional details)

▶ 11. Travel Limit Switch

SPDT switches with adjustable, mechanical cams.
(See page 5 for additional details)



Model 400 / FS440 Features

Design Features

Multi-Voltage (Auto Sensing)

The Electra Actuator Models 400 / FS440 are standard with multi-voltage, auto sensing technology. The actuator can receive any input voltage between 24-240 VAC or DC. The actuator will automatically detect the supply voltage and operate accordingly. There are no internal dip switches. All of the electrical conversions are made internally by the “smart” electronic PCB included with each actuator.



Manual Operation

The Electra Actuator Models 400 / FS440 are standard with integral manual override, which allows the valve to be operated locally. The manual override can be engaged with or without power. The valve can be rotated to the closed position by operating the handwheel clockwise and it can be rotated to the open position by operating the handwheel counterclockwise. Using the external position indicator, the valve can be accurately repositioned manually. The manual override is easy to turn and requires low effort to operate.



Multi-Color LED Indicator

The Electra Actuator Models 400 / FS440 have a multi-colored LED indicator installed in every actuator to allow for constant visual status feedback. Once power is applied the multi-color LED will give the user advanced diagnostics regarding the actuator’s current position, the direction the actuator is rotating, if the manual override is engaged, and if there are any issues that may be preventing the actuator from operation.



External Electrical Connections

The Electra Actuator Models 400 / FS440 feature external DIN connector plugs with ½” conduit connection adapters. The external plugs allow for quick installation as the cover does not need to be removed during the install since all of customer’s wiring can terminate into the exterior plugs. In addition, the ½” conduit connection allows for hard conduit to be installed to the actuator’s external connections. This provides a safe and secure connection while also cutting down on installation time and cost.



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Control Features

Hi-Resolution Servo Card

The Electra Actuator Models 400 / FS440 achieve superior control with the addition of a hi-resolution modulating control board. The digital high resolution servo card achieves a minimum of 8,192 points of resolution for accurate and stable valve control. The modulating control board is easily configurable through the use of (4) onboard dip switches that set the input control signal and the default position upon loss of signal. The servo digital servo card accepts 4-20 mA or 0-10 VDC control signals, depending on the dip switch setup. Feedback output signal is provided as standard on all modulating actuators.



Fail-Safe Capacitor

The Electra Actuator Model FS440 achieves fail-safe functionality with an industrial Ni-Cad rechargeable battery and PCB added to the Model 400 actuator. The electric actuator continues to operate normally when power is supplied, and the battery is constantly trickle charging to keep it fully charged while main power is available. When external power is lost, a switch in the fail-safe PCB draws internal power from the battery to send the actuator to the desired preset position, if not already in that position.



Travel Limit Switch

The Electra Actuator Models 400 / FS440 contain (2) SPDT travel limit switches standard on all actuators and (2) SPDT auxiliary switches standard on all On/Off units. The (2) travel limit switches are used to shut the motor down at the end of the actuator's travel. The (2) auxiliary switches are used to communicate with other appliances. Auxiliary switches are set 5° ahead of the travel limit switches at the factory unless specified otherwise. The cams for each of the auxiliary switches are field adjustable by hand with an allen wrench and can be modified after the actuator has been installed in service. Each cam is labeled for simple field calibration. Once the cam is set it locks itself in place and is engineered to withstand plant induced vibration.



Over Torque Protection

The Electra Actuator Models 400 / FS440 contain integral over-torque protection to prevent mechanical damage to the internal gearing of the actuator. The over-torque mechanism is electronic in design. The actuator constantly measures the current being drawn and compares it with pre-set parameters. If the current draw exceeds the maximum parameters, the power is cut, preventing the actuator from damaging itself internally. In the event the over-torque sensor is triggered, the actuator will operate in the opposite direction of the impedance a few degrees, which allows the gear train to rest in a relaxed, non-tense position to prevent possible mechanical damage to the internal gears.





Model 400 / FS440 Construction

Performance Sample model number: 400-03 (24-240 VAC/DC Electric, Output Torque of 530 IN-LB)

Torque		Model / Amp Draw				Size of Actuator	Speed of Actuator 60Hz	Number of Handwheel Turns 90°	Duty Cycle 30 min. Thermal Protection	Weight (LB)
IN-LB	NM	Single Phase								
		120 VAC Voltage	220 VAC Voltage	24 VDC Voltage	24 VAC Voltage					
221	25	0.30	0.20	0.80	1.20	01	10	8	75%	5
530	60	0.37	0.25	1.25	1.73	03	15	8	75%	7
796	90	0.27	0.16	0.90	1.17	04	29	8	75%	7

Specification

Enclosure	Weatherproof enclosure rated NEMA 4, (IP67)
Power supply	24-240 VAC/DC (Auto Sensing), Single phase 50 / 60 Hertz, + 10%
Duty cycle	75%
Motor	Reversible motor
Limit switches	2 SPDT open and closed, 250 VAC 3 Amp rating
Auxiliary switches	2 SPDT open and closed, 250 VAC 3 Amp rating (On/Off actuators only)
Space heater	3.5 Watt, anti-condensation
Manual override	Toggleable, handwheel operator design
Conduit entries	2 External ISO DIN plugs with 1/2" conduit connections
Rotation	90° ±5° (0°-95°)
Operating temperature	-4°F to 158°F (Operating, ambient temperature range)
Enclosure material	Polyamide Composite
Mounting orientation	Possible mounting configurations shown below

Modulating (DPS Kit) Specification

Control Signal options	0-10 VDC, 1-10 VDC, 0-20 mA, 4-20 mA - Input / Output
Output shaft feedback system	Magnetic, Digital
Accuracy, Hysteresis, Repeatability	Better than 1%

Fail-Safe (BSR Kit) Specification

Initial charge time before operation	36 Hours
Max movements with full charge	5 Full cycles
Minimum recharge after movement	20 minutes

Mounting Orientation



OK



OK



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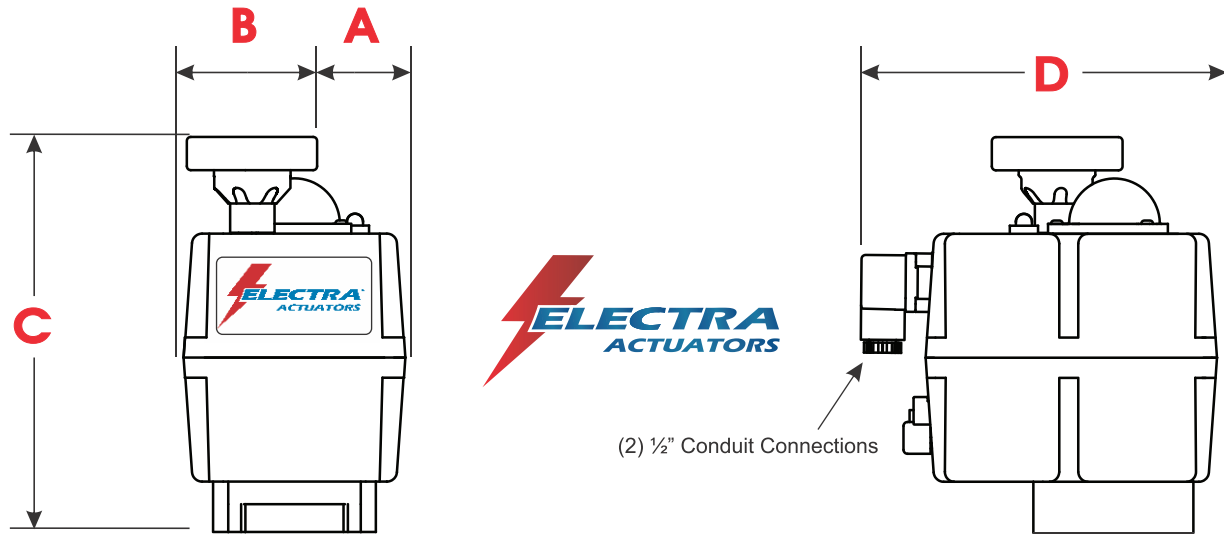
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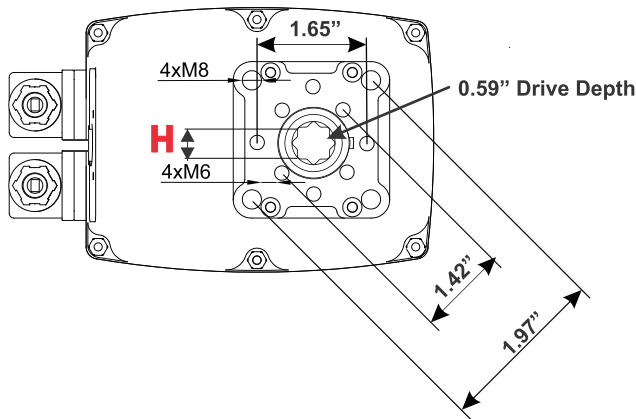


Model 400 / FS440 Dimensions

Dimensions

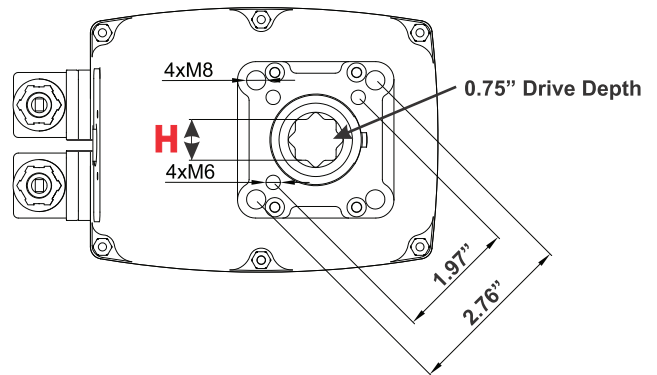


Size: "01"



Size: "03 & 04"

* 0.669" (17 mm) Drive Available



Actuator Specification									
Non-Spring Return Type		Electric Fail Safe Type		ISO 5211 Bolt Circle	Assembly Dimensions (in)				
On/Off Model Number	Modulating Model Number	On/Off Model Number	Modulating Model Number		A	B	C	D	H
EA-400-01-04-O	EA-400-01-04-E	EA-FS440-01-04-O	EA-FS440-01-04-E	F03/F04/F05	1.72	2.62	6.73	7.13	0.551
EA-400-03-04-O	EA-400-03-04-E	EA-FS440-03-04-O	EA-FS440-03-04-E	F05/F07	1.72	2.62	7.72	7.13	*0.551
EA-400-04-04-O	EA-400-04-04-E	EA-FS440-04-04-O	EA-FS440-04-04-E	F05/F07	1.72	2.62	7.72	7.13	*0.551

NOTE: (A) For mm multiply: Inch X 25.4=(mm)

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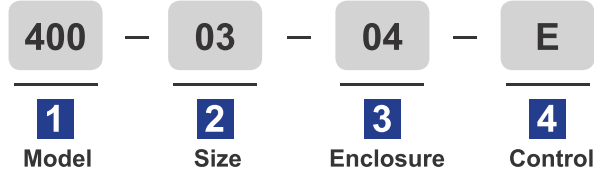
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Model 400 / FS440 Part Numbers



Item	Code	Description
1 Model No. 	400 FS440	Non-Spring Return Type Electric Fail-Safe Type
2 Size	01 03 04	221 In-Lb Torque 530 In-Lb Torque 795 In-Lb Torque

Item	Code	Description
3 Enclosure	04	NEMA 4, (IP67) Housing "Weatherproof" Type
4 Control	O E	On/Off (Open/Close) Operation Modulating Digital Board

A. Warranty

The seller warrants its product against defects in material or workmanship, under normal conditions of use, for a period of one year from the date of original shipment. The seller's obligation under this warranty is limited to repair or replacement at seller's option. Shipping charges are prepaid to factory and all goods must have a return authorization number.

B. Storage

The actuator must be stored in a clean, dry, temperature controlled area. The unit shall be stored with the cover installed and with the conduit openings sealed. Storage must be off the floor, covered with an unsealed dust protector that will allow side and bottom ventilation. Care must be taken to guard the actuator from condensation in extreme temperature variations. If actuators sit for an extended period of time it is recommended that the heaters be hooked up.

C. Moisture Warning

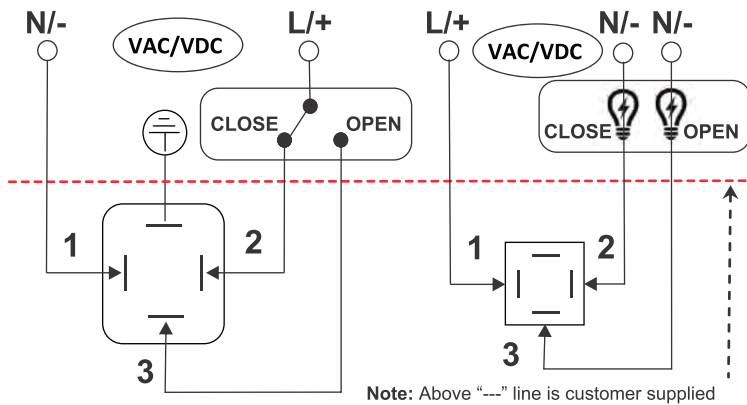
Electra actuators are rated NEMA 4. The only way moisture can enter the actuator is through the conduit entrance. Extra precaution should be used to stop moisture from entering the actuator. Seal tight fittings as well as drip legs and potting compounds should be installed to protect the actuator against condensation. If moisture migrates up the conduit entrance and damages components, the parts are not covered under warranty.

On/Off - Modulating

24 - 240 VAC/DC

**LEFT BLACK PLUG
GRAY BASE
(External Power)**

**RIGHT BLACK PLUG
BLACK BASE
(Aux. Switches)**



NOTES

1. Field Wiring is shown as reference and not supplied with the actuator.
2. Always verify specific actuator model to correct wiring diagram.
3. Wiring as shown in full counterclockwise position. (CCW)
4. Each actuator must be powered through its own individual switch or relay contacts, to prevent cross electrical bleed. Actuators could be damaged if parallel wired, thus voiding the manufacturers warranty.
5. Seal tight water tight conduit connectors must be used to maintain NEMA 4 rating
6. All grounds must be isolated from each other in the customers equipment.
7. Take care in selecting the correct gauge wire, based on actuator AMP draw and the run on the line.

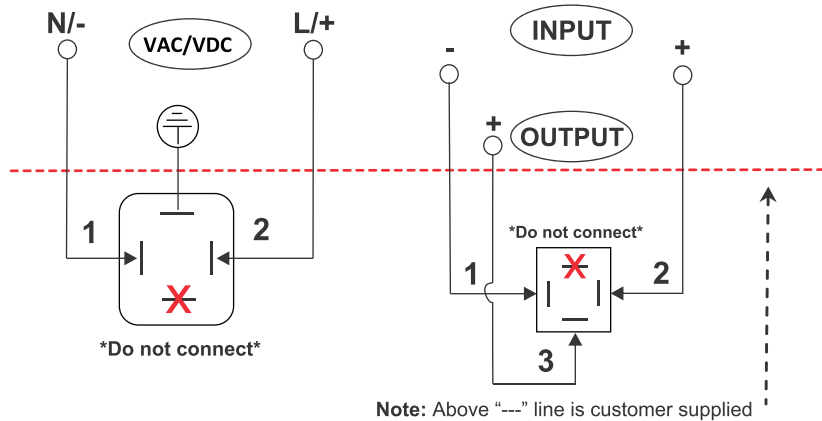
On/Off

DRAWING NO.
EA-400/FS440-OA

24 - 240 VAC/DC

**LEFT BLACK PLUG
GRAY BASE
(External Power)**

**RIGHT BLACK PLUG
BLACK BASE
(Control Signal)**



NOTES

1. Field Wiring is shown as reference and not supplied with the actuator.
2. Always verify specific actuator model to correct wiring diagram.
3. Wiring as shown in full counterclockwise position. (CCW)
4. Each actuator must be powered through its own individual switch or relay contacts, to prevent cross electrical bleed. Actuators could be damaged if parallel wired, thus voiding the manufacturers warranty.
5. Seal tight water tight conduit connectors must be used to maintain NEMA 4 rating
6. All grounds must be isolated from each other in the customers equipment.
7. Take care in selecting the correct gauge wire, based on actuator AMP draw and the run on the line.

Modulating

DRAWING NO.
EA-400/FS440-E

*Input Control Signal is Preset at the Factory (0-10 VDC or 4-20 mA)

Multi-color LED Status Light

On/Off - LED Operation

No	Actuator Status	Time LED is lit	On/Off LED Sequence
1	Actuator without external power	Continuous	OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
2	Actuator in manual mode	200 mSecs	AMBER OFF AMBER OFF AMBER OFF AMBER OFF AMBER OFF
3	Actuator opening under external power	200 mSecs	AMBER GREEN AMBER GREEN AMBER GREEN AMBER GREEN GREEN GREEN OPEN
4	Actuator closing under external power	200 mSecs	AMBER RED AMBER RED AMBER RED AMBER RED RED RED CLOSED
5	Torque limiter activated when opening	200 mSecs	OFF GREEN OFF GREEN OFF GREEN OFF GREEN OFF GREEN
6	Torque limiter activated when closing	200 mSecs	OFF RED OFF RED OFF RED OFF RED OFF RED
7	Actuator closing under battery power (Model FS440 Only)	200mSecs	OFF OFF OFF RED OFF OFF OFF RED OFF OFF
8	Actuator opening under battery power (Model FS440 Only)	200mSecs	OFF OFF OFF GREEN OFF OFF OFF GREEN OFF OFF
9	Battery power low, needs re-charging (Model FS440 Only)	200mSecs	AMBER AMBER AMBER OFF OFF OFF OFF AMBER AMBER AMBER



Note: A PINK LED indicates a connectivity issue. Typically the cause is incorrect wiring or a polarity issue

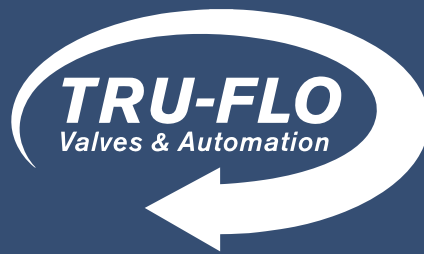
Modulating - LED Operation

No	Actuator Status	Time LED is lit	Modulating LED Sequence
1	Actuator without external power	Continuous	OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
2	Actuator in manual mode	200 mSecs	AMBER OFF AMBER OFF AMBER OFF AMBER OFF AMBER OFF
3	Actuator opening under external power	200 mSecs	BLUE GREEN BLUE GREEN BLUE GREEN STOP POSITION BETWEEN 0° & 90° OPEN 90° BLUE
4	Actuator closing under external power	200 mSecs	BLUE RED BLUE RED BLUE RED STOP POSITION BETWEEN 0° & 90° CLOSED 0° BLUE
5	Torque limiter activated when opening	200 mSecs	OFF GREEN OFF GREEN OFF GREEN OFF GREEN OFF GREEN
6	Torque limiter activated when closing	200 mSecs	OFF RED OFF RED OFF RED OFF RED OFF RED
7	Actuator closing under battery power (Model FS440 Only)	200mSecs	OFF OFF OFF RED OFF OFF OFF RED OFF OFF
8	Actuator opening under battery power (Model FS440 Only)	200mSecs	OFF OFF OFF GREEN OFF OFF OFF GREEN OFF OFF
9	Battery power low, needs re-charging (Model FS440 Only)	200mSecs	AMBER AMBER AMBER OFF OFF OFF OFF AMBER AMBER AMBER



Note: A PINK LED indicates a connectivity issue. Typically the cause is incorrect wiring or a polarity issue

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