

Pressure-independent zone valve PIQCV

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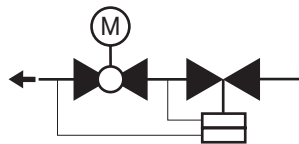
The pressure-independent zone valve PIQCV

The pressure-independent control valve PIQCV (Pressure Independent Quick Compact Valve) is part of the Belimo ZoneTight™ room and zone solutions. This product family includes pressure-dependent 2-way characterised control valves, 3-way changeover ball valves, 6-way zone valves as well as the products contained in this document. The products are characterised by the following features:

- Tightly-sealing ball valve, which prevents circulation losses
- Minimum power consumption during operation and in standby mode
- Compact overall structure
- Quick, easy and manually adjustable flow values (PIQCV)
- Automatic adaption to set k_v value (QCV)
- Tool-free actuator mounting
- Compatible with 24 V, 230 V, open/close, 3-point, modulating, Modbus, BACnet and MP-Bus actuators

Mode of operation

For a pressure-independent solution, such as the PIQCV, the design is greatly simplified. Thanks to the automatic compensation of the influence of differential pressure fluctuations, the PIQCV always provides the required water quantity. Due to dynamic balancing, the valve authority amounts to 1.



Constant flow volume

With a differential pressure of 16...350 kPa, a constant flow volume is achieved thanks to the integrated pressure-controlling valve. Even with pressure fluctuations and in the partial load range, the flow remains constant at the respective opening position (angle of rotation) and ensures stable control.

Pressure stability

The PIQCV offers pressure stability of $\pm 10\%$ in the range 16...35 kPa. In the remaining differential pressure range, pressure stability is $\pm 5\%$.

Control

The ball valve is adjusted by a type CQ(K)-.. rotary actuator. The rotary actuator is controlled by a commercially available modulating or 3-point control system and acting as a throttling device moves the ball of the ball valve to the position determined by the positioning signal. The valve is delivered from the factory in an open state. In this case, the ball valve is opened anticlockwise and closed clockwise.

Project data

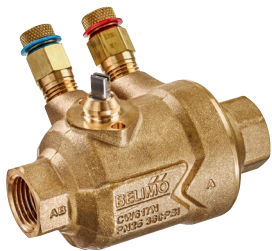
Relevant information

The data, information and limit values on the data sheets of the PIQCV and the associated CQ actuators must be taken into account and/or complied with.

System components

The valve and actuator form a unit. Only the components listed below may be used in combination.

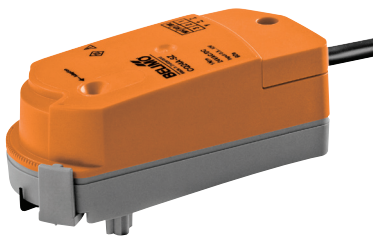
Valve:



C2 ... QPT - .

B	= Flow V'_{nom} =	210 l/h
D	= Flow V'_{nom} =	420 l/h
F	= Flow V'_{nom} =	980 l/h
G	= Flow V'_{nom} =	2100 l/h
Not specified	= No measurement connections	
T	= Measurement connections (P/T ports)	
P	= Pressure-independent	
Q	= Quick connection (tool-free actuator mounting)	
15	= DN 15	
20	= DN 20	
25	= DN 25	
2	= 2-way internal thread	
C	= Compact (zone valve)	

Actuator:



CQCK24A-SR-T

Not specified	= Cable 1 m
T	= Terminal design
Not specified	= Open/close, 3-point
SR	= Modulating 2...10 V
MPL	= Belimo MP-Bus light
BAC	= BACnet/Modbus
24A	= AC/DC 24 V
230A	= AC 230 V
Not specified	= Non fail-safe
K	= Fail-safe actuator (electric)
Not specified	= Running time 75 s
C	= Fast running 35 s
D	= Very fast running 15 s
Q	= Quick connection for zone valve
C	= 1 Nm

Pipeline clearances

The minimum clearances between the pipelines and the walls and ceilings required for project planning depend not only on the valve dimensions but also on the selected actuator and can be found in the data sheets of the valves and actuators.

Pressure-independent characterised control valves

Characterised control valves must be provided as throttling devices in the return. This leads to lower thermal loads on the sealing elements in the valve. The prescribed direction of flow must be observed.

Water quality

The water quality requirements specified in VDI 2035 must be adhered to.

Strainer

Characterised control valves are regulating devices. The use of strainers is recommended in order to prolong their service life for performing control tasks.

Isolation valves

Care must be taken to ensure that sufficient numbers of isolation valves are installed.

Planning information

The minimum required differential pressure of the PIQCV of 16 kPa must be considered in the pump design.

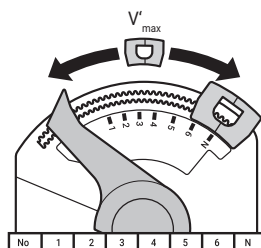
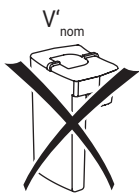
Measurement connections (P/T ports)

The type C2..QPT-.. valves have two measurement connections. The total pressure drop across the valve can be determined using the measurement points at valve inlet (P1) and outlet (P3).

The measurement ports can be used to easily establish whether the effective differential pressure across the valve is within the effective pressure range of 16...350 kPa. If it is, the valve operates independently of pressure and the correct flow rate is automatically ensured by the valve according to the setting table.

Furthermore, the measurement of the differential pressure can be used to optimise the pump setting. This involves reducing the delivery height of the pump only until the minimum differential pressure required (16 kPa) is still present across the valve at the point of lowest pressure (the furthest away from the pump in hydraulic terms).

Definition

Relevant information

Clip position:

Without clip on actuator corresponds to V'_{nom}

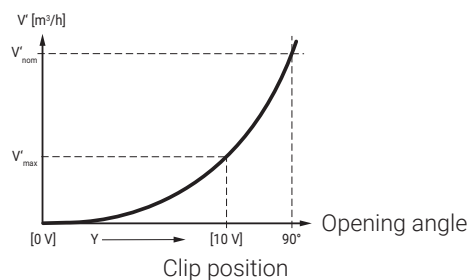
With clip angle limitation equals V'_{max}

V'_{nom}

Greatest possible flow rate of a pressure-independent valve, catalogue value, status upon delivery

V'_{max}

Maximum flow of a pressure-independent valve with the greatest positioning signal, e.g. 10 V



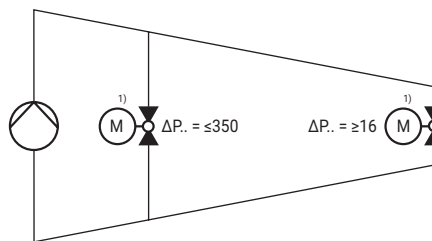
Design

Maximum flow

The integrated pressure-reducing valve ensures permanent, dynamic balancing within the functional range of 16...350 kPa. The valve is determined by the maximum required volumetric flow V'_{max} . The system-specific maximum flow V'_{max} must be within the permissible range.

Minimum differential pressure

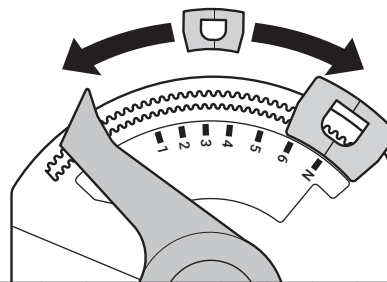
The minimum required pressure drop across the valve (differential pressure) to achieve the maximum flow rate is 16 kPa.





¹⁾ Use valve with measurement connections (P/T ports) (C2..QP(T)-..)

Adjustable flows

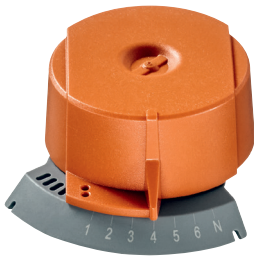
The angle of rotation of the CQ actuator can be changed with the end stop clip in 2.5° increments. This is used to set the V'_{max} value (maximum flow rate of the valve). Remove the end stop clip and place at the desired position. After each flow setting change with the end stop clip, an adaption must be triggered for the modulating actuators.



	 Pts	1	2	3	3+	4-	4	4+	5-	5	5+	6-	6	6+	N-	N	
C2..QP(T)-B	V'_{max} (l/h)	20	30	40	45	50	60	70	80	90	105	120	135	150	165	180	210
	V'_{max} (l/s)	0.006	0.008	0.011	0.013	0.014	0.017	0.019	0.022	0.025	0.029	0.033	0.038	0.042	0.046	0.050	0.058
C2..QP(T)-D	V'_{max} (l/h)	50	70	100	110	130	150	170	190	210	240	270	300	330	360	400	420
	V'_{max} (l/s)	0.014	0.019	0.028	0.031	0.036	0.042	0.047	0.053	0.058	0.067	0.075	0.083	0.092	0.100	0.111	0.117
C2..QP(T)-F	V'_{max} (l/h)	90	130	190	220	250	290	340	390	440	500	570	630	700	760	820	980
	V'_{max} (l/s)	0.025	0.036	0.053	0.061	0.069	0.081	0.094	0.108	0.122	0.139	0.158	0.175	0.194	0.211	0.228	0.272
C2..QP(T)-G	V'_{max} (l/h)	260	410	600	670	750	840	920	1010	1110	1210	1310	1420	1530	1640	1750	2100
	V'_{max} (l/s)	0.072	0.114	0.167	0.186	0.208	0.233	0.256	0.281	0.308	0.336	0.364	0.394	0.425	0.456	0.486	0.583



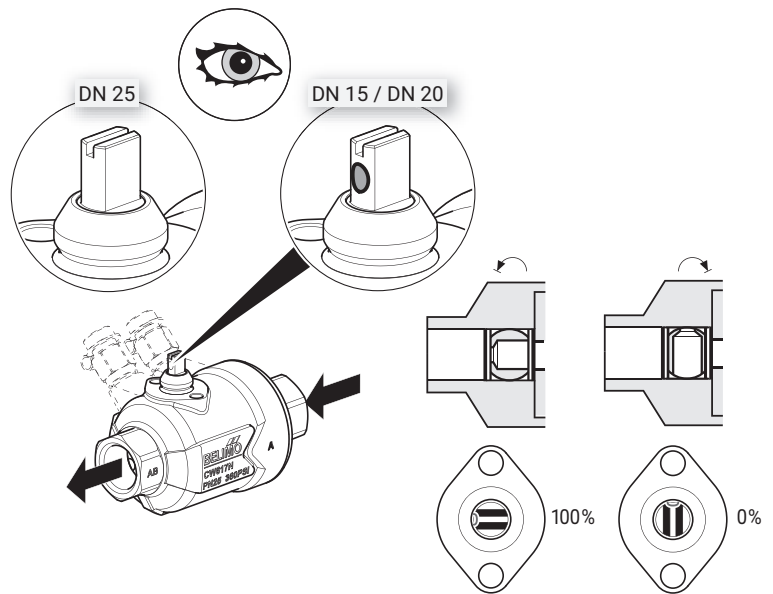
Manual settings

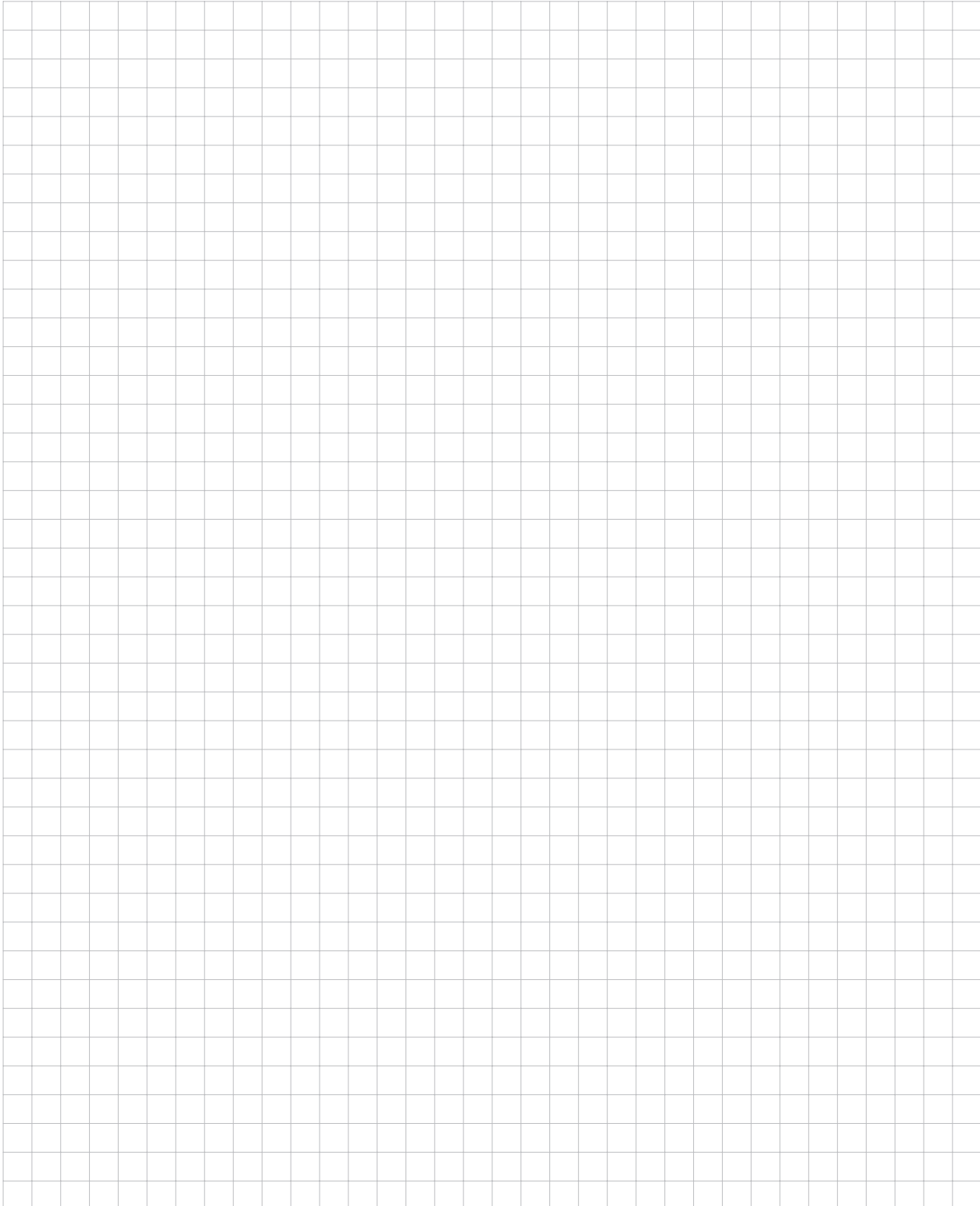


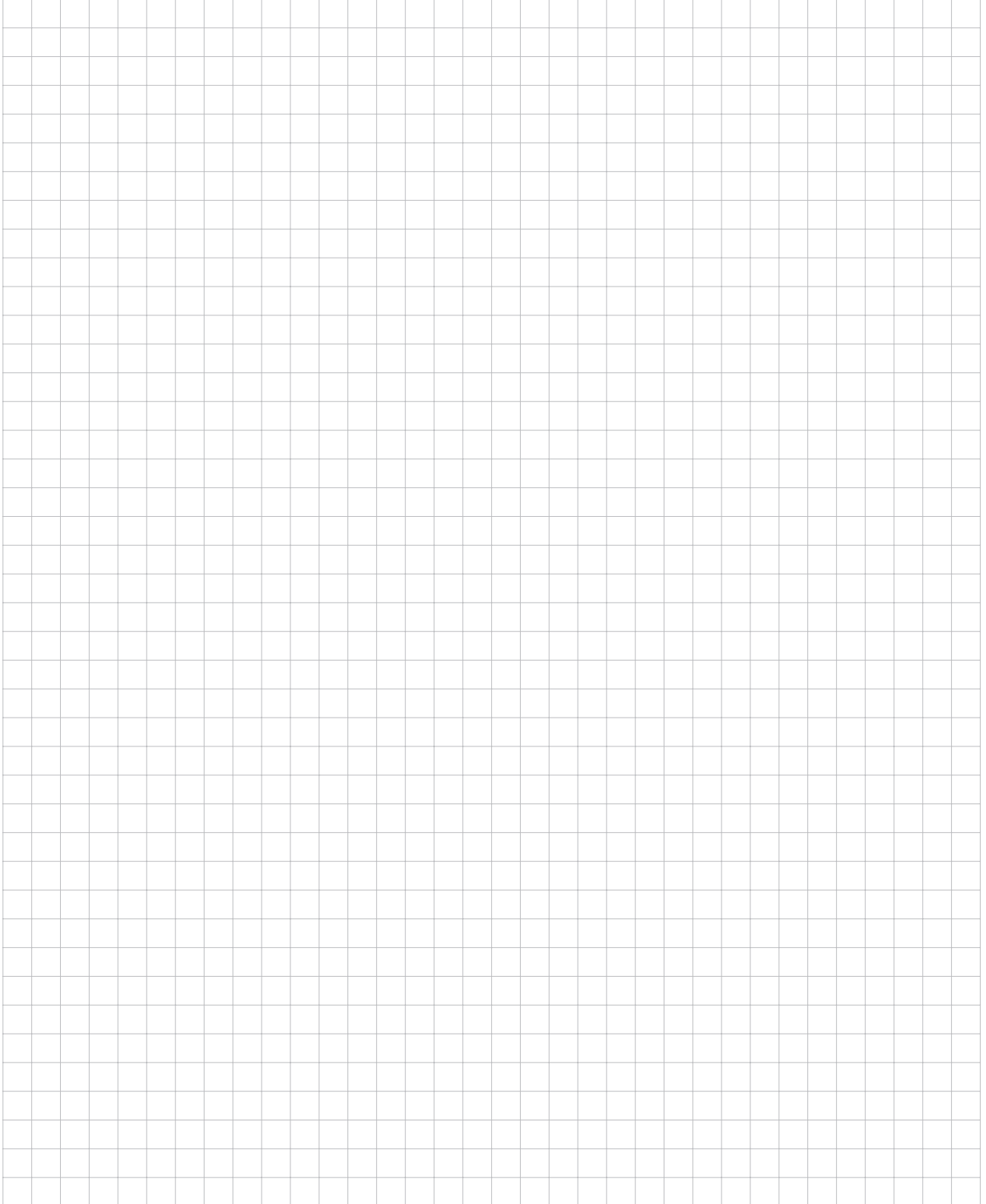
Instead of the electric actuator, the PIQCV valve can also be operated with a flow limiter (flow limiter ZCQ-FL) (see accessories). The flow limiter ensures that the consumer is permanently supplied with a manually set water quantity.

Flow direction

The direction of flow, specified by an arrow on the housing, is to be complied with, since otherwise the ball valve could become damaged. Please ensure that the ball for DN 15 and DN 20 is in the correct position (marking on the spindle).









All inclusive.

As a global market leader, Belimo develops innovative solutions for the regulation and control of heating, ventilation and air-conditioning systems. In doing so, actuators, valves, and sensors make up the core business.

With a consistent focus on customer value, we deliver more than just products. We offer you the complete product range of actuator and sensor solutions for the regulation and control of HVAC systems from a single source. At the same time, we rely on tested Swiss quality with a 5-year guarantee. Our worldwide representatives in over 80 countries guarantee short delivery times and extensive support through the entire product life. Belimo does indeed include everything.

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