S&C RECLOSER BYPASS DISCONNECTS

OUTDOOR DISTRIBUTION
(14.4 KV THROUGH 34.5 KV)

Simplify recloser maintenance and inspection without power interruption. Maximize overcurrent protection and coordination with a wide range of fusing options while recloser is offline.

Introduction

Reclosers and fault-testing technology have become more widespread to provide greater reliability and satisfaction for customers. But what happens when reclosers need to be taken offline to be inspected or maintained?

This is where using S&C's Recloser Bypass Disconnect can be implemented to seamlessly keep the power on while bypassing and isolating reclosers so necessary inspection and maintenance can be performed. The Recloser Bypass Disconnect can be used with numerous fusing options to cover a wide range of protection profiles. It can also be used in applications other than reclosing, such as bypassing and isolating current transformers.

With it's ability to be configured per installation requirements and with continuous current ratings up to 600 A, S&C's Recloser Bypass Disconnect can be

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tailored to fit the space limitations and specific time-current characteristic (TCC) protection demands needed for most recloser bypassing applications.

Application

S&C Recloser Bypass Disconnects are station-type devices used to bypass and isolate automatic circuit reclosers for repair or routine maintenance. They are generally applied in combination with a separately mounted Loadbuster Disconnect® Switch. They can also be applied to bypass and isolate other devices, such as current transformers.

S&C Recloser Bypass Disconnects consist of a fuse, which provides protection for the circuit during recloser downtime, in series with an integral Loadbuster Disconnect Switch. A choice of fuses, including S&C Type SMD-20, Type SMD-40, or Type SM-5 Power Fuses or an S&C Type XS Fuse Cutout, is offered to allow tailoring to the available fault and continuous current levels of a specific application. (S&C Recloser Bypass Disconnects are available with the power fuse mounted either on the right or on the left to fit the physical requirements of the installation.)

Alternately, a second Loadbuster Disconnect Switch is available in place of a fuse for applications where devices other than protective equipment are being bypassed for maintenance or inspection.

S&C Recloser Bypass Disconnects are available in voltage ratings of 14.4 kV, 25 kV, and 34.5 kV. Depending on which S&C Recloser Bypass Disconnect is specified, they can be applied on circuits having a continuous current level through 600 amperes. A complete listing of switch and fuse momentary and/or continuous current ratings is provided in the tables on pages 6 through 11.

Construction

S&C Recloser Bypass Disconnects feature a Loadbuster Disconnect Switch in series with a fuse (or a second Loadbuster Disconnect Switch) mounted to a rugged 3/16-inch (5-mm) thick galvanized formed-steel base. Bases are provided with numerous mounting holes and slots for easy attachment to a user's supporting structure. S&C Recloser Bypass Disconnects are offered with a choice of Cypoxy™ Insulators or porcelain station post insulators.

The disconnect blade of the bypass disconnect is of double-member hard-drawn copper construction, formed for extra rigidity. The blade's broad-based hinge attachment augments the stability of the disconnect, thus ensuring positive contact engagement, even when closed from the side.

Silver-to-silver contacts at the latch end of the disconnect blade are backed by stainless steel loading springs to keep contacts under constant pressure (ensuring minimum resistance at current-transfer points) and to provide a smooth, positive wiping action during each opening and closing operation. And the surface structure of the stationary contacts differs from that of the blade contacts, thus preventing sticking, galling, or seizing. Contacts won't weld, burn, or pit on overcurrents.

The S&C Power Fuse or S&C Fuse Cutout mounted in series with the disconnect blade features spring-backed, silver-to-silver contacts at all current-transfer points. And the easily accessible trunnion pocket in the rugged cast bronze hinge makes inserting the holder or fuse unit (or fuse tube) an easy operation.

Guide surfaces on the inner faces of the hinge casting ensure "on-center" approach of the fuse to the upper live parts upon closing. And a carefully positioned and proportioned bronze pull-ring makes opening with a conventional hookstick a simple operation.

For details concerning the operation of S&C Recloser Bypass Disconnects, refer to the "Operation" section on page 4.

Construction features

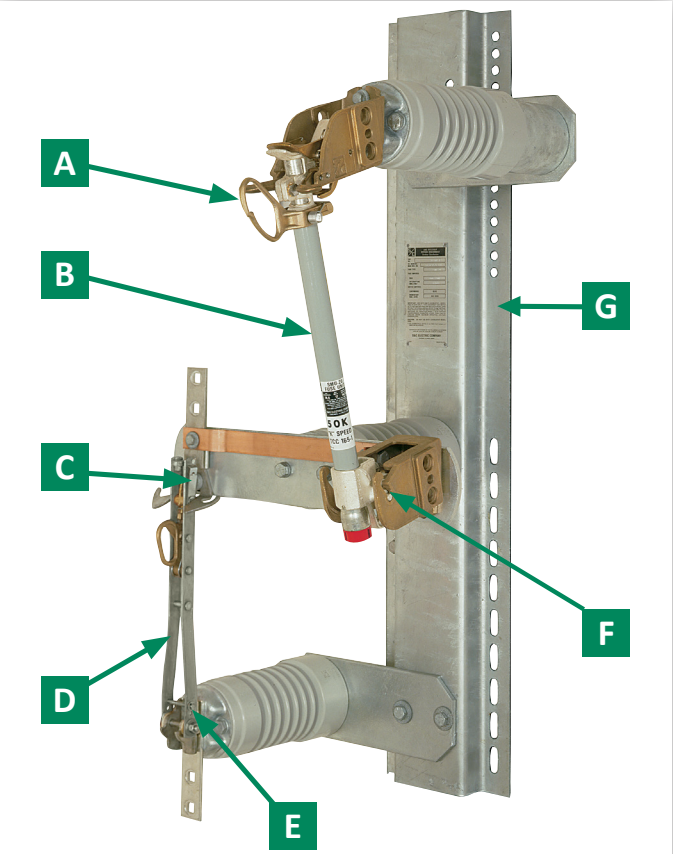


FIGURE 1. Construction of S&C Recloser Bypass Disconnect with Type SMD-20 Power Fuse.

A **Bronze pull-ring** is carefully positioned and proportioned for ease of operation with a conventional hookstick

B **SMU-20® Fuse Unit**

C **Stainless steel loading springs** keep silver-to-silver contacts under constant pressure to produce minimum contact resistance. Positive-wiping-action contacts won't weld, burn, or pit on overcurrents

D **Double-member disconnect blade** features hard-drawn copper construction, formed for extra rigidity, and a broad-based hinge attachment that ensures positive contact engagement even when closed from the side

E **Blade stop pin** is factory set for 160-degree opening and can be readily field-positioned to provide for 90-degree opening

F **Trunnion pocket** in a rugged cast bronze hinge is easily accessible, making inserting the fuse unit an easy operation

G **Rugged galvanized formed-steel base** incorporates numerous mounting holes and slots for easy attachment to the user's supporting structure

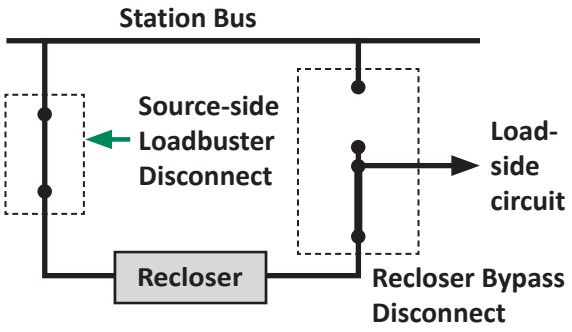
Operation

S&C Recloser Bypass Disconnects are operated as illustrated in Figure 2. In the normal operating configuration, the fuse is removed from the recloser bypass disconnect, and loads are served through the circuit recloser.

To bypass the recloser for repair or inspection, a fuse holder, fuse unit, or cutout fuse tube (as applicable) is installed in the recloser bypass disconnect and closed. The integral disconnect blade is then opened to isolate the recloser from the load-side circuit. Lastly, the source-side Loadbuster Disconnect Switch is opened to de-energize the recloser and to completely isolate it from surrounding circuits. A conventional hookstick can be used to perform each of the operations described above.

To restore the recloser to service, the source-side Loadbuster Disconnect Switch and then the disconnect blade on the bypass disconnect are closed in with a conventional hookstick. (The recloser should also be closed in at this time if not already closed.) Then, the fuse is opened to interrupt the bypass circuit, and the holder, fuse unit, or fuse tube is removed from the fuse mounting. (Outdoor fuses should not be left in the Disconnect position for extended periods.) A conventional hookstick can be used to open the fuse.

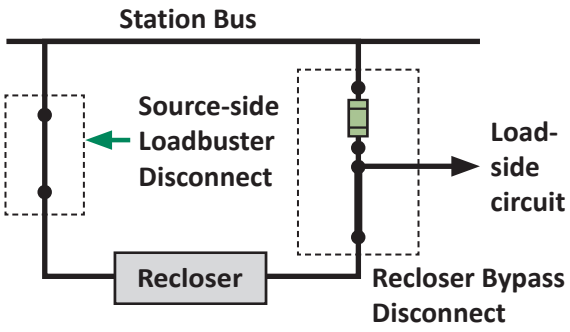
Normal Operating Configuration



Bypass circuit open (fuse removed), with recloser bypass disconnect blade and source-side S&C Loadbuster Disconnect closed.

FIGURE 2. Fuse installed in hinge and close to, in effect, provide a parallel path around the recloser.

Bypassing the Recloser



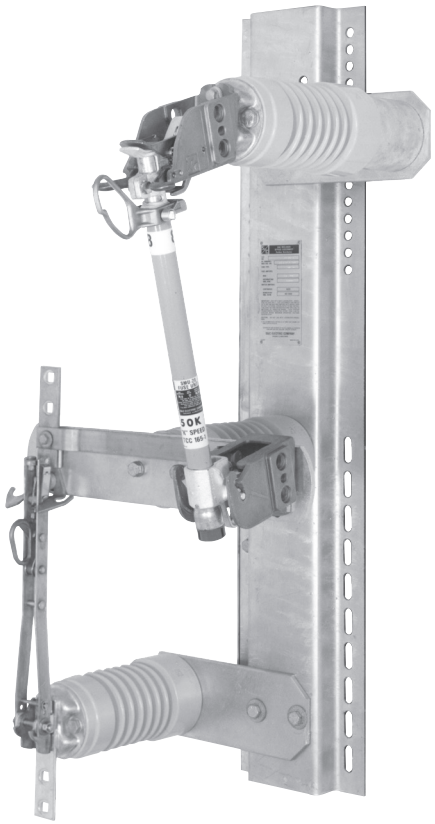
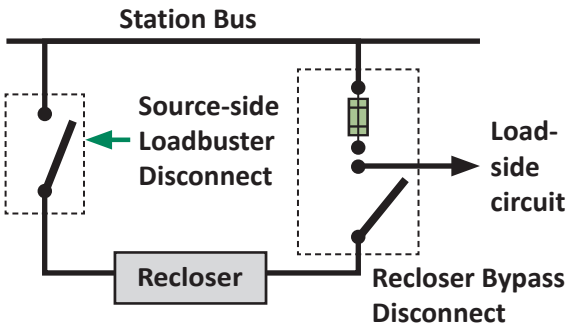


FIGURE 3. Bypass circuit open (fuse removed), with recloser bypass disconnect blade and source-side S&C Loadbuster Disconnect closed.

Isolating the Recloser



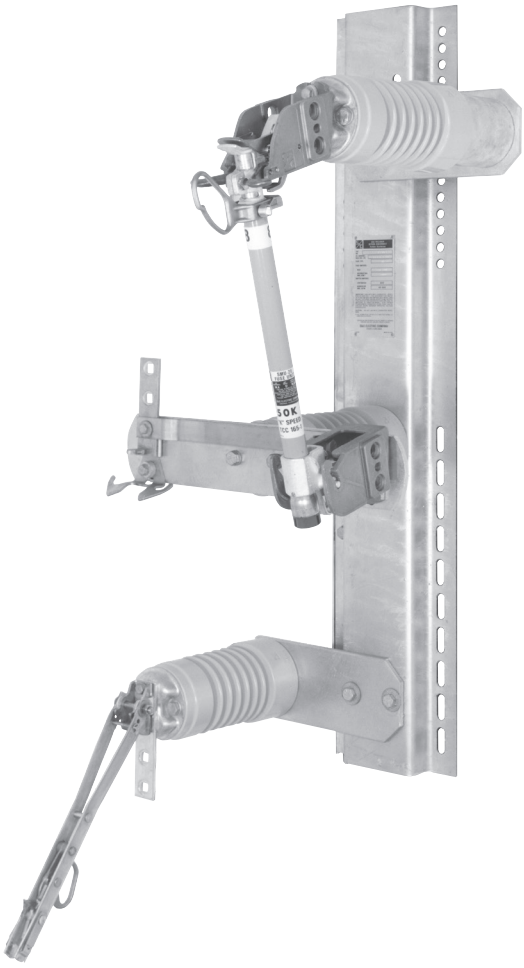


FIGURE 4. Disconnect blade on recloser bypass disconnect and also source-side S&C Loadbuster Disconnect opened to de-energize and completely isolate the recloser.

Ratings

Recloser Bypass Disconnect with Type SMD-20 Power Fuse (fuse on right illustrated[1])

FIGURE 5. Sequence of operation for S&C Recloser Bypass Disconnects.

1 Also available in model with fuse on left.

Rating							Catalog Number[1]			
kV			Amperes, RMS				Cypoxy Station Post Insulators		Porcelain Station Post Insulators	
			Switch		Fuse					
Nom. kV	Max kV	BIL kV	Cont.	Mom.[2] (Asym.)	Max	Interr.[3] (Sym.)	Fuse on Right	Fuse on Left	Fuse on Right	Fuse on Left
14.4	15.5	110	600	40 000	200E[4]	14 000	192702-E	192712-E	192702	192712
25	27	150	600	40 000	200E[4]	12 500	192703-E	192713-E	192703	192713
34.5	38	200	900	40 000	200E[4]	10 000	192704-E	192714-E	192704	192714

TABLE 1. Recloser Bypass Disconnect with Type SMD-20 Power Fuse Ratings

1 Includes fuse unit end-fittings. SMU-20 Fuse Units are not included.

2 One-second rating: 25,000 amperes RMS symmetrical; three-second rating: 16,000 amperes RMS symmetrical.

3 Symmetrical fuse interrupting ratings assigned to recloser bypass disconnects furnished with SMD-20 Power Fuses are based on available short-circuit current at locations where the X/R ratio is 15; the interrupting ratings expressed in amperes RMS asymmetrical are 1.6 times the symmetrical ratings listed.

4 SMD-20 Power Fuses accommodate SMU-20® Fuse Units in ratings through 200K amperes as well as 200E amperes.

Recloser Bypass Disconnect with Type SMD-40 Power Fuse (fuse on right illustrated[1])

FIGURE 6. S&C Recloser Bypass Disconnect with Type SMD-40 Power Fuse, furnished with Cypoxy station post insulators

1 Also available in model with fuse on left.

Rating							Catalog Number[1] [2]			
kV			Amperes, RMS				Cypoxy Station Post Insulators		Porcelain Station Post Insulators	
			Switch		Fuse					
Nom.	Max	BIL	Cont.	Mom.[3] (Asym.)	Max	Interr.[4] (Sym.)	Fuse on Right	Fuse on Left	Fuse on Right	Fuse on Left
14.4	15.5	110	600	40 000	400E	25 000	192802-E	192812-E	192802	192812
25	27	150	600	40 000	400E	20 000	192803-E	192813-E	192803	192813

TABLE 2. S&C Recloser Bypass Disconnect with Type SMD-40 Power Fuse, furnished with Cypoxy station post insulators

1 One-second rating: 25,000 amperes RMS symmetrical; three-second rating: 16,000 amperes RMS symmetrical.

2 SMD-40 mountings can be equipped with an optional attachment hook to accommodate Loadbuster®. Specify by adding suffix "LB" to the catalog number.

3 Symmetrical fuse interrupting ratings assigned to Recloser Bypass Disconnects furnished with SMD-40 Power Fuses are based on available short-circuit current at locations where the X/R ratio is 15; the interrupting ratings expressed in amperes RMS asymmetrical are 1.6 times the symmetrical ratings listed.

4 Includes fuse-unit end fittings. SMU-40® Fuse Units are not included.

Recloser Bypass Disconnect with Type SM-5 Power Fuse (fuse on right illustrated[1])

FIGURE 7. S&C Recloser Bypass Disconnect with Type SM-5® Refill Unit, furnished with porcelain station post insulators

1 *Also available in model with fuse on left.

Rating							Catalog Number[1]			
kV			Amperes, RMS				Cypoxy Station Post Insulators		Porcelain Station Post Insulators	
			Switch		Fuse					
Nom.	Max	BIL	Cont.	Mom.[2] (Asym.)	Max	Interr.[3] (Sym.)	Fuse on Right	Fuse on Left	Fuse on Right	Fuse on Left
14.4	15.5	110	600	40 000	400E	34 000	192722-E	192732-E	192722	192732
25	27	150	600	40 000	300E	20 000	192723-E	192733-E	192723	192733

TABLE 3. Recloser Bypass Disconnect with Type SM-5 Power Fuse Ratings

1 SM-5 Holders and SM-5 Refill Units are not included. Models rated 14.4 kV require an SM-5 Holder, catalog number 86152R2. Models rated 25 kV require an SM-5 Holder, catalog number 86153R2.

2 One-second rating: 25,000 amperes RMS symmetrical; three-second rating: 16,000 amperes RMS symmetrical.

3 Symmetrical fuse interrupting ratings assigned to recloser bypass disconnects furnished with SM-5 Power Fuses are based on available short-circuit current at locations where the X/R ratio is 15; the interrupting ratings expressed in amperes RMS asymmetrical are 1.6 times the symmetrical ratings listed.

Recloser Bypass Disconnect with Type XS Fuse Cutout (fuse on left illustrated[1])

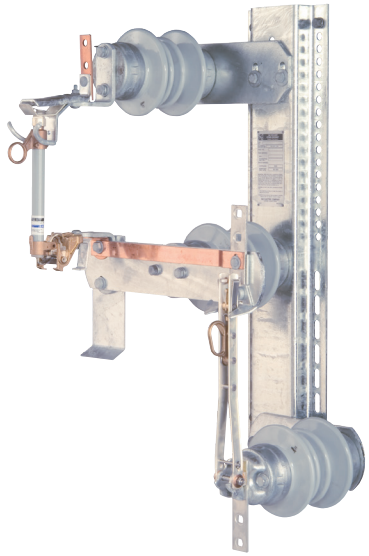


FIGURE 8. S&C Recloser Bypass Disconnect with Type XS Fuse Cutout, furnished with porcelain station post insulators

1 Also available in model with fuse on right.

Rating							Catalog Number[1]			
kV			Amperes, RMS				Cypoxy Station Post Insulators		Porcelain Station Post Insulators	
			Switch		Fuse					
Nom.	Max	BIL	Cont.	Mom.[2] (Asym.)	Max	Interr.[3] (Sym.)	Fuse on Right	Fuse on Left	Fuse on Right	Fuse on Left
14.4	15	110	600	40000	100	7 100	192742R1-E[4]	192752R1-E[5]	192742R1[5]	192752R1[5]
14.4	15	110	600	40000	200	7 100	192762R1-E[5]	192772R1-E[6]	192762R1[6]	192772R1[6]
25	27	150	600	40000	100	5 300	192763R1-Eh[6]	192773R1-E[7]	192763R1[7]	192773R1[7]
25	27	150	600	40000	200	5 300	192743R1-E[6]	192753R1-E[6]	192743R1[6]	192753R1[6]

TABLE 4. Recloser Bypass Disconnect with Type XS Fuse Cutout

1 Fuse links are not included.

2 One-second rating: 25,000 amperes RMS symmetrical; three-second rating: 16,000 amperes RMS symmetrical.

3 Symmetrical fuse interrupting ratings assigned to recloser bypass disconnects furnished with Type XS Fuse Cutouts are based on available short-circuit current at locations where the X/R ratio is 8 for 14.4-kV models, or 12 for 25-kV models; the RMS asymmetrical interrupting ratings are 10,000 amperes for 14.4-kV models, 8,000 amperes for 25-kV models.

4 Includes fuse tube, catalog number 89521R10.

5 Includes fuse tube, catalog number 89572R11.

6 Includes fuse tube, catalog number 89522R10.

Recloser Bypass Disconnect with a Second Loadbuster Disconnect Switch in Place of a Fuse

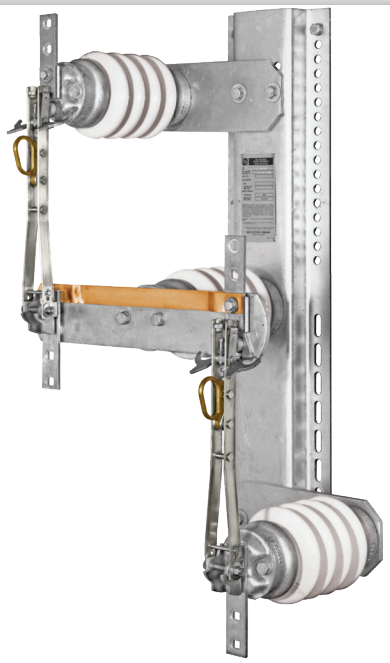


FIGURE 9. S&C Recloser Bypass Disconnect with a second Loadbuster Disconnect Switch in place of a fuse, furnished with porcelain station post insulators

Rating					Catalog Number	
kV			Amperes, RMS			
			Switch			
Nom.	Max	BIL	Cont.	Mom.[1] (Asym.)	Cypoxy Station Post Insulators	Porcelain Station Post Insulators
14.4	15.5	110	600	40 000	192782-E	192782
25	27	150	600	40 000	192783-E	192783

TABLE 5. Recloser Bypass Disconnect with Second Loadbuster Disconnect in Place of Fuse

1 One-second rating: 25,000 amperes RMS symmetrical; three-second rating: 16,000 amperes RMS symmetrical.

Type RA Recloser Bypass Disconnect

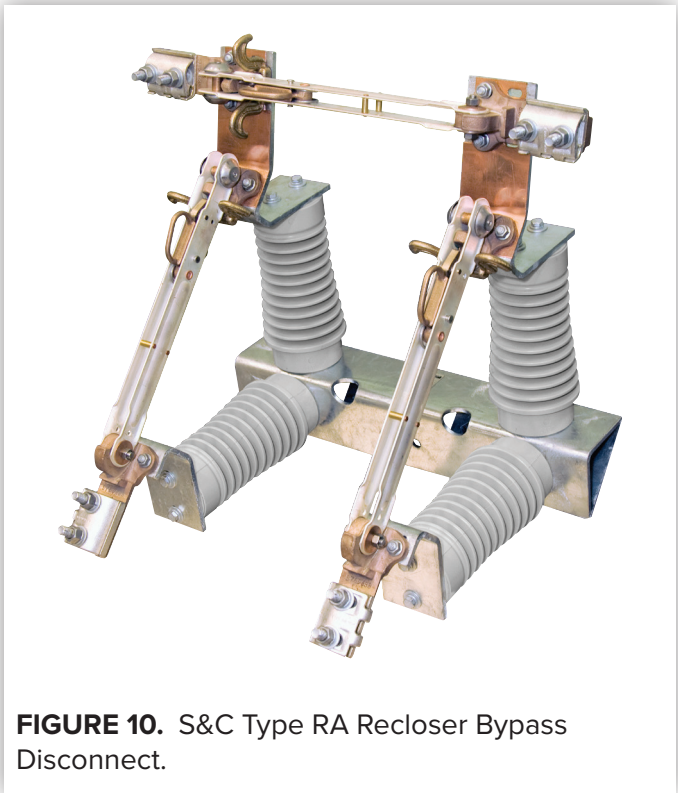


FIGURE 10. S&C Type RA Recloser Bypass Disconnect.

Ratings					Leakage Distance to Ground, Minimum, Inches (mm)	Catalog Number			
kV			Amperes, RMS			Cypoxy Insulators		Porcelain Station Post Insulators	
Nom.	Max	BIL	Cont.	Mom.,[1] Asym.		Clockwise Blade Opening	Counter-Clockwise Blade Opening	Clockwise Blade Opening	Counter-Clockwise Blade Opening
14.4	15.5	110	900	40 000	14.2 (361)	192522-E	192532-E	192522	192532
25	27	125[2]	900	40 000	24.2 (615)	192523-E	192533-E	192523	192533

TABLE 6. Recloser Bypass Disconnect — Type RA

1 For disconnects rated 900 amperes continuous, the 3-second rating is 25,000 amperes RMS symmetrical.
2 These disconnects equipped with Cypoxy Insulators meet requirements for 150-kV BIL rating.

Contact your S&C sales representative for more information

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