



High voltage fuse-links 222

Technical data 454

CESI atestirano

HIGH VOLTAGE FUSES



ETI POWER NEEDS CONTROL

High voltage fuse-links

High voltage high-breaking capacity VV fuse-links

General information

ETI HV fuse-links named VV THERMO are designed to protect devices in switch-gears and other equipment (distribution transformers, capacitors, motors) from thermal and dynamic effects of shortcircuits and overcurrents. Time-current characteristics correspond to standard IEC 60282-1, item 3.3.3. Back-up fuse.

They are suitable for installation in:

- indoor and outdoor switchgear
- gas (SF₆)-insulated enclosures
- special service conditions (different from normal conditions, described in item 2.1. of standard IEC 60282-1)

The most significant features of ETI high voltage fuses:

- Low temperature rise because of low power dissipation
- High breaking capacity 50 kA
- Possibility of three different striker pin forces: 80 N and 120 N (with integrated temperature dependent limiter) and 50 N.
- Reliable sealing system against humidity irruption
- Low switching voltages
- Upon a request, fuse links can be supplied into no-standard dimensions

Overview of standard and non-standard dimensions

ETI VV THERMO	2A	4A	6A	10A	16A	20A	25A	32A	40A	50A	63A	80A	100A	125A	160A	200A	250A	315A	
7,2 kV	192 x Ø 53										192 x Ø 68		192 x Ø 85						
	292 x Ø 53										292 x Ø 68		292 x Ø 85						
	442 x Ø 53										442 x Ø 68				442 x Ø 85				
12 kV	192 x Ø 53					192 x Ø 68					292 x Ø 68		292 x Ø 85						
	292 x Ø 53																		
	442 x Ø 53										442 x Ø 68		442 x Ø 85			537 x Ø 85			
17.5 kV	292 x Ø 53					292 x Ø 68			292 x Ø 85				367 x Ø 68		367 x Ø 85				
	367 x Ø 53																		
	442 x Ø 53										442 x Ø 68		442 x Ø 85						
24 kV	292 x Ø 53					292 x Ø 68			292 x Ø 85		442 x Ø 68		442 x Ø 85						
	442 x Ø 53																		
	537 x Ø 53										537x Ø 68		537 x Ø 85						
36 kV	442 x Ø 53										537 x Ø 68		537 x Ø 85						
	537 x Ø 53																		

Standards

ETI VV (Medium Voltage) fuse-links comply with the following standards and specifications:

- IEC 60282-1, Sixth edition 11 / 2005 "Current limiting fuses"
- DIN 43625 "Hochspannungs-Sicherungen Nennspannung 3,6 bis 36kV"
- "VDE 0670 T402, Wechselstromschaltgeraete fuer Spannungen ueber 1 kV, Auswahl von strombegrenzenden Sicherungseinsaetzen fuer Transformatorstromkreise" / IEC 60787 "Application guide for the selection of high-voltage current limiting fuse-links for transformer circuits"
- IEC 60644 "Specification for high-voltage fuse-links for motor circuit applications"
- IEC 60549 "High-voltage fuses for external protection of power capacitors"

Certificates, Test reports

- CESI (Milan, Italy) certificate for 12kV, 17.5kV and 24kV
- KERI (Chang Wong, S.Korea) certificate for 7.2kV and 24kV
- ICMET (Craiova, Romania) test report for 36kV
- Test reports for 25kV, 38.5kV, 40.5kV and 42kV versions

Construction:

ETI high voltage fuses are designed to assure stable and reliable characteristics. The glazed porcelain tube (made in ETI own ceramic factory) is extremely high mechanical and thermal resistant.

Galvanically protected contact caps made of electrolytic copper are nickel - or upon customer request silver plated. Caps are rolled by pressing into the groove of the tube. The tightness of this connection is assured by a special seal resistant to ageing and high temperatures.

The design and method of production of the melting elements ensures precisely tolerances and stable time / current characteristics. Fuse elements are wound on a ceramic carrier and electrically welded on a special copper strips.

The inside of the tube is filled with quartz sand with an exactly determined granulation and chemical structure. The sand guarantees good and reliable extinguishing of the electric arc.

An important element in the fuse-link construction is also the striker system. Part of that system is temperature sensitive element, which reacts in cases of temperature increasing of the fuse-link due to various reasons. The reaction temperature is set to approximately 250 °C on fuse tube surface. The system reacts in such a way that short time overloads do not cause the fuse to interrupt the circuit unnecessarily. Only when inadmissible values of surrounding temperatures are exceeded, the fuse open the switch via the striker pin. Because of these characteristics, ETI "thermal" striker pin is convenient for the protection of the fuse enclosure of SF6 switchgears which requires additional protection features against inadmissible temperatures of certain switchgear parts.

Striker pin Type description, rated voltage 7,2 kV example:

- VVC; 50N striker force (C mark).
- VVT-D; Temperature limiter (VVT), 80N striker force (D mark).
- VVT-E; Temperature limiter (VVT), 120N striker force (E mark).

Ordering Code Numbers

rated voltage U_n [kV]	Dimension "e" according to DIN and IEC (mm)	rated current [A]	VVC Striker type 50N	VVT-D Striker type 80N THERMO	VVT-E Striker type 120N THERMO	Tube diameter "d" (mm)	weight [kg]
3/7.2	192	2 A	004225003	004226003	004227003	53	1.1
		4 A	004225004	004226004	004227004		
		6 A	004225005	004226005	004227005		
		10 A	004225006	004226006	004227006		
		16 A	004225007	004226007	004227007		
		20 A	004225008	004226008	004227008		
		25 A	004225009	004226009	004227009		
		32 A	004225010	004226010	004227010	68	1.7
		40 A	004225011	004226011	004227011		
		50A	004225012	004226012	004227012		
		63 A	004225013	004226013	004227013	85	2.7
		80 A	004225014	004226014	004227014		
		100 A	004225015	004226015	004227015		
		125A	004225016	004226016	004227016		
		160 A	004225017	004226017	004227017	53	1.6
	292	2A	004225503	004226503	004227503		
		4A	004225504	004226504	004227504		
		6 A	004225505	004226505	004227505		
		10 A	004225506	004226506	004227506		
		16 A	004225507	004226507	004227507		
		20 A	004225508	004226508	004227508		
		25 A	004225509	004226509	004227509		
		32 A	004225510	004226510	004227510		
		40 A	004225511	004226511	004227511		
		50 A	004225512	004226512	004227512		
		63 A	004225513	004226513	004227513	68	2.8
		80A	004225514	004226514	004227514		
		100 A	004225515	004226515	004227515		
		125A	004225516	004226516	004227516	85	4.0
		160 A	004225517	004226517	004227517		
		200 A	004225518	004226518	004227518		
		250 A	004225519	004226519	004227519		
	442	2A	004225603	004226603	004227603	68	3.9
		4A	004225604	004226604	004227604		
		6A	004225605	004226605	004227605		
		10A	004225606	004226606	004227606		
		16A	004225607	004226607	004227607		
		20A	004225608	004226608	004227608		
		25A	004225609	004226609	004227609		
		32A	004225610	004226610	004227610		
		40A	004225611	004226611	004227611		
		50A	004225612	004226612	004227612		
		63 A	004225613	004226613	004227613		
		80A	004225614	004226614	004227614		
		100 A	004225615	004226615	004227615		
		125A	004225616	004226616	004227616		
		160 A	004225617	004226617	004227617		
		200 A	004225618	004226618	004227618		
		250 A	004225619	004226619	004227619	85	5.8
		315 A	004225620	004226620	004227620		

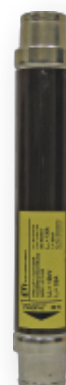
Note 1: Other ratings and dimensions can be supplied by customer request. For particular applications, please contact ETI technical team.
 Note 2: Orange colored types according to IEC 60282-1 dimensions.

High voltage fuse-links

Ordering Code Numbers

rated voltage U_n [kV]	Dimension "e" according to DIN and IEC (mm)	rated current [A]	VVC Striker type 50N	VVT-D Striker type 80N THERMO	VVT-E Striker type 120N THERMO	Tube diameter "d" (mm)	weight [kg]
6/12	192	2 A	004235103	004236103	004237103	53	1.1
		4 A	004235104	004236104	004237104		
		6 A	004235105	004236105	004237105		
		10 A	004235106	004236106	004237106		
		16 A	004235107	004236107	004237107		
		20 A	004235108	004236108	004237108	68	1.7
		25 A	004235109	004236109	004237109		
		32 A	004235110	004236110	004237110		
		40 A	004235111	004236111	004237111		
		50 A	004235112	004236112	004237112		
	292	2 A	004235003	004236003	004237003	53	1.6
		4 A	004235004	004236004	004237004		
		6 A	004235005	004236005	004237005		
		10 A	004235006	004236006	004237006		
		16 A	004235007	004236007	004237007		
		20 A	004235008	004236008	004237008		
		25 A	004235009	004236009	004237009		
		32 A	004235010	004236010	004237010	68	2.8
		40 A	004235011	004236011	004237011		
		50 A	004235012	004236012	004237012		
		63 A	004235013	004236013	004237013		
		80 A	004235014	004236014	004237014		
		100 A	004235015	004236015	004237015	85	4.0
		125 A	004235016	004236016	004237016		
		160 A	004235017	004236017	004237017		
	442	2 A	004235503	004236503	004237503	53	2.3
		4 A	004235504	004236504	004237504		
		6 A	004235505	004236505	004237505		
		10 A	004235506	004236506	004237506		
		16 A	004235507	004236507	004237507		
		20 A	004235508	004236508	004237508		
		25 A	004235509	004236509	004237509		
		32 A	004235510	004236510	004237510		
		40 A	004235511	004236511	004237511		
		50 A	004235512	004236512	004237512		
		63 A	004235513	004236513	004237513	68	3.9
		80 A	004235514	004236514	004237514		
		100 A	004235515	004236515	004237515		
		125 A	004235516	004236516	004237516	85	5.8
		160 A	004235517	004236517	004237517		
		200 A	004235518	004236518	004237518		
	537	160 A	004235617	004236617	004237617	85	7.0
		200 A	004235618	004236618	004237618		
		250 A	004235619	004236619	004237619		

Note 1: Other ratings and dimensions can be supplied by customer request. For particular applications, please contact ETI technical team.
 Note 2: Orange colored types according to IEC 60282-1 dimensions.





Ordering Code Numbers

rated voltage U_n [kV]	Dimension "e" according to DIN and IEC (mm)	rated current [A]	VVC Striker type 50N	VVT-D Striker type 80N THERMO	VVT-E Striker type 120N THERMO	Tube diameter "d" (mm)	weight [kg]
10/17,5	292	2 A	004245103	004246103	004247103	53	1.6
		4 A	004245104	004246104	004247104		
		6 A	004245105	004246105	004247105		
		10 A	004245106	004246106	004247106		
		16 A	004245107	004246107	004247107		
		20 A	004245108	004246108	004247108		
		25 A	004245109	004246109	004247109	68	2.8
		32 A	004245110	004246110	004247110		
		40 A	004245111	004246111	004247111	85	4.0
		50A	004245112	004246112	004247112		
		63 A	004245113	004246113	004247113		
		80 A	004245114	004246114	004247114		
		100A	004245015	004246015	004247015	53	1.9
	367	2 A	004245003	004246003	004247003		
		4 A	004245004	004246004	004247004		
		6 A	004245005	004246005	004247005		
		10 A	004245006	004246006	004247006		
		16 A	004245007	004246007	004247007		
		20 A	004245008	004246008	004247008		
		25 A	004245009	004246009	004247009		
		32 A	004245010	004246010	004247010		
		40 A	004245011	004246011	004247011		
		50 A	004245012	004246012	004247012		
		63 A	004245013	004246013	004247013	68	3.1
		80A	004245014	004246014	004247014		
		100 A	004245015	004246015	004247015	85	4.6
		125A	004245016	004246016	004247016		
		160 A	004245017	004246017	004247017		
	442	2 A	004245503	004246503	004247503	53	2.3
		4 A	004245504	004246504	004247504		
		6 A	004245505	004246505	004247505		
		10 A	004245506	004246506	004247506		
		16 A	004245507	004246507	004247507		
		20 A	004245508	004246508	004247508		
		25 A	004245509	004246509	004247509		
		32 A	004245510	004246510	004247510		
		40 A	004245511	004246511	004247511		
		50 A	004245512	004246512	004247512		
		63 A	004245513	004246513	004247513	68	3.9
		80A	004245514	004246514	004247514		
		100 A	004245515	004246515	004247515	85	5.8
		125A	004245516	004246516	004247516		

Note 1: Other ratings and dimensions can be supplied by customer request. For particular applications, please contact ETI technical team.

Note 2: Orange colored types according to IEC 60282-1 dimensions.

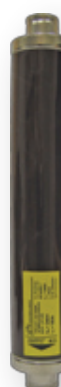
High voltage fuse-links

Ordering Code Numbers

rated voltage U_n [kV]	Dimension "e" according to DIN and IEC (mm)	rated current [A]	VVC Striker type 50N	VVT-D Striker type 80N THERMO	VVT-E Striker type 120N THERMO	Tube diameter "d" (mm)	weight [kg]
10/24	292	2 A	004255103	004256103	004257103	53	1.6
		4 A	004255104	004256104	004257104		
		6 A	004255105	004256105	004257105		
		10 A	004255106	004256106	004257106		
		16 A	004255107	004256107	004257107		
		20 A	004255108	004256108	004257108	68	2.8
		25 A	004255109	004256109	004257109		
		32 A	004255110	004256110	004257110		
		40 A	004255111	004256111	004257111	85	4.0
		50A	004255112	004256112	004257112		
		63 A	004255113	004256113	004257113		
	442	2 A	004255003	004256003	004257003	53	2.3
		4 A	004255004	004256004	004257004		
		6 A	004255005	004256005	004257005		
		10 A	004255006	004256006	004257006		
		16 A	004255007	004256007	004257007		
		20 A	004255008	004256008	004257008		
		25 A	004255009	004256009	004257009		
		32 A	004255010	004256010	004257010		
		40 A	004255011	004256011	004257011	68	3.9
		50 A	004255012	004256012	004257012		
		63 A	004255013	004256013	004257013		
		80A	004255014	004256014	004257014		
		100 A	004255015	004256015	004257015	85	5.8
		125A	004255016	004256016	004257016		
	537	2 A	004255503	004256503	004257503	53	2.8
		4 A	004255504	004256504	004257504		
		6 A	004255505	004256505	004257505		
		10 A	004255506	004256506	004257506		
		16 A	004255507	004256507	004257507		
		20 A	004255508	004256508	004257508		
		25 A	004255509	004256509	004257509		
		32 A	004255510	004256510	004257510		
		40 A	004255511	004256511	004257511	68	4.7
		50 A	004255512	004256512	004257512		
		63 A	004255513	004256513	004257513		
		80A	004255514	004256514	004257514		
		100 A	004255515	004256515	004257515	85	7.0
		125 A	004255516	004256516	004257516		
		160 A	004255517	004256517	004257517		

Note 1: Other ratings and dimensions can be supplied by customer request. For particular applications, please contact ETI technical team.

Note 2: Orange colored types according to IEC 60282-1 dimensions.





Ordering Code Numbers

rated voltage U_n [kV]	Dimension "e" according to DIN and IEC (mm)	rated current [A]	VVC Striker type 50N	VVT-D Striker type 80N THERMO	VVT-E Striker type 120N THERMO	Tube diameter "d" (mm)	weight [kg]
20/36	442	2 A	004265103	004266103	004267103	53	2.3
		4 A	004265104	004266104	004267104		
		6 A	004265105	004266105	004267105		
		10 A	004265106	004266106	004267106		
		16 A	004265107	004266107	004267107		
	537	2 A	004265003	004266003	004267003	53	2.8
		4 A	004265004	004266004	004267004		
		6 A	004265005	004266005	004267005		
		10 A	004265006	004266006	004267006		
		16 A	004265007	004266007	004267007		
		20 A	004265008	004266008	004267008	68	4.7
		25 A	004265009	004266009	004267009		
		32 A	004265010	004266010	004267010		
		40 A	004265011	004266011	004267011	85	7.0
		50 A	004265012	004266012	004267012		
		63 A	004265013	004266013	004267013		
		80A **	004265014	004266014	004267014		

** derating factor to take into consideration. Special parameters required.

Note 1: Other ratings and dimensions can be supplied by customer request. For particular applications, please contact ETI technical team.

Note 2: Orange colored types according to IEC 60282-1 dimensions.

High voltage fuse-links for liquid-immersed transformers



Ordering Code Numbers

rated voltage U_n [kV]	Dimension "e" according to DIN and IEC (mm)	rated current [A]	VVT-D Striker type 80N	Tube diameter "d" (mm)	weight [kg]
6/12	292	2A	004236903	53	1,6
		4A	004236904		
		6A	004236905		
		10A	004236906		
		16A	004236907		
		20A	004236908		
		25A	004236909		
		32A	004236910		
		40A	004236911		
10/24	292	2A	004256943	53	1,6
		4A	004256944		
		6A	004256945		
		10A	004256946		
		16A	004256947		
	442	2A	004256903	53	2,3
		4A	004256904		
		6A	004256905		
		10A	004256906		
		16A	004256907		
		20A	004256908		
		25A	004256909		
		32A	004256910		
		40A	004256911		

High voltage fuse-links

High voltage fuse-links for protection of voltage transformers

Ordering Code Numbers

rated voltage	Dimension "e" according to DIN and IEC (mm)	rated current	VVT-D Striker type 80N	Tube diameter "d" (mm)	weight
U_n [kV]		[A]			[kg]
10/24	235	2A	004251033	53	1,45
		4A	004251034		



Fuse bases for VV fuse-links

1-pole Indoor mounting

type	Rated voltage [kV]	code No.	packaging [pcs]
VVP 12 1p-N	7,2 in 12	004239010	1
VVP 24 1p-N	17,5 in 24	004259010	1
VVP 36 1p-N	36	004269010	1

1-pole Outdoor mounting

type	Rated voltage [kV]	code No.	packaging [pcs]
VVP 12 1p-Z	7,2 in 12	004239030	1
VVP 24 1p-Z	17,5 in 24	004259030	1
VVP 36 1p-Z	36	004269030	1



Accessories

Accessories for 3-pole Indoor fuse-bases

type	code No.	packaging [pcs]
VVP 12 3p-N	004239020	1
VVP 24 3p-N	004259020	1
VVP 36 3p-N	004269020	1

Accessories for 3-pole Outdoor fuse-bases

type	code No.	packaging [pcs]
VVP 12 3p-Z	004239040	1
VVP 24 3p-Z	004259040	1
VVP 36 3p-Z	004269040	1

Note: customer himself can assemble 3-pole fuse-base from 3pcs. of 1-pole fuse-base and 2pcs. of accessories.



