



3ES Surge Arrester

Metal-enclosed, SF₆-insulated for High Voltage Systems up to 800 kV

Answers for energy.

SIEMENS

Perfect Fit

Based on more than 80 years of experience in the world market of surge arresters and a comprehensive portfolio of products for installations rated up to 800 kV, Siemens has become the preferred supplier of HV surge arrester technology for utilities, industrial companies and equipment manufacturers as well as public institutions and consultancies.

Whatever your needs, our surge arresters have a perfect fit in any installation. Sized to demand at competitive costs, they combine the right performance with maximum reliability over a long service life. From overall trouble-free operation to uncompromising safety demands, such as for gas-insulated switchgear – our 3ES series of surge arrester has a history of successful applications throughout the world.



Maximum protection

Siemens gas-insulated, metal-enclosed arresters (GIS arresters) provide maximum protection for gas-insulated switchgear (GIS) and transformers. The reasons are twofold: On the one hand, GIS arresters can be installed very close to the object to be protected, which is important wherever they are fed by long cables, for instance. In this way, over-voltages caused by traveling waves can effectively be minimized. On the other hand, the low self-inductance of GIS arresters provides the best conceivable protection against high rate-of-rise voltages, which are particularly critical for gas-insulated equipment.

Service experience since 1974

The first Siemens GIS arresters were supplied in 1974. Since then, they have been designed for an extremely wide range of different applications, with installations worldwide. Today, Siemens has extensive know-how in GIS arrester technology, ensuring optimum operating characteristics and highest reliability.

Single-phase and three-phase configurations

Siemens offers two different series of GIS arresters. The 3ES2-D, 3ES2-E and 3ES5-H models all feature an electrical and mechanical single-column design. The same design is also available for three-phase configurations (i. e. 3ES5-C three phases per vessel).



Gas and electrical monitoring for GIS arrester

In contrast, the 3ES9-J series has a three-column mechanical and single-column electrical design, which results in a meandering low-inductance current path and reduces the overall length of the arresters.

Ultimate safety

Naturally, all Siemens GIS surge arresters are equipped with pressure-relief safety diaphragms and comply with international standards, such as IEC 60517. By careful choice of materials and paint structure, all Siemens GIS arresters are suitable for outdoor installation.

Arrester monitoring

Every GIS surge arrester from Siemens provides a gas connection. This permits the arrester to be incorporated in an existing gas monitoring system. Alternatively, a separate arrester gas monitor can be provided. The earthed end of each individual arrester phase is routed out of the tank through an insulated bushing which can be used to connect monitoring devices, such as surge counters, telltale spark gaps or leakage current meters.

Versatile connection to any GIS system

Siemens GIS arresters permit versatile connection to any GIS system. Bushings may be of the standard

design or customer specific. Gas-to-gas type bushings as well as gas-to-oil type bushings for connection to transformers are available. In addition to standard connection flanges, special flanges or auxiliary adapter flanges can also be designed, manufactured and supplied according to customer requirements.

Simple and economical start-up

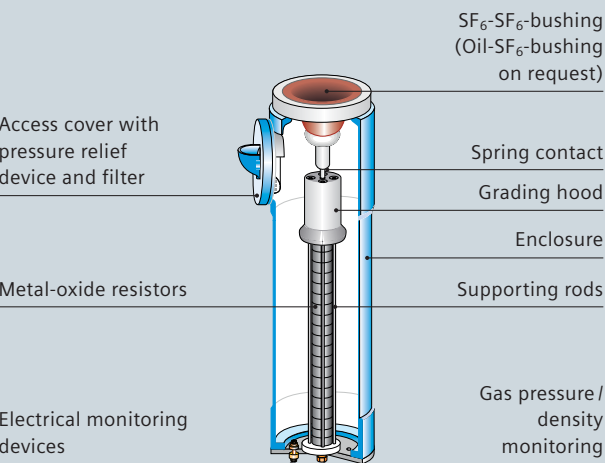
Our GIS arresters minimize the time and labor required for commissioning. The internal mechanical design of the arresters eliminates the need for transportation retainers and opening the tank, which is normally undesirable. However, an internal disconnecting piece is provided, permitting dielectric tests to be performed on the GIS without having to remove the arrester. Depending on the customer's requirements, GIS arresters can be installed in suspended, upright or horizontal positions.

Maintenance-free

Siemens GIS arresters are virtually maintenance-free. Apart from the usual reading of optional electrical monitoring devices and the gas monitor, only the gas humidity has to be checked after ten years, and only the filter material within the tank has to be changed after twenty years of service.

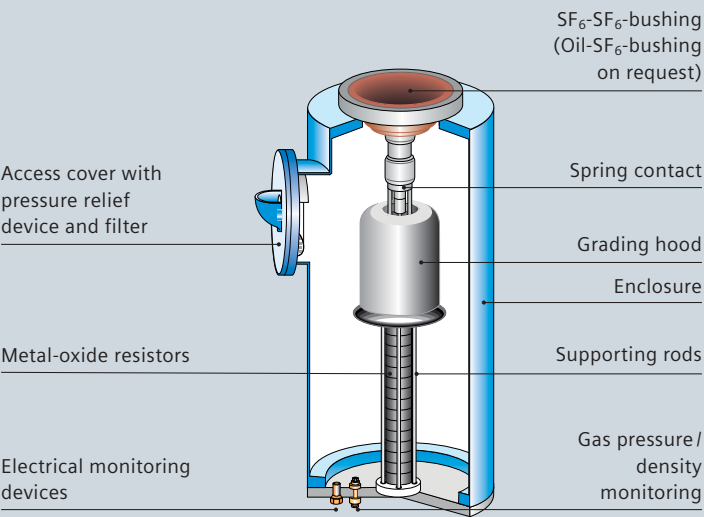
3ES2-D/E

single-phase
(diameter 396 mm)



3ES5-F/G/L

single-phase
(diameter 710 mm)



GIS arresters connected to a 420 kV GIS busbar

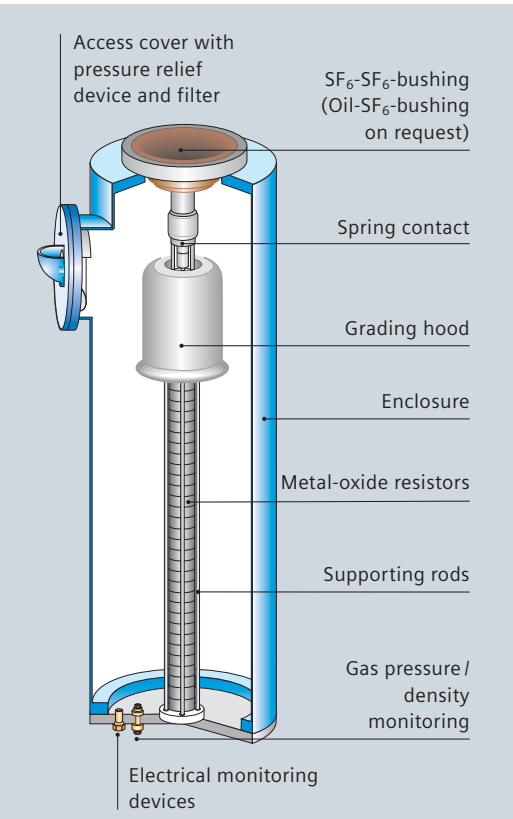
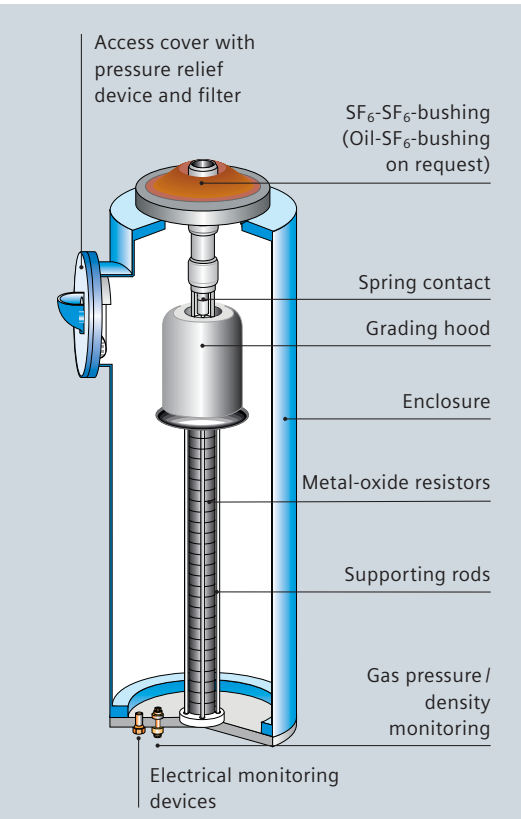


Type

Highest voltage for equipment U_m	[kV]
Max. rated voltage	[kV]
Max. nominal discharge current	[kA]
Max. line discharge class	
Max. thermal energy absorbing capability (per kV of U_r)	[kJ/kV]
Max. long duration current impulse, 2 ms	[A]
Max. height	[mm]
Max. weight	[kg]

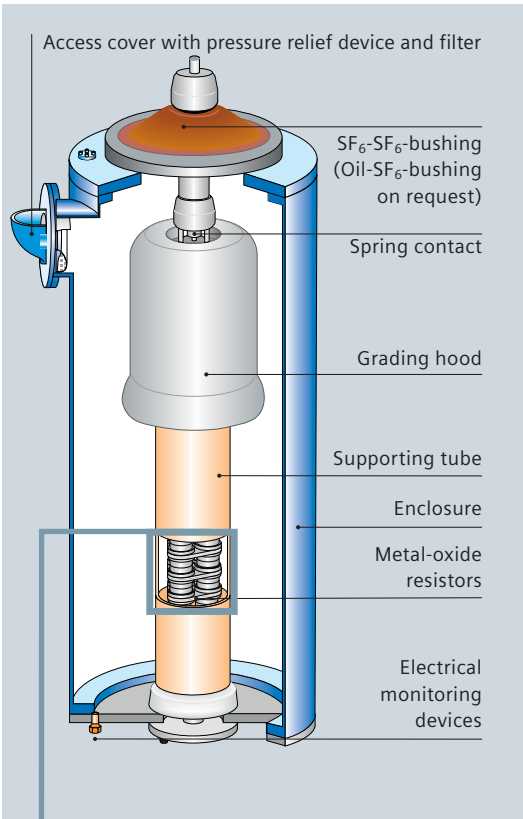
3ES5-H

single-phase
(diameter 710 mm)

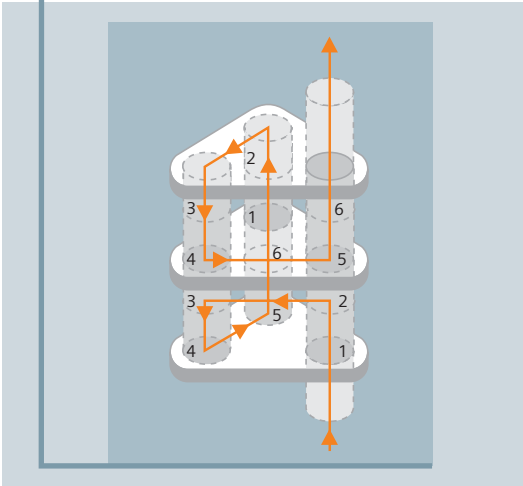


3ES9-J

single-phase
(diameter 1200 mm)



D	E	F/L	G/L	H	J
170	245	245	362	550	800
156	216	216	288	444	612
20	20	20	20	20	20
4	4	4	5	5	5
10	10	10	13	13	18
1200	1200	1200	1600	1600	2100
1460	1460	1500	1850	2800	3100
275	300	700	750	900	1500

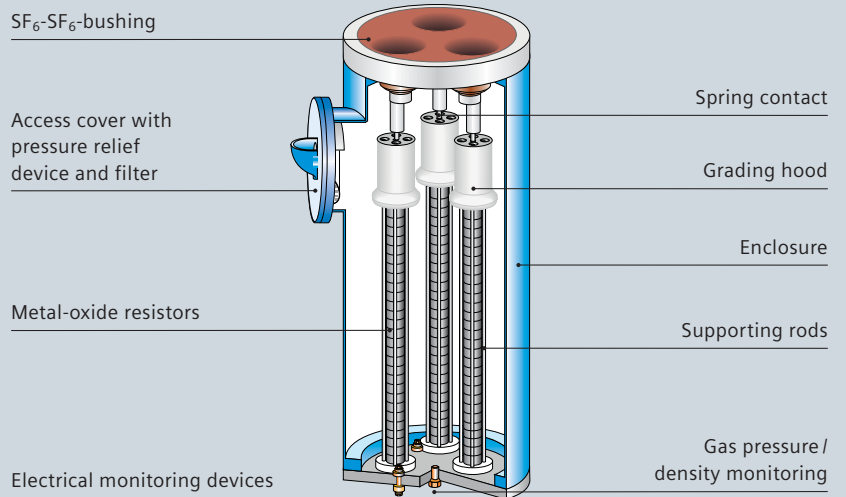


3ES5-C

three-phase
(diameter 710 mm)



Gas-insulated switchgear up to 145 kV,
Type 8DN8-2

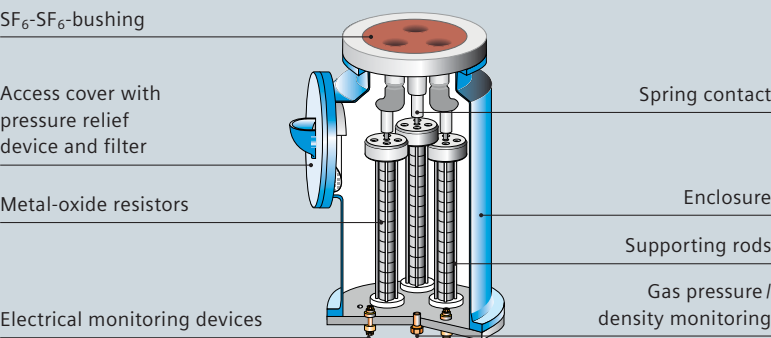


Type

Highest voltage for equipment U_m	[kV]
Max. rated voltage	[kV]
Max. nominal discharge current	[kA]
Max. line discharge class	
Max. thermal energy absorbing capability (per kV of U_r)	[kJ/kV]
Max. long duration current impulse, 2 ms	[A]
Max. height	[mm]
Max. weight	[kg]

3ES4-K

three-phase
(diameter 640 mm)



Gas-insulated switchgear up to 72.5 kV, Type 8DN8-4

C	K
170	72.5
156	96
20	10
4	3
10	8
1200	850
1720	1000
960	680

Gas and electrical monitoring for GIS arrester

- 1 Surge counter with leakage current measurement
- 2 Gas pressure/density monitoring

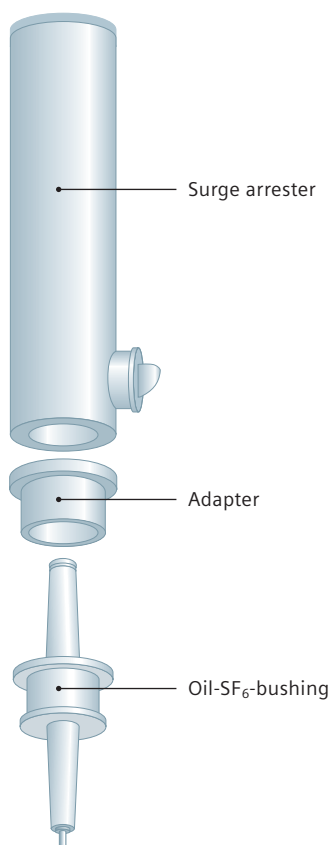


GIS arresters installed at a 123 kV transformer with Oil-SF₆-bushing

Special Application

Immediate safety for any transformer

With the 3ES surge arrester with oil-SF₆-bushing, Siemens offers optimum over-voltage protection for transformers. Due to their modular design, these arresters can be connected particularly to oil transformers of any type and/or oil-SF₆-bushing from any manufacturer, worldwide. An appropriate adapter, if required, is used for connection.

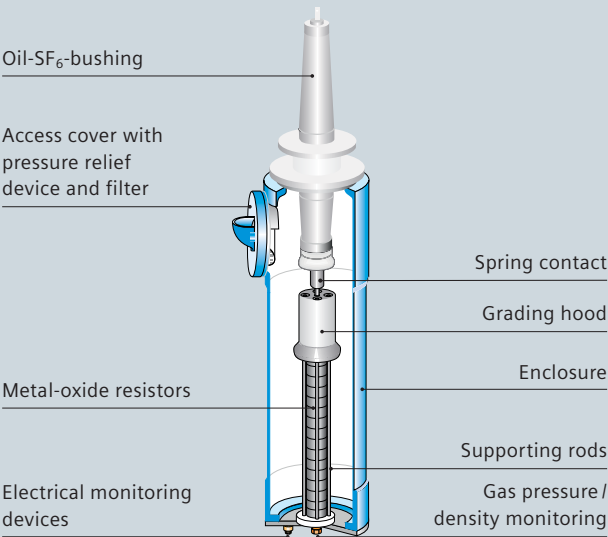


Universal technology

The special advantage of the 3ES series is that it offers a perfect solution for any need of over-voltage protection at operating voltages from 60 to 550 kV. If required, the systems can be installed by our experienced service technicians on-site. The performance and quality of 3ES encapsulated arresters from Siemens have resulted in their use by most of the leading transformer manufacturers, including ABB, Alstom Power Generation, EFACEC, Konçar and Siemens.

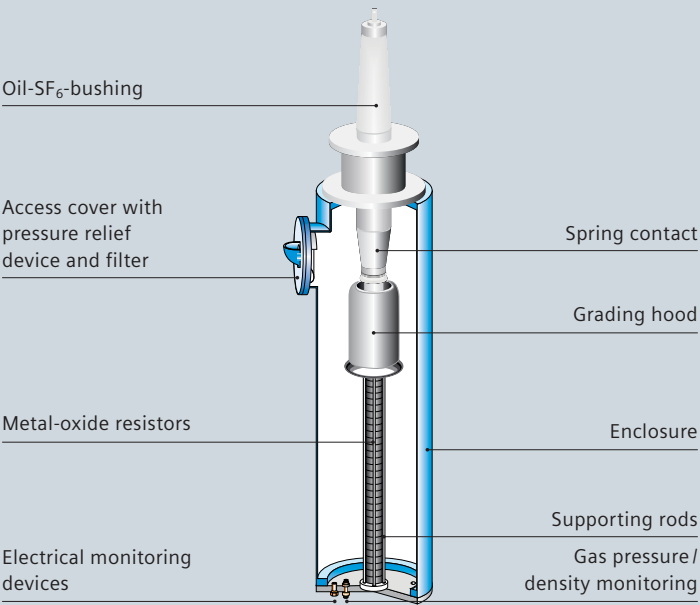
3ES2-C/D

Oil-SF₆
(diameter 396 mm)



3ES5-C/D

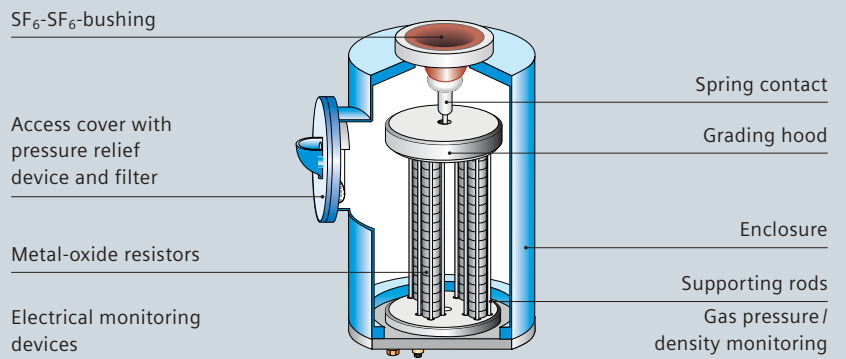
Oil-SF₆
(diameter 710 mm)



Type		3ES2-C/D	3ES5-C/D
Highest voltage for equipment U _m	[kV]	170	550
Max. rated voltage	[kV]	156	444
Max. nominal discharge current	[kA]	20	20
Max. line discharge class		4	5
Max. thermal energy absorbing capability (per kV of U _r)	[kJ / kV]	10	13
Max. long duration current impulse, 2 ms	[A]	1200	1600
Max. height	[mm]	1505	3360
Max. weight	[kg]	250	1300

3ES6-E/H

(diameter 800 mm)



Gas-insulated surge arresters with extra-high energy absorption capability are also available for special applications. Typical applications of this kind are off-shore installations with very long cable routes as well as special network situations with exceptionally long lasting temporary overvoltages (TOV). Here in particular, the outstanding properties of Siemens GIS surge arresters are especially advantageous. They offer extreme compactness as well as high energy absorption capability and resistance against environmental influences thanks to their complete encapsulation. The result is maximum protection for even the most extreme requirements.

Type		E/H
Highest voltage for equipment U_m	[kV]	420
Max. rated voltage	[kV]	336
Max. nominal discharge current	[kA]	20
Max. line discharge class		5
Max. absorbing capability total	[MJ]	7
Max. long duration current impulse, 2 ms	[A]	1600
Max. height	[mm]	1700
Max. weight	[kg]	1100

Control Devices for Surge Arrester



Control spark gap
To estimate the current that flows through the surge arrester in case of an overvoltage and to count the surges

Order number: 3EX6040



Surge counter

Order number: 3EX5030



Surge counter with leakage current meter

Order number: 3EX5050



Surge counter with leakage current meter remote indication

Order number: 3EX5060



Order number: 3EX5062



LCM II
System for live condition check of metal oxide surge arresters
For GIS-arresters upon request
Order name: Transinor LCM II

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