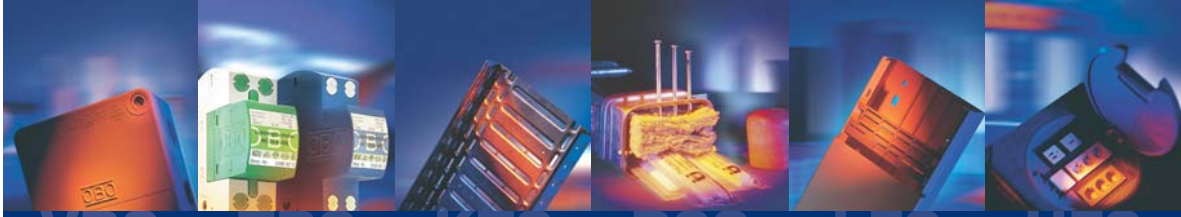
OBO BETTERMANN



TBS. Surge protection systems
Order information and technical data

Protection and isolating spark gaps

- Protection spark gap or isolating spark gap?
- Isolating spark gaps
- Protection spark gap
- Coupling of earthing installations

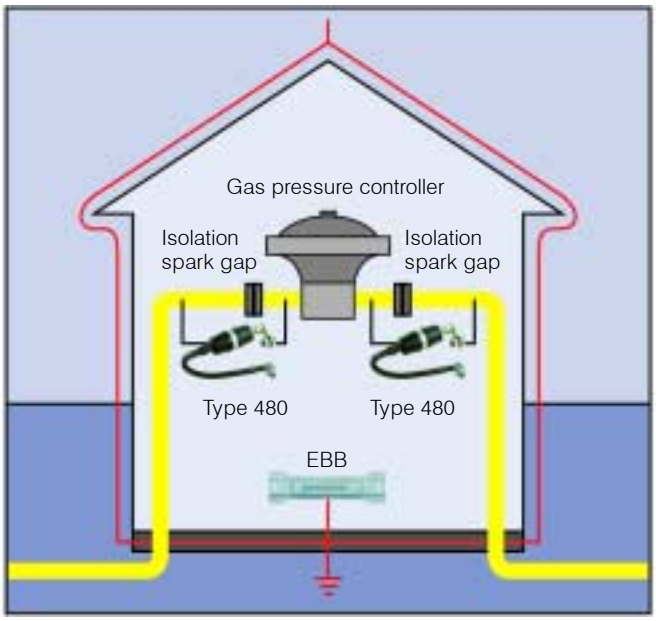
Protection spark gap or isolating spark gap?

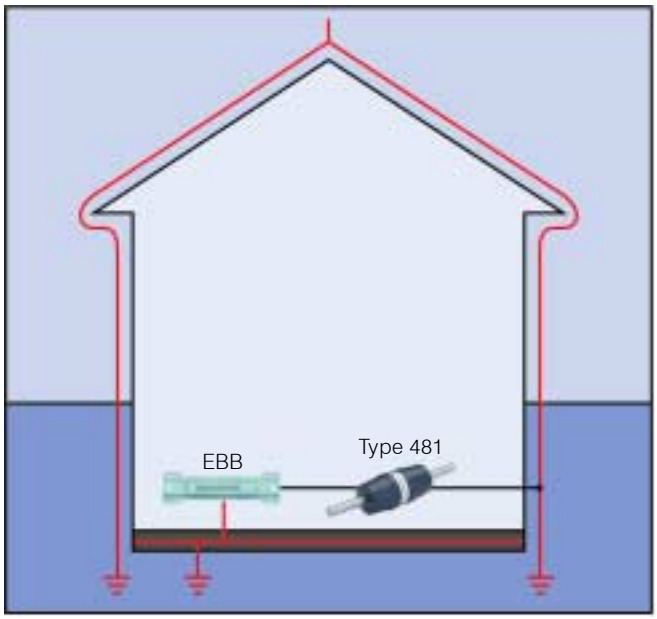
OBO isolating and protection spark gaps are intended to provide galvanic isolation between electrical installation parts that are not connected to each other for operational purposes.

If the potential rises in one of the installation parts as a result of a lightning strike, the isolating spark gap guarantees a conducting connection at that time, equalising the potential between the parts.

Spark gap applications:

- Establishing galvanic isolation of insulating flanges.
- Bridging of an unavoidable proximity with unacceptably small distance in a building, across an isolating spark gap, where the establishment of a direct connection is not permissible.
- Avoidance of the transfer of fault voltages, especially in the TT system.





Gas governor station (isolating spark gap for explosion hazard areas)

Isolating spark gap type 480 is suitable for bridging insulating flanges or insulating fittings, especially in explosion hazard areas.

Buildings with more than one earthing installation

If a building has two earthing installations – a foundation earthing point and a deep earthing point for example – they can be connected via an isolating spark gap. This prevents electrochemical corrosion of the earthing points – unlike a direct conducting connection. In addition, the entire earthing point area is effective in the event of a direct lightning strike.

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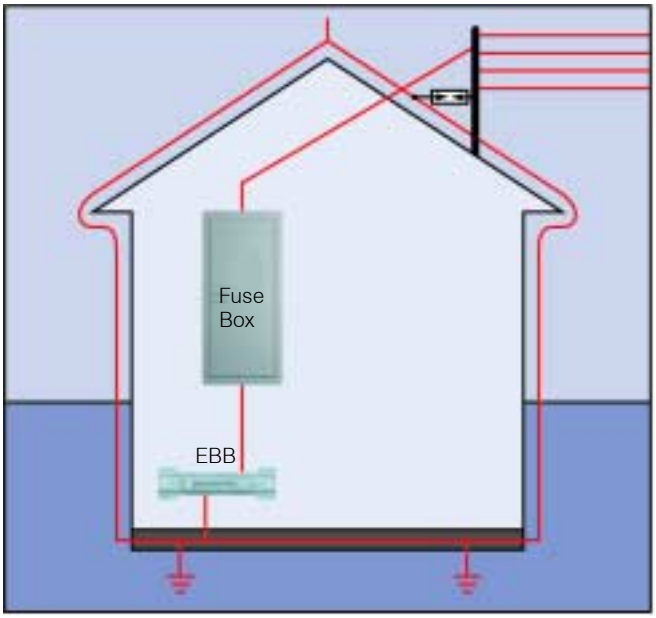
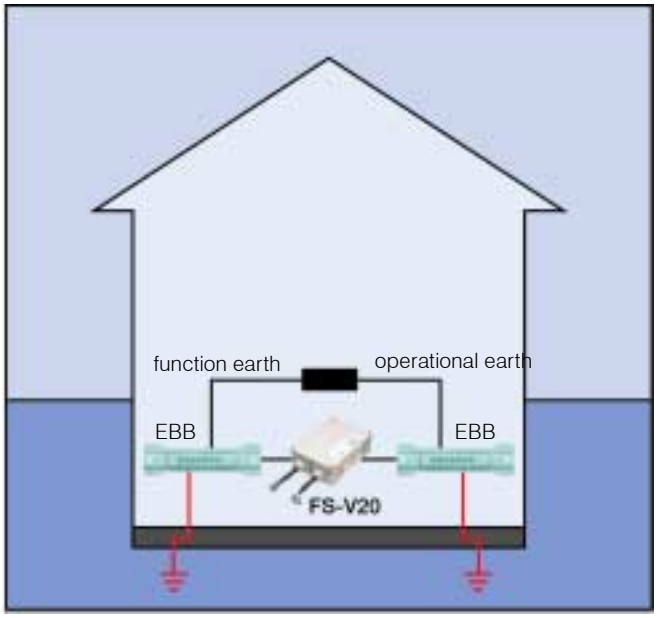
- Degrading of one installation by another, e. g. an information installation. For this purpose, a function earth is provided, if necessary, in addition to the standard building earthing point (electrical and lightning protection).
- Connection of the earthing point with the earthing points of the nearby building via isolating spark gaps, especially with the TT system, in order to make use of all the earths for lightning protection.
- Avoidance of the transfer of fault voltages, especially in the TT system.
- This measure avoids the need to break connections for measurement and testing purposes.

As their name implies, isolating and protection spark gaps contain a spark gap. The spark gap changes from the non-conducting to the conducting state when an arc is caused by an impulse voltage.





Overhead line connection

With an overhead line connection, the roof mast of a low-voltage overhead line should be as far as possible from the lightning protection installation. If this distance is less than half a metre, an enclosed protection spark gap must be installed. Connection to the roof mast requires the approval of the energy supply company.

Buildings with more than one earthing installation

If a separate earthing installation (function earth) is required for the operation of special electronic equipment, it is recommended that the earthing installations should be bridged with spark gaps for lightning protection. This prevents dangerously high voltage differences arising between the earthing installations. A choke is also installed, to keep high-frequency voltages away from the function earth.

Isolating spark gaps 480 and 481

Operation and fields of application

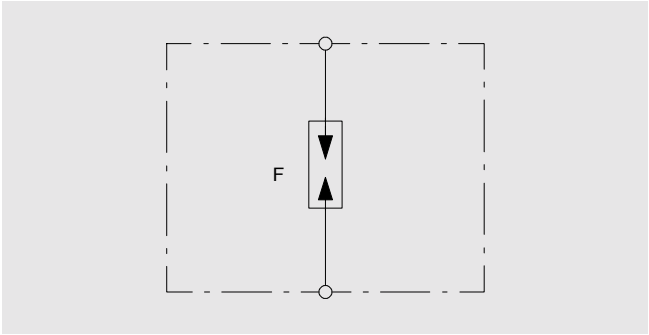
Isolating spark gaps provide galvanic isolation of electrically conducting parts of an installation that must not be connected to each other.

Isolating spark gap 480, for instance, is used to bridge insulating flanges and insulating fittings on pipes. Isolating spark gap 481 may be used, for example, to connect a lightning protection system with the earthing system of heavy-current installations above 1 kV, with the auxiliary earthing points of residual current devices or with the measurement earthing points of laboratories.

Further fields of application are the bridging of proximity points or making connections to pipework and tank installations which have cathodic corrosion protection.

Both isolating spark gaps consist of two electrodes positioned at a defined distance in an insulated housing. In the event of lightning, the spark gap arcs through, and the two electrodes are temporarily electrically connected to each other.

In version 480, electrodes of tungsten-copper ensure an extremely high resistance to erosion, as well as low wear. This spark gap has (Ex) approval for use in explosion hazard areas.



Block diagram of 480/481

Mounting

Isolating spark gaps 480 and 481 are installed with connecting lugs or connectors between the parts of the installation to be bridged. When installing the spark gaps, keep cable lengths short, since long cables increase the risk of unnecessary stress on the insulation due to inductive voltages.

Test marks

Ex **Type 480**

Technical data

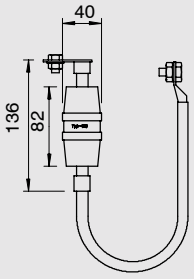
Isolating spark gaps		Parex isolating spark gap 480	Isolating spark gap 481
Explosion protection		(Ex)s G 4 to VDE 0171	-
Test certificate		PTB No. III B/E-29 859	-
AC clamping voltage	U_p (50 Hz)	1 kV (higher voltages are possible)	2.5 kV
100% lightning impulse clamping voltage	$U_{p\ 100}$ (1.2/50)	2 kV	5 kV
Nominal discharge current	I_n (8/20)	100 kA	100 kA
Impulse current test (10/350) with the lightning current parameters set out in IEC 61312-1 (02.95) Impulse current Charge Spec. energy	 I_{imp} Q W/R	 100 kA 50 As 2.5 MJ/Ω	 50 kA 25 As 0.63 MJ/Ω
Electrodes		Tungsten-copper	Stainless-steel
Housing		Epoxy moulding compound	Epoxy moulding compound
Connecting bolt		-	Ø 10 mm; Stainless-steel
Connecting lug		Brass, nickel-plated, with screw, nut and spring washer	-
Connecting lead		25 mm^2 Cu, NSLFF highly-flexible, with cable lug, screw, nut and spring washer	-
Screws and nuts		M10 Steel, hot-dip galvanised	-
Connecting lead length	L L L	180 mm 250 mm 350 mm	-
			Subject to technical alterations

Ordering data

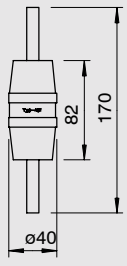
Type	Description	Order no.
480/180	Connecting lead length 180 mm	**5240 03 4**
480/250	Connecting lead length 250 mm	**5240 07 7**
480/350	Connecting lead length 350 mm	**5240 06 9**

Connecting lead length mm

180
250
350

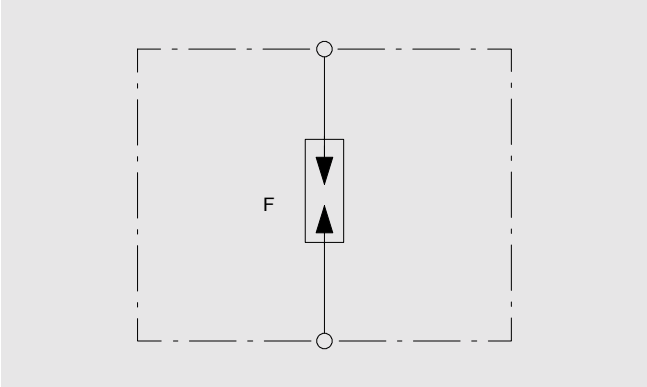


Type	Description	Order no.
481	Connection Ø 10 mm; stainless-steel	**5240 08 5**



Protection spark gap 482

The spark gap consists of two electrodes arranged at a defined distance from each other in a ceramic housing. Type 482 satisfies the requirements of degree of protection IP 54.



Block diagram of 482

Operation and fields of application

OBO protection spark gap 482 is used to bridge proximity points between the service entry mast of a low-voltage overhead line and components of the external lightning protection system in accordance with VDE 0100 and VDE 0185.

Mounting

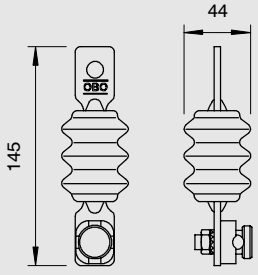
OBO protection spark gap 482 is installed between parts of the installation to be bridged, by means of connectors.

Technical data

Protection spark gap 482		
AC clamping voltage	U_{AW} (50 Hz)	10 kV
Electrodes and connecting lugs		Malleable cast iron, hot-dip galvanised
Housing		Ceramic
Connecting lugs One connecting lug fitted with one-piece connector type 5001/DIN		Hole Ø 11 mm (M10)
Clamping range		8-10 mm
Screw and nut		M10, steel, hot-dip galvanised
Serrated lock washer		Stainless-steel
Clamp plate		Zinc die-cast, electro-galvanised
IP Code		IP 54
		Subject to technical alterations

Ordering data

Type	Description	Order no.
482	Protection spark gap	**5240 05 0**



Please always state the order number when ordering.

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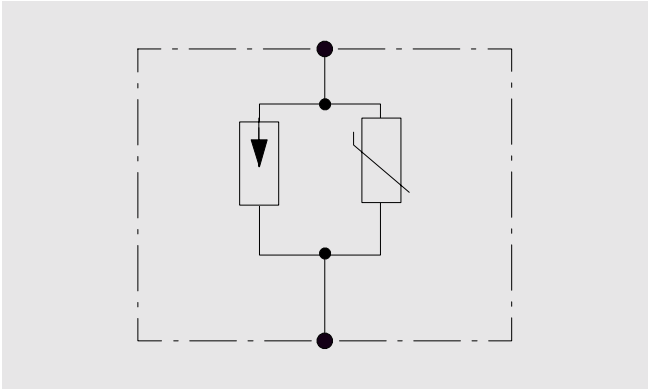
Coupling of earthing installations FS-V 20

The spark gap and high-power zinc oxide varistor in parallel provide potential equalisation, this prevents flashovers in the electronics.

The FS-V 20 has an extremely short response time and a low residual voltage.



Block diagram of FS-V 20

Operation and fields of application

Surge device FS-V 20 is used to provide coupling of separate earthing installations with respect to lightning current. In the event of lightning and EMP effects, it prevents dangerously high voltage differences arising between the function earth and the protective earth.

Mounting

The FS-V 20 is connected between the function earth and the operational earth. It is connected directly to the relevant equipotential bonding bar. A choke connected in parallel in accordance with DIN 57160 VDE 0160 (not supplied) prevents high-frequency voltages reaching the function earth.

Technical data

FS-V 20		
Nominal discharge current	I_n	100 kA
Impulse current test (10/350) with the lightning current parameters set out in IEC 61312-1 (02.95) Peak current Charge Spec. energy	 I_{imp} Q W/R	 100 kA 50 As 2.5 MJ/Ω
Discharge capacity to DIN 48 810	$\int i\,dt$ $\int i^2\,dt$	10 As 10^5 A^2s
Voltage protection level	U_p	≤ 1.5 kV
Enclosure dimensions		196 x 144 x 71
		Subject to technical alterations

Ordering data

Type	Description	Order no.
FS-V 20	Complete, in plastic enclosure	**5099 80 3**