



DEHNmid and DEHNtrack  
protect Medium Voltage Systems



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# DEHNmid and DEHNtrack

DEHNmid and DEHNtrack medium-voltage arresters can be installed on lines and substations to protect medium-voltage systems from surges.

The modular design of DEHNmid and DEHNtrack makes these arresters highly flexible. Their dimensions are specifically tailored to the rated voltage of the arrester and the required creepage distance. This leads to a compact design which is adapted to the service conditions. Glass fibre fabric with epoxy resin ensures that the arrester has a high mechanical strength and, in combination with silicone rubber, a high insulating capacity.

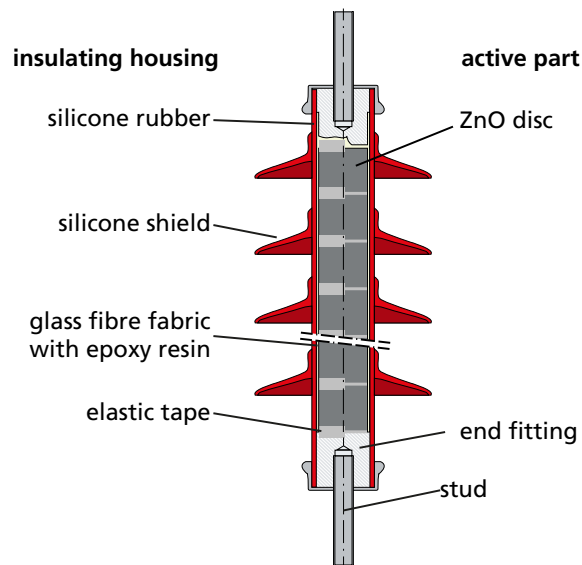
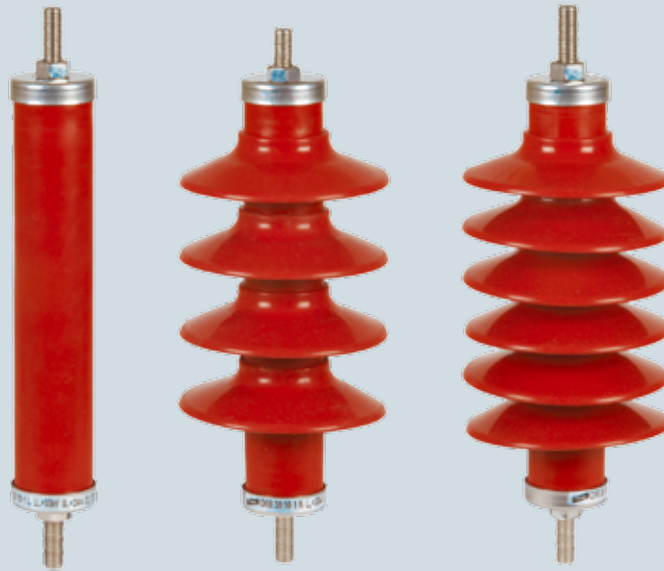


Figure 1: Design of a DEHNmid medium-voltage arrester

Wherever DEHNmid and DEHNtrack arresters are used – their resistant housing made of high-temperature vulcanised silicone rubber provides excellent sealing and prevents the formation of creepage current paths. The unique hydrophobic properties of this material refuse to allow any films of moisture or deposits of pollution to form on the arrester even under extreme environmental conditions. Even aggressive saline mist in conjunction with a high ambient temperature leaves the arrester housing and the stainless steel conductor terminals unharmed.

## Benefits of DEHNmid and DEHNtrack arresters:

- They protect medium-voltage systems from surges
- Their modular design allows flexible use
- They stand out due to their high insulating capacity
- They withstand even extreme environmental conditions



DEHNmid arresters for different applications

## Selection of DEHNmid surge arresters

Three application parameters are essential for selecting DEHNmid surge arresters:

- Maximum voltage between the line conductors  $U_S$  (maximum system voltage)
- Method of neutral point treatment of the medium-voltage network
- Environmental conditions (e.g. degree of pollution) at the place of installation

The maximum voltage between the line conductors  $U_S$  is defined as r.m.s. value of the maximum line-to-line-voltage during fault-free system operation. If this value is not specified by the network operator, the following is generally assumed for  $U_S$ :

Formula 0:

$$U_S = 1.2 \times U_{L-L}$$

$U_S$  = maximum system voltage

$U_{L-L}$  = system voltage (line-to-line-voltage)

The selection procedure can be divided into 2 steps:

### Step 1:

The maximum continuous operating voltage  $U_C$  for which the arrester is designed is determined from  $U_S$  and the method of neutral point treatment. The rated voltage of the arrester which is required for DEHNmid devices can be calculated by means of the following fixed relationship:

Formula 1:

$$U_r = 1.25 \times U_C$$

$U_C$  = maximum continuous operating voltage

$U_r$  = rated voltage

In the IEC 60099-4\* standard, the rated voltage  $U_r$  is defined as maximum permissible r.m.s. value of the a.c. voltage for which the surge arrester is designed to operate correctly under temporary overvoltage conditions as established in the operating duty test.  $U_r$  defines all electrical properties of the medium-voltage arrester. The rated voltage is included in the type designation of DEHNmid arresters, e.g. DMI 30 10 1  $\cong U_r = 30$  kV.

### Step 2:

The environmental conditions at the place of installation define the mechanical properties. In addition to the DMI ... L arresters for indoor use, two types for outdoor use are available:

- The DMI ... **N** devices are designed for "normal environmental conditions"
- The DMI ... **H** devices are suitable for areas with a "high degree of pollution"

In the following, the procedure for selecting the medium-voltage arresters to be installed is described according to the neutral point treatment of the medium-voltage system. In this context, a distinction is made between the types of installation line-earth, neutral point-earth and line-line.

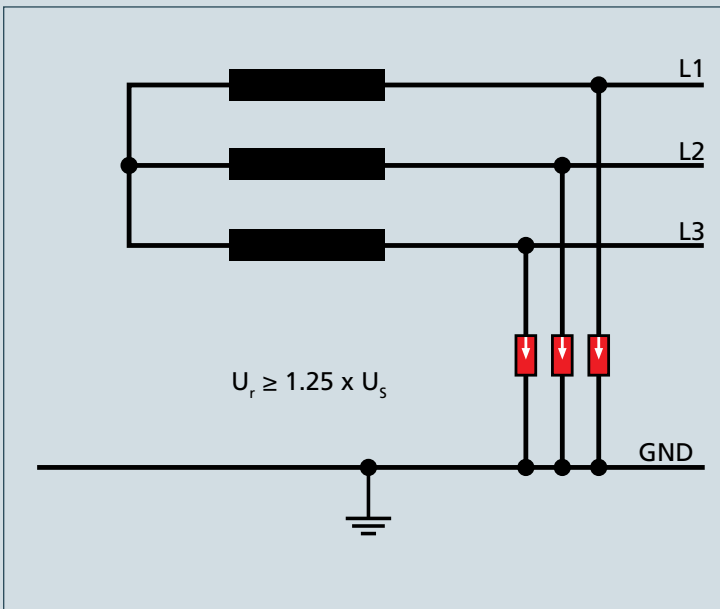


Figure 2: Isolated neutral system

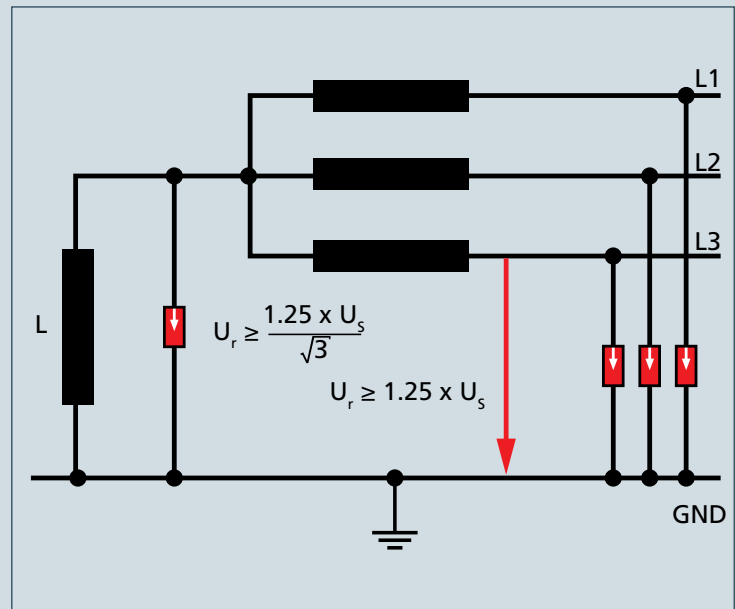


Figure 3: Resonant earthed neutral system

## Isolated neutral systems or resonant earthed neutral systems

In isolated neutral systems (Figure 2), no transformer neutral point is directly or indirectly earthed. Thus, the entire earth fault current  $I_{ce}$  can flow over an extended period of time under earth fault conditions.

In resonant earthed neutral systems (Figure 3), the transformer neutral points are earthed via reactors. In case of an earth fault in the system, the sum of the inductive currents in these earthing reactors is almost equal to the capacitive earth fault current and therefore the arc earth faults are quenched.

### Selection of arresters:

In case of single-pole earth faults, the line-to-line-voltage of the unfaulted line conductors rises to the voltage  $U_s$ . Since an earth fault can take several hours, the maximum continuous operating voltage  $U_c$  of the arrester must be dimensioned according to the maximum system voltage  $U_s$ .

Formula 2: Arrester connected between line conductor and earth

$$U_c \geq U_s \rightarrow U_r \geq 1.25 \times U_s$$

Example:  
20 kV system, no defined tripping time

$$U_s = 24 \text{ kV}$$

$$U_r = 1.25 \times 24 \text{ kV} = 30 \text{ kV}$$

→ DMI 30 ...

If surge arresters are installed at the transformer neutral point to protect the earthing reactors, these arresters are to be rated according to formula 3.

Formula 3: Arrester connected between neutral point and earth

$$U_c \geq \frac{U_s}{\sqrt{3}} \rightarrow U_r \geq \frac{1.25 \times U_s}{\sqrt{3}}$$

Example:  
20 kV system, no defined tripping time

$$U_s = 24 \text{ kV}$$

$$U_r \geq \frac{1.25 \times 24 \text{ kV}}{\sqrt{3}} = 17.33 \text{ kV}$$

→ DMI 18 ...

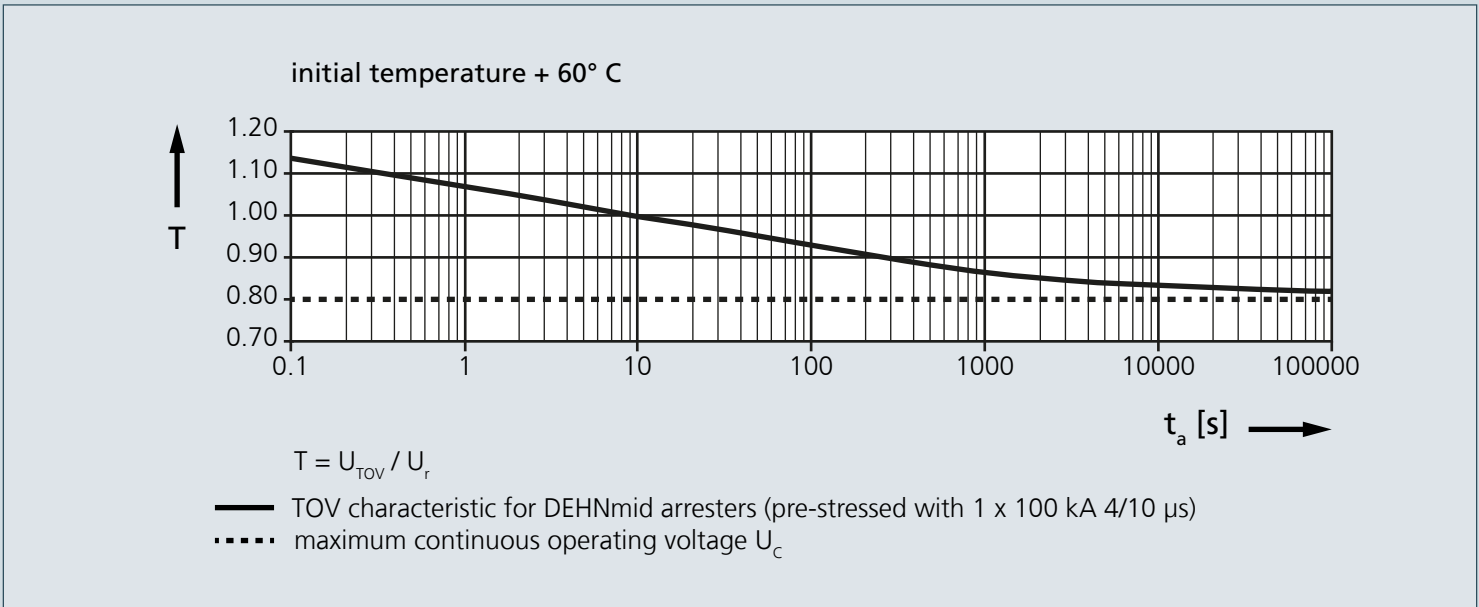


Figure 4: a.c. voltage/time characteristic for DEHNmid arresters

## Isolated neutral systems with earth fault tripping

Apart from isolated neutral systems, the line-to-earth voltage also rises in isolated neutral systems with earth fault tripping in case of single-pole earth faults. Due to the early earth fault tripping, the maximum continuous operating voltage  $U_c$  of the arrester can be reduced via the factor  $T$ . This factor defines the withstand capability of the arrester to temporary overvoltage  $U_{TOV}$  and is arrester-specific. The factor for DEHNmid arresters can be taken from the a.c. voltage/time characteristic (Figure 4).

### Selection of arresters:

The following selection criterion can be used for arresters which are installed between the line conductor and earth:

Formula 4: Arrester connected between line conductor and earth

$$U_c \geq \frac{U_s}{T} \rightarrow U_r \geq \frac{U_s}{T} \times 1.25$$

Example:

20 kV system, tripping time  $t_a = 0.4$  s

$U_s = 24$  kV;  $T_{(0.4s)} = 1.1$  (from figure 4)

$$U_r \geq \frac{24 \text{ kV}}{1.1} \times 1.25 = 27.27 \text{ kV}$$

→ DMI 30 ...

The arresters installed between the transformer neutral point and earth are rated as follows:

Formula 5: Arrester connected between neutral point and earth

$$U_c \geq \frac{U_s}{T \times \sqrt{3}} \rightarrow U_r \geq \frac{U_s}{T \times \sqrt{3}} \times 1.25$$

Example:

20 kV system, tripping time  $t_a = 0.4$  s

$U_s = 24$  kV,  $T_{(0.4s)} = 1.1$

$$U_r \geq \frac{24 \text{ kV}}{\sqrt{3} \times 1.1} \times 1.25 = 15.74 \text{ kV}$$

→ DMI 18 ...

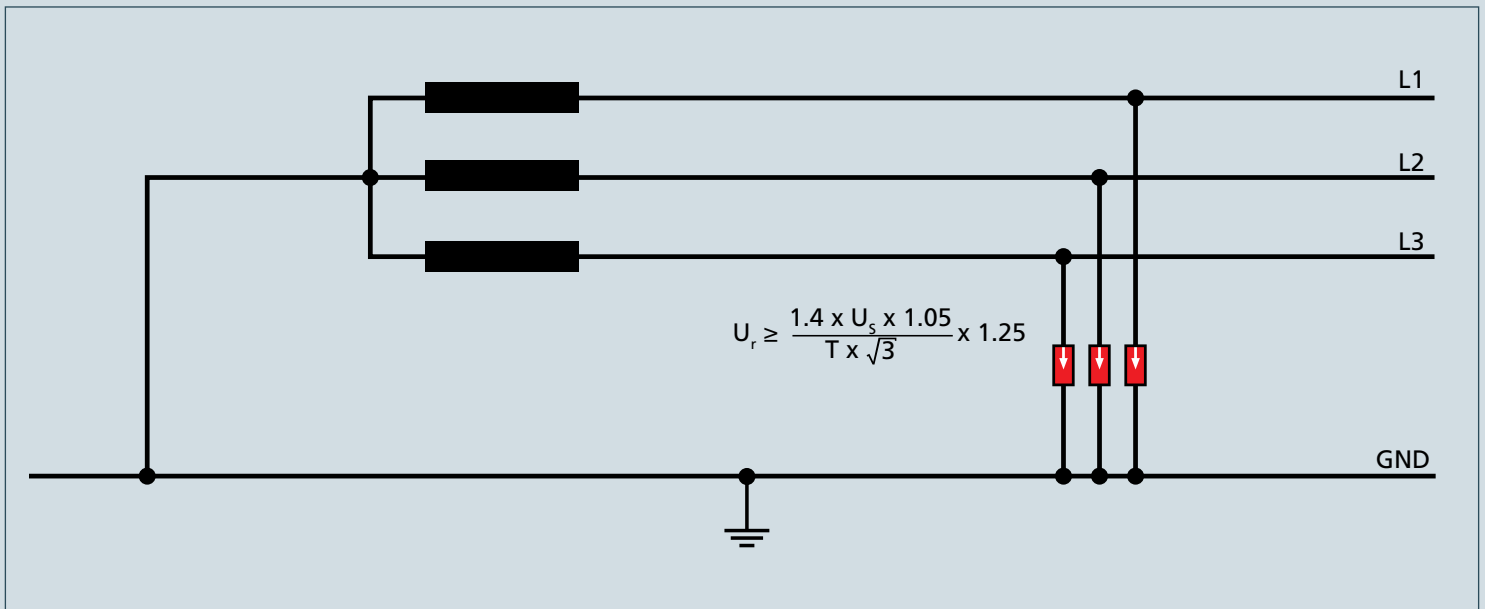


Figure 5: Solidly earthed neutral system

## Systems with low impedance neutral earthing or solidly earthed neutral systems (earth fault factor $k \leq 1.4$ )

In systems with low impedance neutral earthing or solidly earthed neutral systems (Figure 5), at least so many transformers are impedance-earthed that the line voltage in the entire system never exceeds a factor of 1.4 under earth fault conditions (earth fault factor  $k \leq 1.4$ ). Due to the high earth or short-circuit current, tripping in systems with low impedance neutral earthing is quick, namely typically less than 3 seconds.

To achieve a low voltage protection level between the line conductor and earth, arresters with a low continuous operating voltage  $U_c$  according to formula 6 can be selected. The factor of 1.05 used in formula 6 is a safety factor based on experience. This factor can be replaced by 1.0 when knowing the system's conditions.

Formula 6:

$$U_c \geq \frac{1.4 \times U_s \times 1.05}{T \times \sqrt{3}} \rightarrow U_r \geq \frac{1.4 \times U_s \times 1.05}{T \times \sqrt{3}} \times 1.25$$

Example:

20 kV system, tripping time  $t_a = 3$  s

$$U_s = 24 \text{ kV}, T_{(3s)} = 1.04$$

$$U_r \geq \frac{1.4 \times 24 \text{ kV} \times 1.05}{\sqrt{3} \times 1.04} \times 1.25 = 24.48 \text{ kV}$$

→ DMI 27 ...

The maximum continuous operating voltage for arresters which are used for unearthed transformer neutral points must be calculated according to formula 7.

Formula 7: Arrester connected between neutral point and earth

$$U_c \geq \frac{0.4 \times U_s}{T} \rightarrow U_r \geq \frac{0.4 \times U_s}{T} \times 1.25$$

Example:

20 kV system, tripping time  $t_a = 3$  s

$$U_s = 24 \text{ kV}, T_{(3s)} = 1.04$$

$$U_r \geq \frac{0.4 \times 24 \text{ kV}}{1.04} \times 1.25 = 11.53 \text{ kV}$$

→ DMI 12 ...

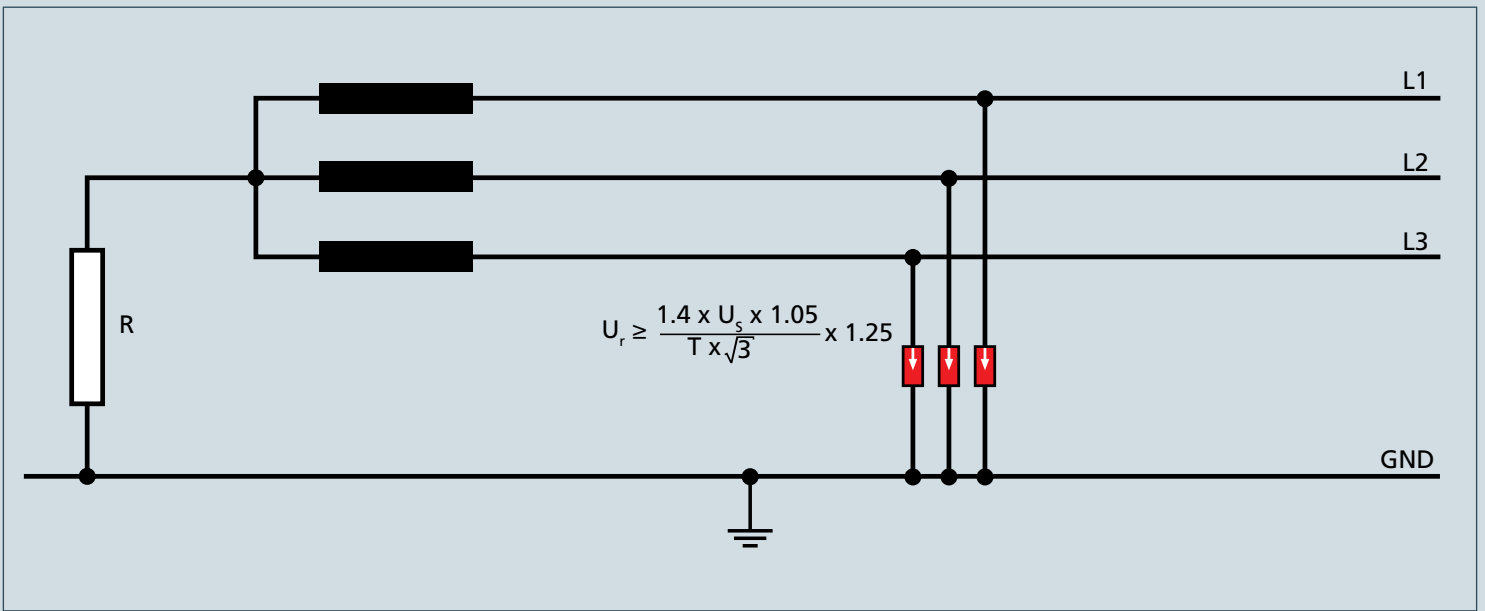


Figure 6: Impedance earthed neutral system

## Systems with low impedance neutral earthing and system sections with an earth fault factor > 1.4

Not all transformer neutral points are impedance, resonant or solidly earthed. In case of earth faults in the system, the line voltage can exceed the factor 1.4.

When selecting arresters, it is advisable to proceed as in case of systems with high impedance neutral earthing and earth fault tripping. In this context, the maximum continuous operating voltage is rated according to formula 4.

Formula 4:

$$U_c \geq \frac{U_s}{T} \rightarrow U_r \geq \frac{U_s}{T} \times 1.25$$

## Impedance earthed neutral systems (low impedance $k > 1.4$ )

Impedance earthed neutral systems are characterised by the fact that the neutral points of the transformers are earthed via low-impedance earthing chokes. Consequently, every earth fault causes a short-circuit to earth which is limited to max. 2 kA due to the design of the earthing chokes. Under earth fault conditions, the voltage in the "healthy line conductors" can rise to  $U_m$ . In case of impedance earthed neutral systems, the voltage can even rise 5% above  $U_m$ .

The following rule must be observed for rating the arrester:

Formula 8: Arrester connected between line conductor and earth

$$U_c \geq \frac{1.05 \times U_s}{T} \rightarrow U_r \geq \frac{1.05 \times U_s}{T} \times 1.25$$

Example:

20 kV system, tripping time  $t_a = 10$  s

$$U_s = 24 \text{ kV}, T_{(10s)} = 1$$

$$U_r \geq \frac{1.05 \times 24 \text{ kV}}{1} \times 1.25 = 31.5 \text{ kV}$$

→ DMI 33 ...



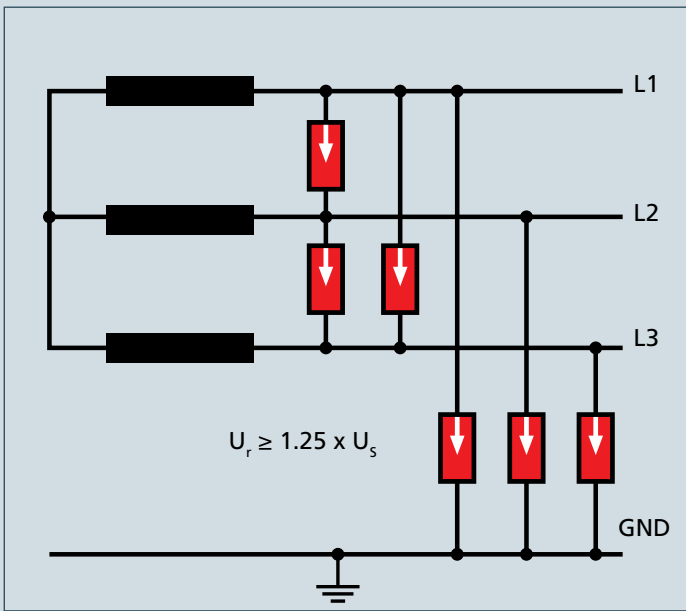


Figure 7: Protection by six identical arresters

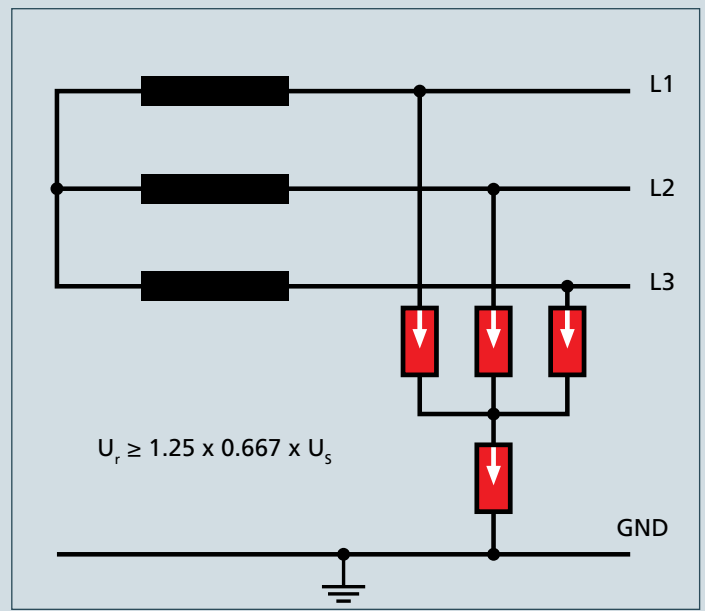


Figure 8: Neptune circuit

## Installation of arresters between the line conductors

In addition to arresters between the line conductor and earth, it may be advisable for special applications e.g. arc furnaces to limit switching overvoltages between the three line conductors.

There are basically two possibilities to limit overvoltages between the line conductor and earth and between the line conductors.

### Possibility 1: (Figure 7)

Three arresters between the line conductor and earth and three arresters between the line conductors.

All arresters must be rated as follows:

Formula 9:

$$U_r \geq 1.25 \times U_s$$

The advantage of this solution is an extremely low voltage protection level in all protective paths.

### Possibility 2: Neptune circuit (Figure 8)

One arrester each between the line conductor and a virtual neutral point which is sufficiently isolated from earth and one arrester between this virtual neutral point and earth.

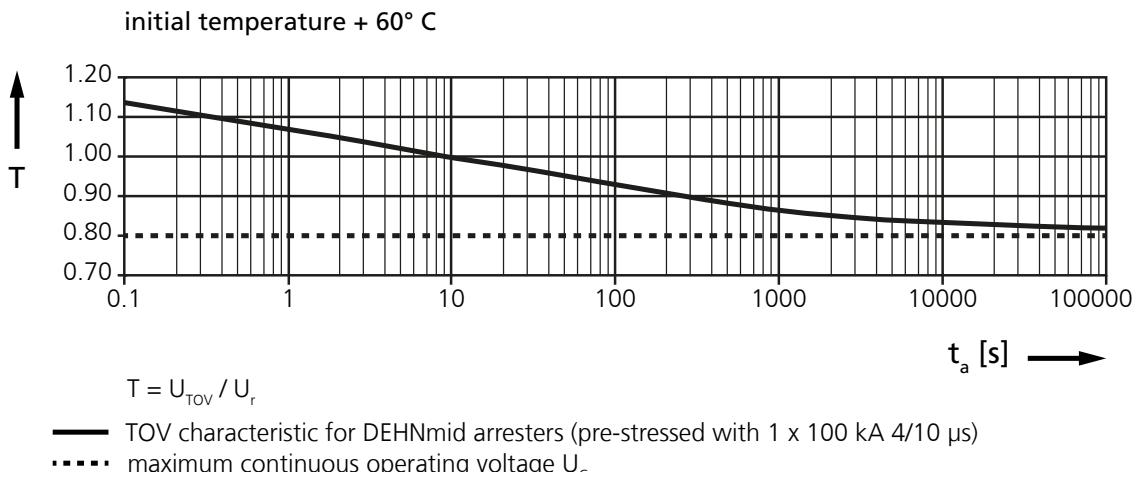
When rated according to

Formula 10:

$$U_r \geq 1.25 \times 0.667 \times U_s$$

a reduced number of arresters adequately protects many applications.

# a.c. voltage/time characteristic for DEHNmid arresters

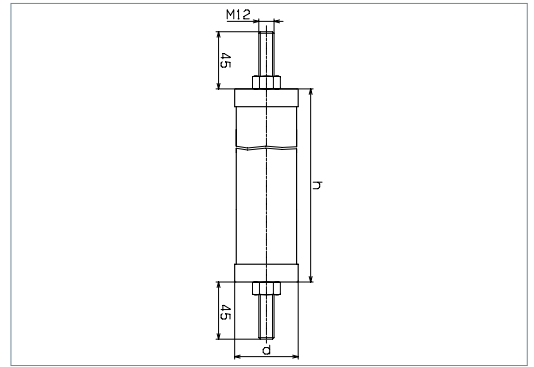


## Selection of DEHNmid arresters for a.c. systems

Selection depending on the system voltage, method of neutral point earthing in the system and tripping time ( $t_a$ ) of earth faults. Installation of the arresters between the line conductor and earth.

System voltage	Max. voltage	Isolated neutral system/ resonant earthed neutral system	System with high impedance neutral earthing and earth fault tripping					System with low impedance neutral earthing (earth fault factor $\leq 1.4$ )				Impedance earthed neutral system	
			$t_a = 0.1$ s T = 1.15	$t_a = 0.5$ s T = 1.10	$t_a = 1.0$ s T = 1.08	$t_a = 3.0$ s T = 1.04	$t_a = 10.0$ s T = 1.00	$t_a = 0.1$ s T = 1.15	$t_a = 0.5$ s T = 1.10	$t_a = 1.0$ s T = 1.08	$t_a = 3.0$ s T = 1.04	$t_a = 0.5$ s T = 1.10	$t_a = 3.0$ s T = 1.04
6	7,2	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 9 ...	DMI 12 ...
10	12	DMI 15 ...	DMI 15 ...	DMI 15 ...	DMI 15 ...	DMI 15 ...	DMI 15 ...	DMI 12 ...	DMI 12 ...	DMI 12 ...	DMI 15 ...	DMI 15 ...	DMI 18 ...
15	17,5	DMI 24 ...	DMI 21 ...	DMI 21 ...	DMI 21 ...	DMI 24 ...	DMI 24 ...	DMI 18 ...	DMI 18 ...	DMI 18 ...	DMI 21 ...	DMI 24 ...	DMI 24 ...
20	24	DMI 30 ...	DMI 27 ...	DMI 30 ...	DMI 30 ...	DMI 30 ...	DMI 30 ...	DMI 24 ...	DMI 24 ...	DMI 24 ...	DMI 27 ...	DMI 30 ...	DMI 31 ...
30	36	DMI 45 ...	DMI 42 ...	DMI 42 ...	DMI 42 ...	DMI 45 ...	DMI 45 ...	DMI 36 ...	DMI 36 ...	DMI 36 ...	DMI 39 ...	DMI 45 ...	DMI 48 ...
36	43,2	-	DMI 48 ...	DMI 51 ...	DMI 51 ...	-	-	DMI 42 ...	DMI 42 ...	DMI 45 ...	DMI 45 ...	-	-

# DEHNmid DMI ... L

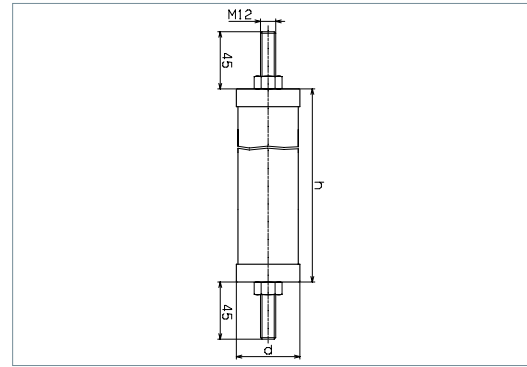


Dimension drawing DMI ... 10 1 L

Version without shield; for indoor use

Type	DMI 3 10 1 L	DMI 6 10 1 L	DMI 9 10 1 L	DMI 12 10 1 L	DMI 15 10 1 L	DMI 18 10 1 L
Part No.	990 001	990 002	990 003	990 004	990 005	990 006
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Overload capacity	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Line discharge class (1)	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (1)	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s
Line discharge class (2)	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (2)	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s
Rated voltage (a.c.) ( $U_r$ )	3 kV	6 kV	9 kV	12 kV	15 kV	18 kV
Max. continuous operating voltage (MCOV) (a.c.) ( $U_c$ )	2.4 kV	4.8 kV	7.2 kV	9.6 kV	12.0 kV	14.4 kV
Temporary overvoltage (TOV) at 1 sec. ( $U_{1s}$ )	3.5 kV	6.9 kV	10.4 kV	13.8 kV	17.3 kV	20.7 kV
Temporary overvoltage (TOV) at 10 sec. ( $U_{10s}$ )	3.3 kV	6.5 kV	9.8 kV	13.1 kV	16.4 kV	19.6 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	10.7 kV	19.3 kV	28.9 kV	37.5 kV	42.8 kV	52.4 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	9.3 kV	16.7 kV	25.1 kV	32.6 kV	37.2 kV	45.6 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	10.0 kV	18.0 kV	27.0 kV	35.0 kV	40.0 kV	49.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	11.1 kV	20.0 kV	30.0 kV	38.9 kV	44.4 kV	54.4 kV
Residual voltage at 40 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	12.5 kV	22.5 kV	33.8 kV	43.8 kV	50.0 kV	61.3 kV
Residual voltage at 125 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	7.3 kV	13.1 kV	19.7 kV	25.6 kV	29.2 kV	35.8 kV
Residual voltage at 250 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	7.5 kV	13.6 kV	20.3 kV	26.4 kV	30.1 kV	36.9 kV
Residual voltage at 500 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	7.8 kV	14.0 kV	21.1 kV	27.3 kV	31.2 kV	38.2 kV
Residual voltage at 1000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	8.1 kV	14.6 kV	21.9 kV	28.4 kV	32.4 kV	39.7 kV
Residual voltage at 2000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	8.5 kV	15.3 kV	23.0 kV	29.8 kV	34.0 kV	41.7 kV
Insulation of arrester housing / nominal power frequency withstand voltage (dry) ( $U_{PFWL}$ )	24 kV	32 kV	40 kV	46 kV	50 kV	54 kV
Insulation of arrester housing / nominal lightning withstand voltage ( $U_{LWV}$ )	36 kV	46 kV	58 kV	68 kV	74 kV	78 kV
Height (h)	92 mm	112 mm	132 mm	152 mm	162 mm	182 mm
Weight (M)	0.7 kg	0.9 kg	1.0 kg	1.2 kg	1.3 kg	1.5 kg
Creepage distance (+/- 5%)	68 mm	88 mm	108 mm	128 mm	138 mm	158 mm
Torsional strength	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm
Maximum permissible dynamic service load (MPDSL)	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm
Tensile strength	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N
Ambient temperature ( $T_A$ )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Altitude	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level
Power frequency ( $f_N$ )	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz
Housing material	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing
Colour	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013
Fittings	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel
Clamping of conductors	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm
Test standards	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4

# DEHNmid DMI ... L

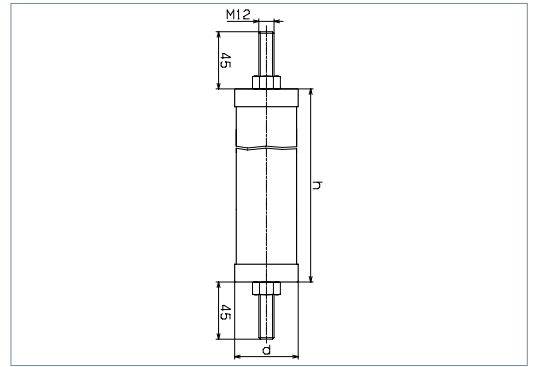


Dimension drawing DMI ... 10 1 L

Version without shield; for indoor use

Type	DMI 21 10 1 L	DMI 24 10 1 L	DMI 27 10 1 L	DMI 30 10 1 L	DMI 31 10 1 L	DMI 33 10 1 L
Part No.	990 007	990 008	990 009	990 010	990 011	990 012
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Overload capacity	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Line discharge class (1)	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (1)	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s
Line discharge class (2)	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (2)	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s
Rated voltage (a.c.) (U <sub>r</sub> )	21 kV	24 kV	27 kV	30 kV	31 kV	33 kV
Max. continuous operating voltage (MCOV) (a.c.) (U <sub>c</sub> )	16.8 kV	19.2 kV	21.6 kV	24.0 kV	25.0 kV	26.4 kV
Temporary overvoltage (TOV) at 1 sec. (U <sub>1s</sub> )	24.2 kV	27.6 kV	31.1 kV	34.5 kV	35.7 kV	38.0 kV
Temporary overvoltage (TOV) at 10 sec. (U <sub>10s</sub> )	22.9 kV	26.2 kV	29.4 kV	32.7 kV	33.8 kV	36.0 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	62.1 kV	70.6 kV	80.3 kV	85.6 kV	91.0 kV	94.2 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	53.9 kV	61.4 kV	69.8 kV	74.4 kV	79.1 kV	81.8 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	58.0 kV	66.0 kV	75.0 kV	80.0 kV	85.0 kV	88.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	64.4 kV	73.3 kV	83.3 kV	88.8 kV	94.4 kV	97.7 kV
Residual voltage at 40 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	72.5 kV	82.5 kV	93.8 kV	100.0 kV	106.3 kV	110.0 kV
Residual voltage at 125 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	42.3 kV	48.2 kV	54.8 kV	58.4 kV	62.1 kV	64.2 kV
Residual voltage at 250 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	43.7 kV	49.7 kV	56.5 kV	60.2 kV	64.0 kV	66.3 kV
Residual voltage at 500 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	45.2 kV	51.5 kV	58.5 kV	62.4 kV	66.3 kV	68.6 kV
Residual voltage at 1000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	47.0 kV	53.5 kV	60.8 kV	64.8 kV	68.9 kV	71.3 kV
Residual voltage at 2000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	49.3 kV	56.1 kV	63.8 kV	68.0 kV	72.3 kV	74.8 kV
Insulation of arrester housing / nominal power frequency withstand voltage (dry) (U <sub>PFWL</sub> )	62 kV	68 kV	72 kV	84 kV	92 kV	92 kV
Insulation of arrester housing / nominal lightning withstand voltage (U <sub>LWL</sub> )	90 kV	100 kV	106 kV	122 kV	132 kV	132 kV
Height (h)	204 mm	224 mm	244 mm	254 mm	274 mm	274 mm
Weight (M)	1.7 kg	1.8 kg	2.0 kg	2.1 kg	2.2 kg	2.4 kg
Creepage distance (+/- 5%)	180 mm	200 mm	220 mm	230 mm	250 mm	250 mm
Torsional strength	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm
Maximum permissible dynamic service load (MPDSL)	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm
Tensile strength	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N
Ambient temperature (T <sub>a</sub> )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Altitude	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level
Power frequency (f <sub>N</sub> )	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz
Housing material	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing
Colour	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013
Fittings	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel
Clamping of conductors	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm
Test standards	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4

# DEHNmid DMI ... L

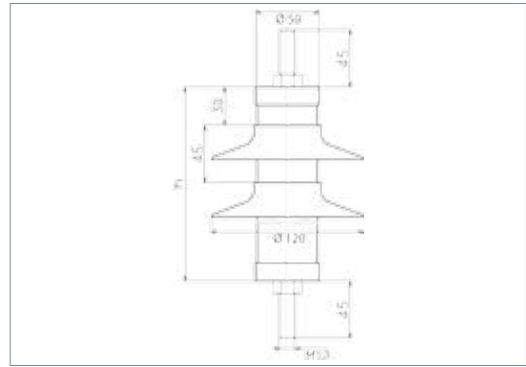


Dimension drawing DMI ... 10 1 L

Version without shield; for indoor use

Type	DMI 36 10 1 L	DMI 39 10 1 L	DMI 42 10 1 L	DMI 45 10 1 L	DMI 48 10 1 L	DMI 51 10 1 L
Part No.	990 013	990 014	990 015	990 016	990 017	990 018
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Overload capacity	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Line discharge class (1)	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (1)	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s
Line discharge class (2)	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (2)	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s
Rated voltage (a.c.) ( $U_r$ )	36 kV	39 kV	42 kV	45 kV	48 kV	51 kV
Max. continuous operating voltage (MCOV) (a.c.) ( $U_c$ )	28.8 kV	31.2 kV	33.6 kV	36.0 kV	38.4 kV	40.8 kV
Temporary overvoltage (TOV) at 1 sec. ( $U_{1s}$ )	41.4 kV	44.9 kV	48.3 kV	51.8 kV	55.2 kV	58.7 kV
Temporary overvoltage (TOV) at 10 sec. ( $U_{10s}$ )	39.2 kV	42.5 kV	45.8 kV	49.1 kV	52.3 kV	55.6 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	104.9 kV	114.5 kV	124.1 kV	128.4 kV	141.2 kV	147.7 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	91.1 kV	99.5 kV	107.9 kV	111.6 kV	122.8 kV	128.3 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	98.0 kV	107.0 kV	116.0 kV	120.0 kV	132.0 kV	138.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	108.8 kV	118.8 kV	128.8 kV	133.2 kV	146.5 kV	153.2 kV
Residual voltage at 40 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	122.5 kV	133.8 kV	145.0 kV	150.0 kV	165.0 kV	172.5 kV
Residual voltage at 125 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	71.5 kV	78.7 kV	84.7 kV	87.6 kV	96.4 kV	100.7 kV
Residual voltage at 250 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	73.8 kV	80.6 kV	87.3 kV	90.4 kV	99.4 kV	103.9 kV
Residual voltage at 500 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	76.4 kV	83.5 kV	90.5 kV	93.6 kV	103.0 kV	107.6 kV
Residual voltage at 1000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	79.4 kV	86.7 kV	94.0 kV	97.2 kV	106.9 kV	111.8 kV
Residual voltage at 2000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	83.3 kV	91.0 kV	98.6 kV	102.0 kV	112.2 kV	117.3 kV
Insulation of arrester housing / nominal power frequency withstand voltage (dry) ( $U_{PPWL}$ )	118 kV	128 kV	132 kV	144 kV	146 kV	150 kV
Insulation of arrester housing / nominal lightning withstand voltage ( $U_{LWL}$ )	170 kV	180 kV	192 kV	208 kV	214 kV	218 kV
Height (h)	362 mm	384 mm	406 mm	414 mm	446 mm	456 mm
Weight (M)	3.0 kg	3.2 kg	3.4 kg	3.6 kg	3.8 kg	4.0 kg
Creepage distance (+/- 5%)	338 mm	360 mm	382 mm	390 mm	422 mm	432 mm
Torsional strength	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm
Maximum permissible dynamic service load (MPDSL)	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm
Tensile strength	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N
Ambient temperature ( $T_a$ )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Altitude	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level
Power frequency ( $f_n$ )	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz
Housing material	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing
Colour	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013
Fittings	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel
Clamping of conductors	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm
Test standards	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4

# DEHNmid DMI ... N

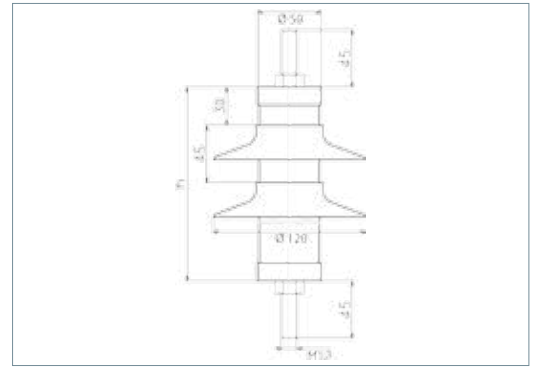


Dimension drawing DMI ... 10 1 N

Normal creepage distance; for indoor and outdoor use

Type	DMI 3 10 1 N	DMI 6 10 1 N	DMI 9 10 1 N	DMI 12 10 1 N	DMI 15 10 1 N	DMI 18 10 1 N
Part No.	990 101	990 102	990 103	990 104	990 105	990 106
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Overload capacity	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Line discharge class (1)	1 (2.8 kJ/kV <sub>UP</sub> )	1 (2.8 kJ/kV <sub>UP</sub> )	1 (2.8 kJ/kV <sub>UP</sub> )	1 (2.8 kJ/kV <sub>UP</sub> )	1 (2.8 kJ/kV <sub>UP</sub> )	1 (2.8 kJ/kV <sub>UP</sub> )
Long-duration current impulse (1)	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s
Line discharge class (2)	2 (4.5 kJ/kV <sub>UP</sub> )	2 (4.5 kJ/kV <sub>UP</sub> )	2 (4.5 kJ/kV <sub>UP</sub> )	2 (4.5 kJ/kV <sub>UP</sub> )	2 (4.5 kJ/kV <sub>UP</sub> )	2 (4.5 kJ/kV <sub>UP</sub> )
Long-duration current impulse (2)	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s
Rated voltage (a.c.) ( $U_n$ )	3 kV	6 kV	9 kV	12 kV	15 kV	18 kV
Max. continuous operating voltage (MCOV) (a.c.) ( $U_c$ )	2.4 kV	4.8 kV	7.2 kV	9.6 kV	12.0 kV	14.4 kV
Temporary overvoltage (TOV) at 1 sec. ( $U_{1s}$ )	3.5 kV	6.9 kV	10.4 kV	13.8 kV	17.3 kV	20.7 kV
Temporary overvoltage (TOV) at 10 sec. ( $U_{10s}$ )	3.3 kV	6.5 kV	9.8 kV	13.1 kV	16.4 kV	19.6 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	10.7 kV	19.3 kV	28.9 kV	37.5 kV	42.8 kV	52.4 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	9.3 kV	16.7 kV	25.1 kV	32.6 kV	37.2 kV	45.6 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	10.0 kV	18.0 kV	27.0 kV	35.0 kV	40.0 kV	49.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	11.1 kV	20.0 kV	30.0 kV	38.9 kV	44.4 kV	54.4 kV
Residual voltage at 40 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	12.5 kV	22.5 kV	33.8 kV	43.8 kV	50.0 kV	61.3 kV
Residual voltage at 125 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	7.3 kV	13.1 kV	19.7 kV	25.6 kV	29.2 kV	35.8 kV
Residual voltage at 250 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	7.5 kV	13.6 kV	20.3 kV	26.4 kV	30.1 kV	36.9 kV
Residual voltage at 500 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	7.8 kV	14.0 kV	21.1 kV	27.3 kV	31.2 kV	38.2 kV
Residual voltage at 1000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	8.1 kV	14.6 kV	21.9 kV	28.4 kV	32.4 kV	39.7 kV
Residual voltage at 2000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	8.5 kV	15.3 kV	23.0 kV	29.8 kV	34.0 kV	41.7 kV
Insulation of arrester housing / nominal power frequency withstand voltage (dry) ( $U_{PFWL}$ )	34 kV	42 kV	48 kV	56 kV	60 kV	64 kV
Insulation of arrester housing / nominal power frequency withstand voltage (wet) ( $U_{PFWL}$ )	22 kV	26 kV	32 kV	39 kV	40 kV	42 kV
Insulation of arrester housing / nominal lightning withstand voltage ( $U_{LWL}$ )	50 kV	60 kV	70 kV	82 kV	86 kV	92 kV
Height (h)	92 mm	112 mm	132 mm	152 mm	162 mm	182 mm
Weight (M)	0.7 kg	0.9 kg	1.0 kg	1.2 kg	1.3 kg	1.5 kg
Creepage distance (+/- 5%)	143 mm	163 mm	183 mm	278 mm	288 mm	308 mm
Torsional strength	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm
Maximum permissible dynamic service load (MPDSL)	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm
Tensile strength	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N
Ambient temperature ( $T_a$ )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Altitude	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level
Power frequency ( $f_N$ )	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz
Housing material	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing
Colour	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013
Fittings	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel
Clamping of conductors	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm
Test standards	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4

# DEHNmid DMI ... N

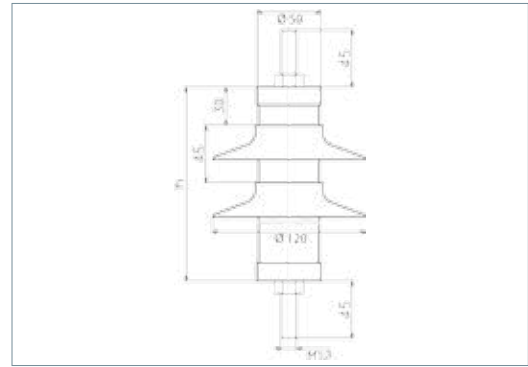


Dimension drawing DMI ... 10 1 N

Normal creepage distance; for indoor and outdoor use

Type	DMI 21 10 1 N	DMI 24 10 1 N	DMI 27 10 1 N	DMI 30 10 1 N	DMI 31 10 1 N	DMI 33 10 1 N
Part No.	990 107	990 108	990 109	990 110	990 111	990 112
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Overload capacity	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Line discharge class (1)	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (1)	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s
Line discharge class (2)	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (2)	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s
Rated voltage (a.c.) ( $U_r$ )	21 kV	24 kV	27 kV	30 kV	31 kV	33 kV
Max. continuous operating voltage (MCOV) (a.c.) ( $U_c$ )	16.8 kV	19.2 kV	21.6 kV	24.0 kV	25.0 kV	26.4 kV
Temporary overvoltage (TOV) at 1 sec. ( $U_{1s}$ )	24.2 kV	27.6 kV	31.1 kV	34.5 kV	35.7 kV	38.0 kV
Temporary overvoltage (TOV) at 10 sec. ( $U_{10s}$ )	22.9 kV	26.2 kV	29.4 kV	32.7 kV	33.8 kV	36.0 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	62.1 kV	70.6 kV	80.3 kV	85.6 kV	91.0 kV	94.2 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	53.9 kV	61.4 kV	69.8 kV	74.4 kV	79.1 kV	81.8 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	58.0 kV	66.0 kV	75.0 kV	80.0 kV	85.0 kV	88.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	64.4 kV	73.3 kV	83.3 kV	88.8 kV	94.4 kV	97.7 kV
Residual voltage at 40 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	72.5 kV	82.5 kV	93.8 kV	100.0 kV	106.3 kV	110.0 kV
Residual voltage at 125 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	42.3 kV	48.2 kV	54.8 kV	58.4 kV	62.1 kV	64.2 kV
Residual voltage at 250 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	43.7 kV	49.7 kV	56.5 kV	60.2 kV	64.0 kV	66.3 kV
Residual voltage at 500 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	45.2 kV	51.5 kV	58.5 kV	62.4 kV	66.3 kV	68.6 kV
Residual voltage at 1000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	47.0 kV	53.5 kV	60.8 kV	64.8 kV	68.9 kV	71.3 kV
Residual voltage at 2000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	49.3 kV	56.1 kV	63.8 kV	68.0 kV	72.3 kV	74.8 kV
Insulation of arrester housing / nominal power frequency withstand voltage (dry) ( $U_{PFWL}$ )	70 kV	78 kV	82 kV	94 kV	100 kV	100 kV
Insulation of arrester housing / nominal power frequency withstand voltage (wet) ( $U_{PFWL}$ )	46 kV	52 kV	54 kV	62 kV	66 kV	66 kV
Insulation of arrester housing / nominal lightning withstand voltage ( $U_{LWL}$ )	104 kV	114 kV	120 kV	136 kV	146 kV	146 kV
Height (h)	204 mm	224 mm	244 mm	254 mm	274 mm	274 mm
Weight (M)	1.7 kg	1.8 kg	2.0 kg	2.1 kg	2.2 kg	2.4 kg
Creepage distance (+/- 5%)	405 mm	425 mm	520 mm	530 mm	625 mm	625 mm
Torsional strength	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm
Maximum permissible dynamic service load (MPDSL)	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm
Tensile strength	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N
Ambient temperature ( $T_A$ )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Altitude	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level
Power frequency ( $f_N$ )	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz
Housing material	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing
Colour	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013
Fittings	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel
Clamping of conductors	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm
Test standards	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4

# DEHNmid DMI ... N



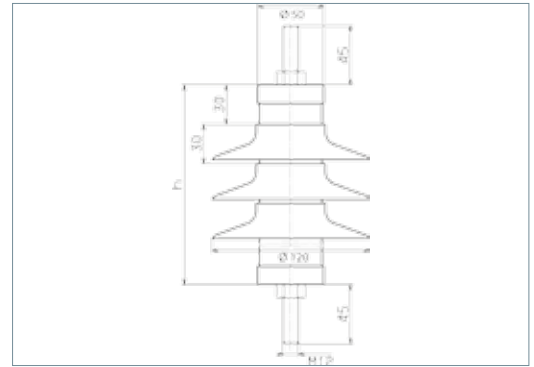
Dimension drawing DMI ... 10 1 N

Normal creepage distance; for indoor and outdoor use

Type	DMI 36 10 1 N	DMI 39 10 1 N	DMI 42 10 1 N	DMI 45 10 1 N	DMI 48 10 1 N	DMI 51 10 1 N
Part No.	990 113	990 114	990 115	990 116	990 117	990 118
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Overload capacity	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Line discharge class (1)	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (1)	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s
Line discharge class (2)	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (2)	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s
Rated voltage (a.c.) (U <sub>r</sub> )	36 kV	39 kV	42 kV	45 kV	48 kV	51 kV
Max. continuous operating voltage (MCOV) (a.c.) (U <sub>c</sub> )	28.8 kV	31.2 kV	33.6 kV	36.0 kV	38.4 kV	40.8 kV
Temporary overvoltage (TOV) at 1 sec. (U <sub>1s</sub> )	41.4 kV	44.9 kV	48.3 kV	51.8 kV	55.2 kV	58.7 kV
Temporary overvoltage (TOV) at 10 sec. (U <sub>10s</sub> )	39.2 kV	42.5 kV	45.8 kV	49.1 kV	52.3 kV	55.6 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	104.9 kV	114.5 kV	124.1 kV	128.4 kV	141.2 kV	147.7 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	91.1 kV	99.5 kV	107.9 kV	111.6 kV	122.8 kV	128.3 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	98.0 kV	107.0 kV	116.0 kV	120.0 kV	132.0 kV	138.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	108.8 kV	118.8 kV	128.8 kV	133.2 kV	146.5 kV	153.2 kV
Residual voltage at 40 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	122.5 kV	133.8 kV	145.0 kV	150.0 kV	165.0 kV	172.5 kV
Residual voltage at 125 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	71.5 kV	78.7 kV	84.7 kV	87.6 kV	96.4 kV	100.7 kV
Residual voltage at 250 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	73.8 kV	80.6 kV	87.3 kV	90.4 kV	99.4 kV	103.9 kV
Residual voltage at 500 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	76.4 kV	83.5 kV	90.5 kV	93.6 kV	103.0 kV	107.6 kV
Residual voltage at 1000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	79.4 kV	86.7 kV	94.0 kV	97.2 kV	106.9 kV	111.8 kV
Residual voltage at 2000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	83.3 kV	91.0 kV	98.6 kV	102.0 kV	112.2 kV	117.3 kV
Insulation of arrester housing / nominal power frequency withstand voltage (dry) (U <sub>PFWL</sub> )	126 kV	134 kV	142 kV	152 kV	156 kV	168 kV
Insulation of arrester housing / nominal power frequency withstand voltage (wet) (U <sub>PFWL</sub> )	84 kV	88 kV	94 kV	100 kV	104 kV	112 kV
Insulation of arrester housing / nominal lightning withstand voltage (U <sub>LWL</sub> )	184 kV	194 kV	206 kV	222 kV	226 kV	246 kV
Height (h)	362 mm	384 mm	406 mm	414 mm	446 mm	456 mm
Weight (M)	3.0 kg	3.2 kg	3.4 kg	3.6 kg	3.8 kg	4.0 kg
Creepage distance (+/- 5%)	788 mm	885 mm	907 mm	990 mm	1022 mm	1107 mm
Torsional strength	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm
Maximum permissible dynamic service load (MPDSL)	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm
Tensile strength	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N
Ambient temperature (T <sub>a</sub> )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Altitude	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level
Power frequency (f <sub>N</sub> )	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz
Housing material	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing
Colour	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013
Fittings	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel
Clamping of conductors	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm
Test standards	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4



# DEHNmid DMI ... H

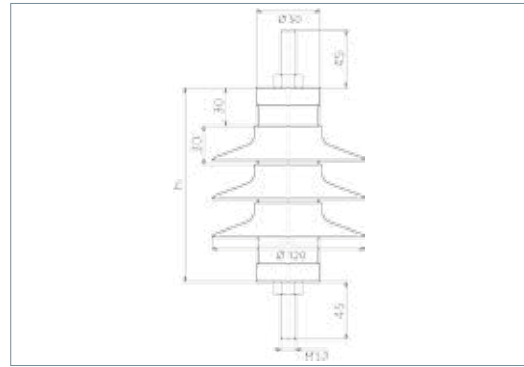


Dimension drawing DMI ... 10 1 H

Increased creepage distance; for outdoor use

Type	DMI 15 10 1 H	DMI 18 10 1 H	DMI 21 10 1 H	DMI 24 10 1 H	DMI 27 10 1 H	DMI 30 10 1 H	DMI 31 10 1 H
Part No.	990 201	990 202	990 203	990 204	990 205	990 206	990 207
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Overload capacity	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Line discharge class (1)	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (1)	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s
Line discharge class (2)	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (2)	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s
Rated voltage (a.c.) ( $U_r$ )	15 kV	18 kV	21 kV	24 kV	27 kV	30 kV	31 kV
Max. continuous operating voltage (MCOV) (a.c.) ( $U_c$ )	12.0 kV	14.4 kV	16.8 kV	19.2 kV	21.6 kV	24.0 kV	25.0 kV
Temporary overvoltage (TOV) at 1 sec. ( $U_{1s}$ )	17.3 kV	20.7 kV	24.2 kV	27.6 kV	31.1 kV	34.5 kV	35.7 kV
Temporary overvoltage (TOV) at 10 sec. ( $U_{10s}$ )	16.4 kV	19.6 kV	22.9 kV	26.2 kV	29.4 kV	32.7 kV	33.8 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	42.8 kV	52.4 kV	62.1 kV	70.6 kV	80.3 kV	85.6 kV	91.0 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	37.2 kV	45.6 kV	53.9 kV	61.4 kV	69.8 kV	74.4 kV	79.1 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	40.0 kV	49.0 kV	58.0 kV	66.0 kV	75.0 kV	80.0 kV	85.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	44.4 kV	54.4 kV	64.4 kV	73.3 kV	83.3 kV	88.8 kV	94.4 kV
Residual voltage at 40 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	50.0 kV	61.3 kV	72.5 kV	82.5 kV	93.8 kV	100.0 kV	106.3 kV
Residual voltage at 125 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	29.2 kV	35.8 kV	42.3 kV	48.2 kV	54.8 kV	58.4 kV	62.1 kV
Residual voltage at 250 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	30.1 kV	36.9 kV	43.7 kV	49.7 kV	56.5 kV	60.2 kV	64.0 kV
Residual voltage at 500 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	31.2 kV	38.2 kV	45.2 kV	51.5 kV	58.5 kV	62.4 kV	66.3 kV
Residual voltage at 1000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	32.4 kV	39.7 kV	47.0 kV	53.5 kV	60.8 kV	64.8 kV	68.9 kV
Residual voltage at 2000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	34.0 kV	41.7 kV	49.3 kV	56.1 kV	63.8 kV	68.0 kV	72.3 kV
Insulation of arrester housing / nominal power frequency withstand voltage (dry) ( $U_{PFWL}$ )	60 kV	64 kV	70 kV	78 kV	82 kV	94 kV	100 kV
Insulation of arrester housing / nominal power frequency withstand voltage (wet) ( $U_{PFWL}$ )	40 kV	42 kV	46 kV	52 kV	54 kV	62 kV	66 kV
Insulation of arrester housing / nominal lightning withstand voltage ( $U_{LWL}$ )	86 kV	92 kV	104 kV	114 kV	120 kV	136 kV	146 kV
Height (h)	162 mm	182 mm	204 mm	224 mm	244 mm	254 mm	274 mm
Weight (M)	1.3 kg	1.5 kg	1.7 kg	1.8 kg	2.0 kg	2.1 kg	2.2 kg
Creepage distance (+/- 5%)	363 mm	383 mm	480 mm	575 mm	595 mm	680 mm	775 mm
Torsional strength	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm
Maximum permissible dynamic service load (MPDSL)	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm
Tensile strength	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N
Ambient temperature ( $T_A$ )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Altitude	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level
Power frequency ( $f_N$ )	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz
Housing material	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing
Colour	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013
Fittings	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel
Clamping of conductors	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm	up to $\varnothing$ 16 mm
Test standards	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4

# DEHNmid DMI ... H

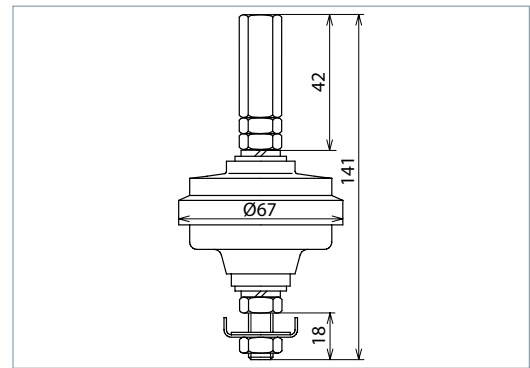


Dimension drawing DMI ... 10 1 H

Increased creepage distance; for outdoor use

Type	DMI 33 10 1 H	DMI 36 10 1 H	DMI 39 10 1 H	DMI 42 10 1 H	DMI 45 10 1 H	DMI 48 10 1 H	DMI 51 10 1 H
Part No.	990 208	990 209	990 210	990 211	990 212	990 213	990 214
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA	100 kA
Overload capacity	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA	20 kA
Line discharge class (1)	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )	1 (2.8 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (1)	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s	250 A / 2000 $\mu$ s
Line discharge class (2)	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )	2 (4.5 kJ/kV <sub>Ur</sub> )
Long-duration current impulse (2)	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s	500 A / 2000 $\mu$ s
Rated voltage (a.c.) (U <sub>n</sub> )	33 kV	36 kV	39 kV	42 kV	45 kV	48 kV	51 kV
Max. continuous operating voltage (MCOV) (a.c.) (U <sub>c</sub> )	26.4 kV	28.8 kV	31.2 kV	33.6 kV	36.0 kV	38.4 kV	40.8 kV
Temporary overvoltage (TOV) at 1 sec. (U <sub>1s</sub> )	38.0 kV	41.4 kV	44.9 kV	48.3 kV	51.8 kV	55.2 kV	58.7 kV
Temporary overvoltage (TOV) at 10 sec. (U <sub>10s</sub> )	36.0 kV	39.2 kV	42.5 kV	45.8 kV	49.1 kV	52.3 kV	55.6 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	94.2 kV	104.9 kV	114.5 kV	124.1 kV	128.4 kV	141.2 kV	147.7 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	81.8 kV	91.1 kV	99.5 kV	107.9 kV	111.6 kV	122.8 kV	128.3 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	88.0 kV	98.0 kV	107.0 kV	116.0 kV	120.0 kV	132.0 kV	138.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	97.7 kV	108.8 kV	118.8 kV	128.8 kV	133.2 kV	146.5 kV	153.2 kV
Residual voltage at 40 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	110.0 kV	122.5 kV	133.8 kV	145.0 kV	150.0 kV	165.0 kV	172.5 kV
Residual voltage at 125 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	64.2 kV	71.5 kV	78.7 kV	84.7 kV	87.6 kV	96.4 kV	100.7 kV
Residual voltage at 250 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	66.3 kV	73.8 kV	80.6 kV	87.3 kV	90.4 kV	99.4 kV	103.9 kV
Residual voltage at 500 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	68.6 kV	76.4 kV	83.5 kV	90.5 kV	93.6 kV	103.0 kV	107.6 kV
Residual voltage at 1000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	71.3 kV	79.4 kV	86.7 kV	94.0 kV	97.2 kV	106.9 kV	111.8 kV
Residual voltage at 2000 A (40/100 $\mu$ s) ( $\hat{u}_{res}$ )	74.8 kV	83.3 kV	91.0 kV	98.6 kV	102.0 kV	112.2 kV	117.3 kV
Insulation of arrester housing / nominal power frequency withstand voltage (dry) (U <sub>PFWL</sub> )	100 kV	126 kV	134 kV	142 kV	152 kV	156 kV	168 kV
Insulation of arrester housing / nominal power frequency withstand voltage (wet) (U <sub>PPWL</sub> )	66 kV	84 kV	88 kV	94 kV	100 kV	104 kV	112 kV
Insulation of arrester housing / nominal lightning withstand voltage (U <sub>LWL</sub> )	146 kV	184 kV	194 kV	206 kV	222 kV	226 kV	246 kV
Height (h)	274 mm	362 mm	384 mm	406 mm	414 mm	446 mm	456 mm
Weight (M)	2.4 kg	3.0 kg	3.2 kg	3.4 kg	3.6 kg	3.8 kg	4.0 kg
Creepage distance (+/- 5%)	775 mm	1013 mm	1110 mm	1132 mm	1215 mm	1322 mm	1407 mm
Torsional strength	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm	78 Nm
Maximum permissible dynamic service load (MPDSL)	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm	230 Nm
Tensile strength	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N	1400 N
Ambient temperature (T <sub>a</sub> )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Altitude	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level	up to 1000 m above sea level
Power frequency (f <sub>N</sub> )	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz	(16 - 62) Hz
Housing material	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing	HTV silicone housing
Colour	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013	auburn, RAL 3013
Fittings	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel	terminals, screws and nuts of stainless steel
Clamping of conductors	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm	up to Ø16 mm
Test standards	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4	IEC 60099-4

# Disconnecter

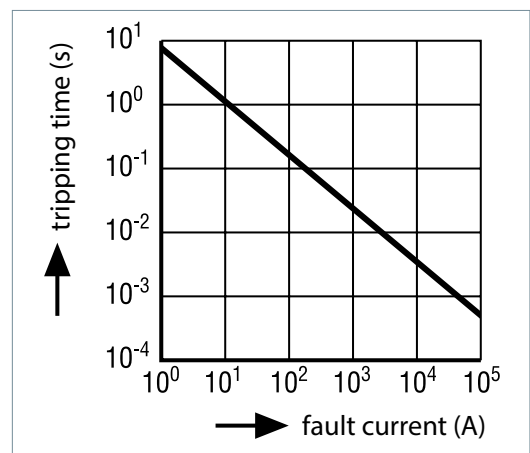


Dimension drawing DIC 10

## Disconnection unit for DEHNmid arresters

- Disconnects overloaded arresters from the system
- Prevents potential earth faults
- Ensures trouble-free operation of the medium-voltage network
- Spark gap/thermal effect principle
- No ignition of a small explosive device
- Maintenance-free

Disconnectors galvanically isolate overloaded arresters. They are series-connected with the medium-voltage arresters in their earth connection.



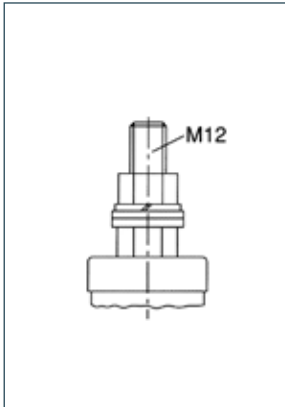
In medium-voltage networks, surge arresters are distributed throughout the whole network. Consequently, an overloaded arrester is hard to find and therefore replacement cannot always be immediately made. The disconnecter ensures safe disconnection of an overloaded surge arrester. Otherwise, a faulty arrester could form a permanent earth fault. Especially in solidly earthed systems, a faulty surge arrester prevents operation of the cable section affected if no disconnecter is used. Therefore, the disconnecter is an important component for trouble-free operation of a medium-voltage network.

The disconnecter is series-connected with the DEHNmid surge arresters in their earth connection. This is especially important in conjunction with polymer-housed arresters, since their housing does not decay during a failure and black carbon and burn traces then form an earth fault.

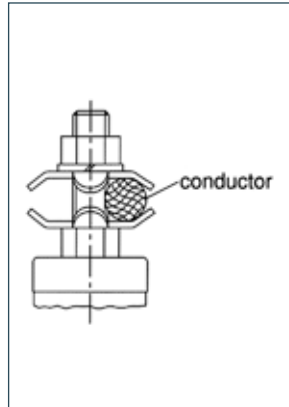
One of the most common working principles is the ignition of a small explosive device. This is difficult, particularly in daily use, for example storage, transport, etc. The disconnecter from DEHN is based on a spark gap/thermal effect principle and ensures safe disconnection without the typical disadvantages of an explosive device.

Type	DIC 10
Part No.	994 003
Weight	0.18 kg
Ambient temperature (T <sub>U</sub> )	-40 °C ... +55 °C
Altitude	3000 m above sea level
Power frequency (f <sub>N</sub> )	48-62 Hz
Housing material	ultraviolet-resistant low-pressure polyethylene
Colour	green
Fittings	stainless steel screws and nuts
Clamping of conductors	up to Ø12 mm

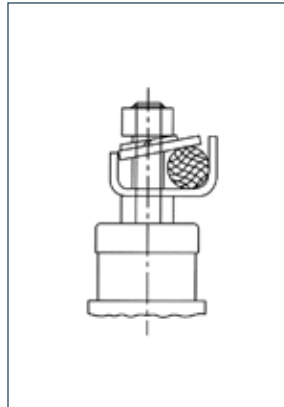
# Clamp connections



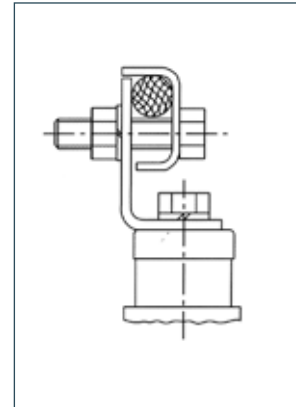
Cable lug  
Type: KA KS  
Part No.: 994 050



Overhead conductor clamp  
up to D = 9 mm  
Type: KA LS 9  
Part No.: 994 051

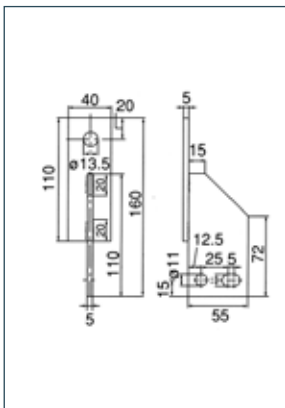


Overhead conductor clamp  
up to D = 16 mm  
Type: KA LS 16  
Part No.: 994 052

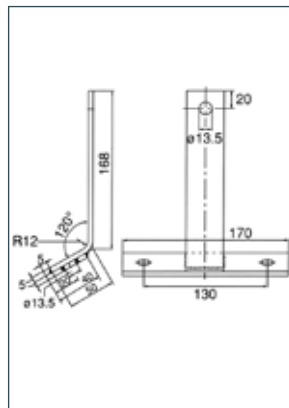


Overhead conductor clamp  
up to D = 9 to 16 mm  
Type: KA LS 9:16  
Part No.: 994 053

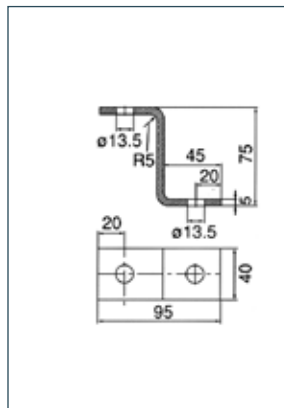
# Fixing elements



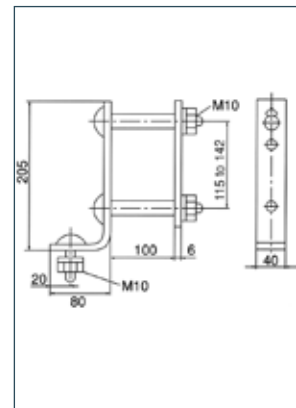
DIN fixing  
Type: BF DIN  
Part No.: 994 054



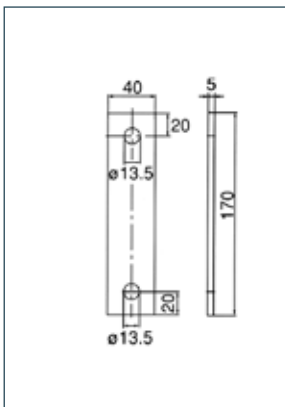
TGL fixing  
Type: BF TGL  
Part No.: 994 058



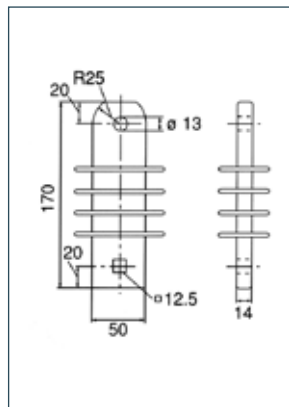
Fixing angle  
Type: BF WI  
Part No.: 994 055



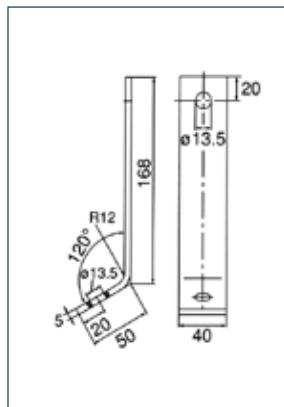
Cross-arm fixing  
Type: BF TRA  
Part No.: 994 059



NEMA fixing  
Type: BF NEMA  
Part No.: 994 056

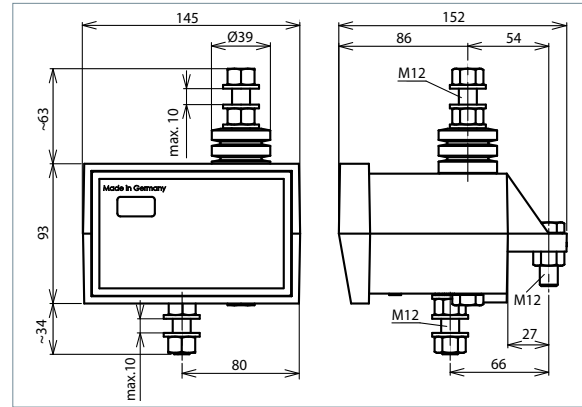
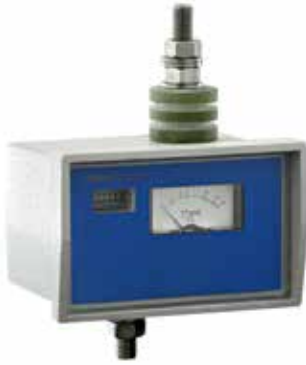


Insulating bracket  
Type: BF IH  
Part No.: 994 060



Wall fixing  
Type: BF WA  
Part No.: 994 057

# Impulse counter



Dimension drawing IZ(M) 100

## Counter for recording surges and for measuring leakage currents

- Resistant to currents as high as 100 kA (4/10  $\mu$ s)
- Fast value acquisition
- Corrosion-resistant
- Mechanically stable
- Water-proof
- Maintenance-free
- Auxiliary contacts (remote signalling contacts) optionally available

Impulse counters are used for recording discharge processes of DEHNmid surge arresters and life cycle monitoring of DEHNmid surge arresters by measuring the leakage current via the IZM 100 impulse counter.

**IZ 100:** Counter with register for recording surges and for measuring leakage currents

**IZM 100:** Counter with register for recording surges and with measuring scale for measuring leakage currents

The impulse counter can be connected to an earthing conductor or to the common earthing conductor of three arresters. A six-digit register records surges of 200 A (8/20  $\mu$ s) and higher. Five counting processes can be recorded per second. In case of high impulse currents of 100 kA (4/10  $\mu$ s), a residual nominal voltage of 5 kV s is achieved.

ensuring water resistance and water tightness.

The impulse counter can be mechanically fixed by means of a rear lug with M12 screw connection or an additional fixing angle. The IZM 100 type features a measuring scale for measuring leakage currents.

The devices do not have to be supplied with auxiliary voltage. A powder-coated, corrosion-resistant and mechanically stable housing ensures permanent use. The inspection window is sealed with a silicone resin adhesive and a drying agent is provided in the enclosure,

Except for cleaning the inspection window, both types are maintenance-free.

Type	IZ 100	IZM 100	IZ 100 FM
Part No.	994 001	994 002	994 004
Register	six-digit	six-digit	six-digit
Min. sensitivity of the counting current	100 A (8/20 $\mu$ s)	100 A (8/20 $\mu$ s)	100 A (8/20 $\mu$ s)
Max. high current resistance	100 kA (4/10 $\mu$ s)	100 kA (4/10 $\mu$ s)	100 kA (4/10 $\mu$ s)
Voltage drop at 20 kA (8/20 $\mu$ s)	1 kV s	1 kV s	1 kV s
Measuring scale	—	0-30 mA <sub>rms</sub>	—
Max. counting speed	5 counting processes per second	5 counting processes per second	5 counting processes per second
Type of remote signalling contact	—	—	make contact
Housing material	powder-coated aluminium	powder-coated aluminium	powder-coated aluminium
Colour	grey	grey	grey
Earth-side connection	M12 threaded pin with two nuts made of StSt	M12 threaded pin with two nuts made of StSt	M12 threaded pin with two nuts made of StSt
Phase-side connection	M12 threaded pin with two nuts made of StSt	M12 threaded pin with two nuts made of StSt	M12 threaded pin with two nuts made of StSt
Housing attachment	rear lug / M12 or additional fixing angle	rear lug / M12 or additional fixing angle	rear lug / M12 or additional fixing angle
Switching capacity (a.c.)	—	—	250 V / 0.5 A
Length of two-wire cable (make contact)	—	—	approx. 0.4 m

# Selection of DEHNtrack arresters for d.c. railway networks



When selecting DEHNtrack surge arresters for d.c. railway networks, three application parameters must be observed:

- Energy absorption capability of the arresters
- Maximum voltage in railway networks
- Environmental conditions at the place of installation (e.g. degree of pollution)

A sufficient energy absorption capability ensures that an arrester is capable of withstanding the stress at the place of installation for a long period of time without being damaged.

Special DEHNtrack versions of line discharge class 3 fulfil these requirements.

The maximum non-permanent voltage in railway networks ( $U_{max2}$ ) describes the maximum value of the voltage which may only occur for a limited period of time (not longer than 5 minutes). The continuous operating voltage ( $U_c$ ) of the arrester must be greater than or equal to the non-permanent voltage ( $U_{max2}$ ).

Formula 1:

$$U_c \geq U_{max2}$$

The higher the environmental stress at the place of installation of the arrester e.g. when installed close to the sea, the higher is the probability that the arrester housing is polluted. By increasing the creepage distance of the arrester, flashover at the arrester housing is prevented even in case of heavy pollution.

The creepage distance is often defined by pollution levels according to Table F.1 of IEC 60099-4.

Pollution level	Minimum specific creepage distance mm/kV $U_{max1}$
I – light	16
II – medium	20
III – heavy	25
IV – very heavy	31

The table below gives an overview of the most important traction power supply systems, the voltages to be considered and the relevant electrical dimensioning of the arresters:

Nominal voltage $U_N$	Maximum continuous operating voltage $U_{max1}$	Maximum non-permanent voltage $U_{max2}$	Maximum long-term overvoltage $U_{max3}$	DEHNtrack DTR ...
600 V	720 V	800 V	1015 V	DTR 1.2 10 3
750 V	900 V	1000 V	1269 V	DTR 1.2 10 3
1500 V	1800 V	1950 V	2538 V	DTR 2.4 10 3
3000 V	3600 V	3900 V	5075 V	DTR 4.8 10 3

## Legend:

Nominal voltage  $U_N$ :  
Maximum continuous operating voltage  $U_{max1}$ :  
Maximum non-permanent voltage  $U_{max2}$ :

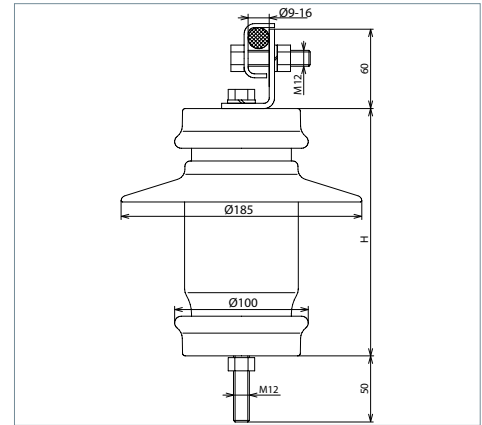
Maximum long-term overvoltage  $U_{max3}$ :  
Continuous operating voltage  $U_c$ :

Value of the voltage defined for a system.

Maximum value of the voltage that can occur indefinitely. This voltage may occur for a period of more than 5 minutes.  
Maximum value of the voltage that can occur as a maximum non-permanent voltage for a limited period of time. This voltage must not exceed 5 minutes.

Voltage as a maximum value of the long-term overvoltage for  $t = 20$  ms. This value does not depend on the frequency.  
Maximum permissible r.m.s. value of the power-frequency voltage that may be applied continuously between the terminals of the arrester.

# DEHNtrack



Dimension drawing DTR ...

## Surge arrester for d.c. systems > 1 kV

- Metal oxide arrester for d.c. systems up to 4.8 kV
- Nominal discharge current of 10 kA (8/20  $\mu$ s)
- High current withstand capability of 100 kA (4/10  $\mu$ s)
- For indoor and outdoor use
- Maximum protection under conditions of pollution
- Maximum protection against mechanical vibrations
- Break resistance in case of overload
- Freely selectable mounting position

DEHNtrack protects d.c. systems and rectifier stations against surges and is especially suited for installation in rolling stock, trolley buses and overhead lines.

The active part of DEHNtrack d.c. arresters consists of high-quality and thermally stable ZnO varistor discs. The continuous U/I characteristic, quick sparkover performance and low residual voltage of ZnO varistor discs make them ideal components for d.c. arresters.

The coating of the varistor block is a key element of the design of arresters for d.c. systems. High-temperature vulcanised silicone ensures permanent protection from environmental influences such as air humidity or deposits of pollution. Moreover, repeated climatic and mechanical stress has also been considered.

The rated voltage is selected according to the maximum operating voltage of the d.c. system. DEHNtrack d.c. arresters are available with the following rated voltages:

$U_r = 1.2$ kV	→	DTR 1.2 10 3
$U_r = 2.4$ kV	→	DTR 2.4 10 3
$U_r = 3.6$ kV	→	DTR 3.6 10 3
$U_r = 4.8$ kV	→	DTR 4.8 10 3

Numerous clamp connections and fixing elements are available as accessory.

Type	DTR 1.2 10 3	DTR 2.4 10 3	DTR 3.6 10 3	DTR 4.8 10 3
Part No.	990 301	990 302	990 303	990 304
Nominal discharge current (8/20 $\mu$ s) ( $I_n$ )	10 kA	10 kA	10 kA	10 kA
High current impulse (4/10 $\mu$ s)	100 kA	100 kA	100 kA	100 kA
Long duration current impulse	1000 A / 2000 $\mu$ s	1000 A / 2000 $\mu$ s	1000 A / 2000 $\mu$ s	1000 A / 2000 $\mu$ s
Line discharge class	3 (6.7 kJ/kV $_{Ur}$ )	3 (6.7 kJ/kV $_{Ur}$ )	3 (6.7 kJ/kV $_{Ur}$ )	3 (6.7 kJ/kV $_{Ur}$ )
Rated voltage (d.c.) ( $U_r$ )	1.2 kV	2.4 kV	3.6 kV	4.8 kV
Continuous operating voltage (d.c.) ( $U_c$ )	1.0 kV	2.0 kV	3.0 kV	4.0 kV
Residual voltage at 10 kA (1/2 $\mu$ s) ( $\hat{u}_{res}$ )	2.9 kV	5.5 kV	8.3 kV	10.9 kV
Residual voltage at 5 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	2.5 kV	4.8 kV	7.3 kV	9.5 kV
Residual voltage at 10 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	2.6 kV	5.0 kV	7.6 kV	10.0 kV
Residual voltage at 20 kA (8/20 $\mu$ s) ( $\hat{u}_{res}$ )	2.9 kV	5.5 kV	8.3 kV	10.9 kV
Residual voltage at 250 kA (30/70 $\mu$ s) ( $\hat{u}_{res}$ )	2.1 kV	4.0 kV	6.1 kV	7.9 kV
Residual voltage at 500 kA (30/70 $\mu$ s) ( $\hat{u}_{res}$ )	2.2 kV	4.1 kV	6.2 kV	8.1 kV
Residual voltage at 1000 kA (30/70 $\mu$ s) ( $\hat{u}_{res}$ )	2.3 kV	4.2 kV	6.4 kV	8.3 kV
Insulation of arrester housing / nominal power frequency withstand voltage (wet) ( $U_{PFWL}$ )	$\geq 40$ kV	$\geq 40$ kV	$\geq 40$ kV	$\geq 40$ kV
Insulation of arrester housing / nominal switching withstand voltage (wet) ( $U_{SWL}$ )	$\geq 50$ kV	$\geq 50$ kV	$\geq 50$ kV	$\geq 50$ kV
Height (h)	173 mm	180 mm	187 mm	193 mm
Weight (M)	3 kg	3 kg	3 kg	3 kg
Creepage distance (+/- 5%)	230 mm	237 mm	244 mm	250 mm
Mechanical shock resistance acc. to IEC 68 Part 2-29	15 g	15 g	15 g	15 g
Vibration resistance acc. to IEC 68 Part 2-6	3 g (10-500 Hz)	3 g (10-500 Hz)	3 g (10-500 Hz)	3 g (10-500 Hz)
Ambient temperature ( $T_A$ )	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C	-40 °C ... +55 °C
Housing material	silicone	silicone	silicone	silicone
Colour	grey, RAL 7040	grey, RAL 7040	grey, RAL 7040	grey, RAL 7040
Fittings	Al cast alloy	Al cast alloy	Al cast alloy	Al cast alloy
Connections	stainless steel terminals and screws	stainless steel terminals and screws	stainless steel terminals and screws	stainless steel terminals and screws

[www.dehn-international.com/partners](http://www.dehn-international.com/partners)



**Surge Protection**  
**Lightning Protection**  
**Safety Equipment**  
**DEHN protects.**

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GmbH + Co.KG.

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