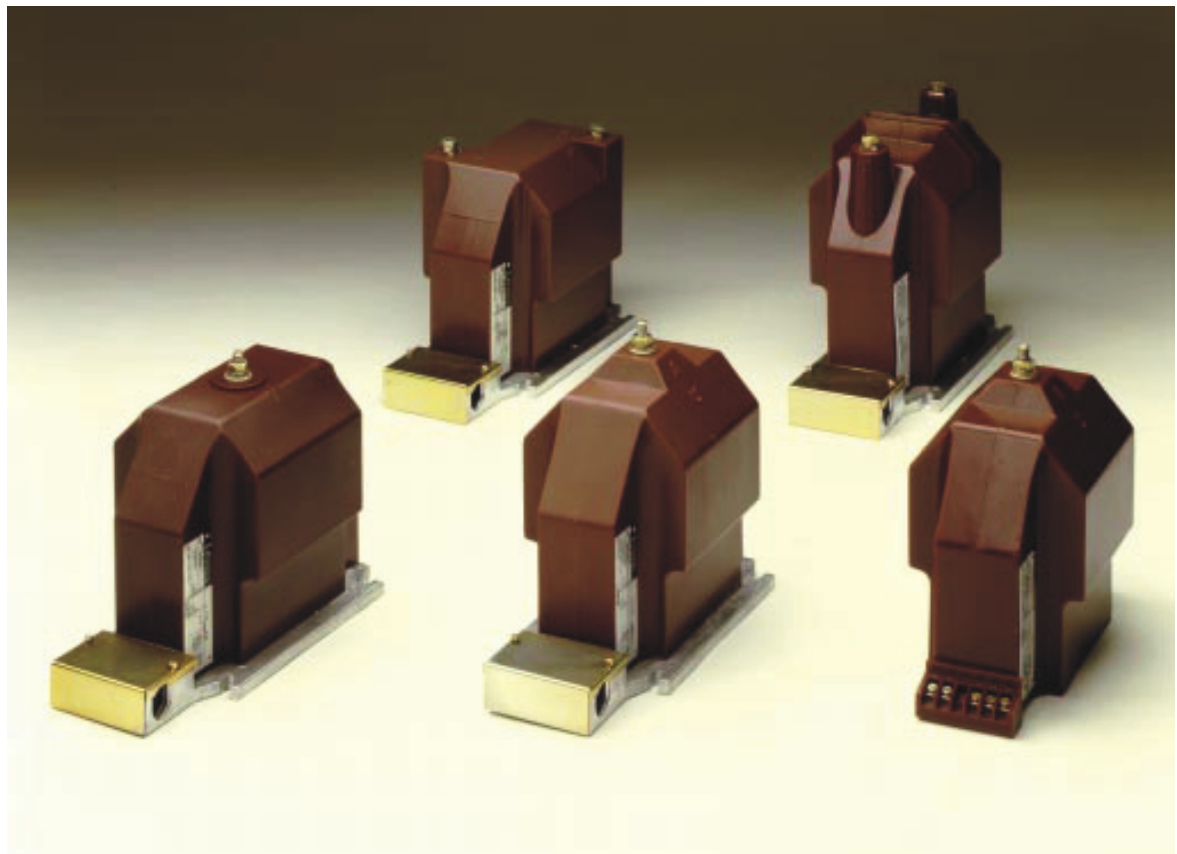


Voltage Transformers for Indoor Use type Kres

Catalogue card A82/06/00/E





KRES Voltage Transformers for Indoor Use

12 and 24 kV

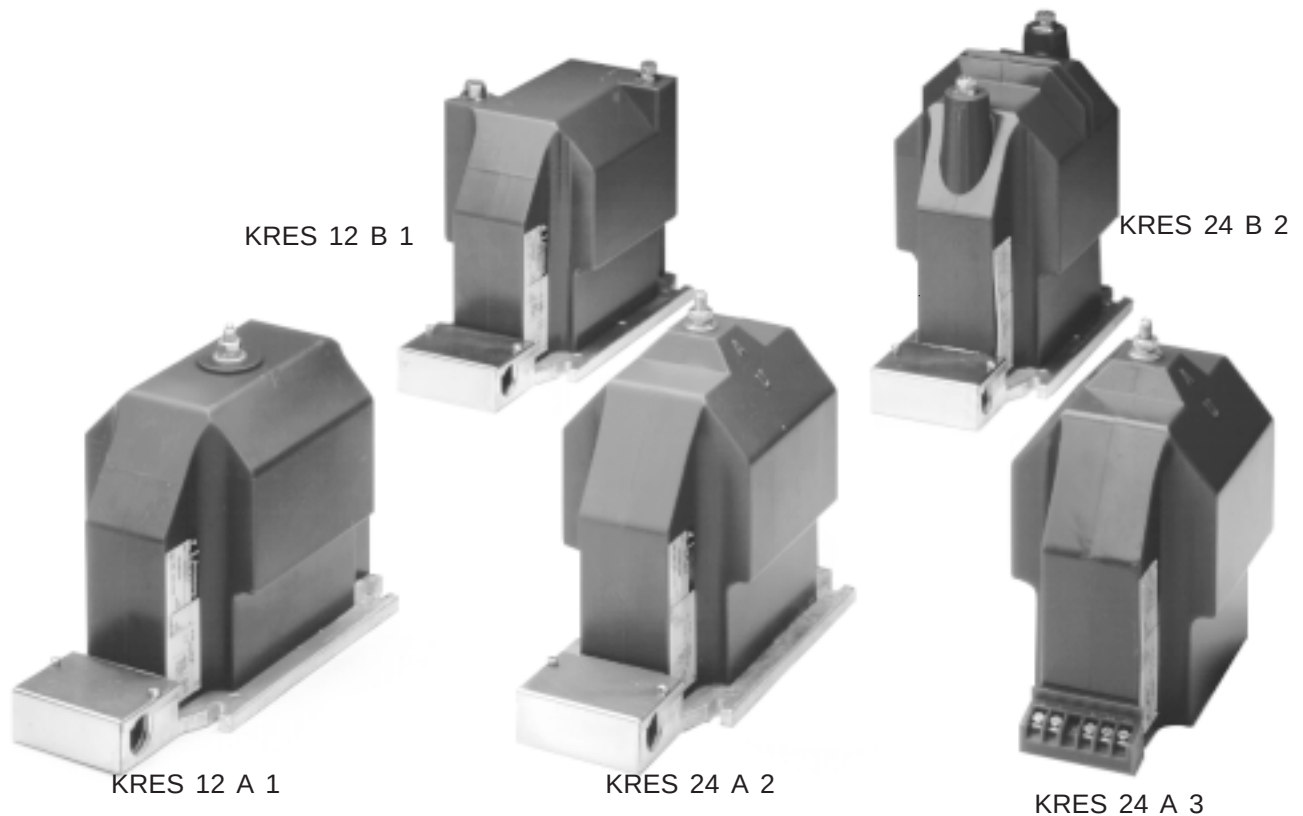
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KRES Voltage Transformers for Indoor Use

12 and 24 kV



881039

Description

The product range includes single phase and single or double pole insulated voltage transformers.

The voltage transformers have a high-class cast resin insulation

The transformers are vacuum encapsulated in epoxy resin, which ensures faultless insulation. Incombustible high-class raw material, together with uniform cast resin bodies, gives the voltage transformers a high mechanical and electrical strength that requires no maintenance.

The lowest ambient operating temperature is -5°C according to IEC-recommendation. However, if the transformers are protected against condensation, and the formation of frost on the insulation they can even be used down to -40°C . It is advisable to protect the transformers from direct sunlight and an excess of dust.

Secondary cables can be easily connected

The terminal box is provided with an opening for an armour tube or similar protection, for the secondary cables to be connected. Upon special request the terminal box can be made with a threaded opening. Degree of protection is IP 30.

One $2.5\ldots 10\text{ mm}^2$ or two $2.5\ldots 6\text{ mm}^2$ conductors can be directly connected to the secondary terminals.

KRES 24 A3 does not have a terminal box. The number of secondary terminals is max. 4, except for type KRES 24 A3 where max. 6 pcs are available.

Extensive routine testing ensures high quality

Voltage testing of the primary and secondary windings and accuracy class measurement are performed as general tests in accordance with the required standards on every voltage transformer. Partial discharge measurements are made on every transformer.

Indoor voltage transformers 12 and 24 kV

Technical data and ordering information

System and test voltages acc. IEC 186

Primary winding

Type	Highest voltage kV	Alternating test voltage kV	Impulse test voltage 1.2/50 μ s, kV	Rated frequency
KRES 12_	3.6 7.2 12	10 20 28	40 60 75	50 (60)
KRES 24_	17.5 24	38 50	95 125	

PRIMARY.TBL

The test voltage of secondary winding is 3 kV (1 min).

Standards

IEC Publication 186 and 44-4
Others on request, e.g.
VDE 0414/12.70
BS 3941
ANSI C57.13
SS 427 08 13

Preferred transformers for 12 and 24 kV

Technical data and ordering information

A selection of KRES-type voltage transformers are made as preferred versions which has two advantages:

1. The transformers are ready-designed and complete with documentation for the most common types to ensure a short delivery time.
2. Simplified ordering process with every preferred KRES having a unique ordering code.

The single pole transformers are provided with earth fault windings as described in the table on page 7.

The preferred transformers fulfill the following standards:
IEC Publication 186, and 44–4

Features and ratings common to all preferred transformers

Secondary limiting current:

1-pole transformers: 4 A for measuring windings
 6 A, 8 h, $U = 1.9 U_n$, for earth fault windings

2-pole transformers: 4 A for measuring windings.

Earth fault winding is always fitted in one-pole transformers.

Frequency: 50 Hz (except for 13.8 kV transformers)

When ordering transformers in accordance with the following table, please state ordering code and quantity.

E.g. KRES 24 A 2-V01, 3 pc.

Type: KRES 12 A 1 Single pole insulated up to 12: $\sqrt{3}$ kV
 KRES 24 A 2 Single pole insulated up to 24: $\sqrt{3}$ kV
 KRES 24 A 3 Single pole insulated up to 24: $\sqrt{3}$ kV, without mounting plate
 KRES 12 B 1 Double pole insulated up to 12 kV
 KRES 24 B 2 Double pole insulated up to 24 kV

Preferred transformers for 12 and 24 kV

Single pole insulated transformers

Technical data and ordering information

The tables contain both transformers with normal IEC burdens, e.g. 50 VA in class 0.5, and transformers with extended IEC burdens, e.g. 1-50 VA in class 0.5.

These preferred transformers have a unique feature: The allowed burden is as low as 1 VA, which means that the same transformers, e.g. class 0.5, 1-50 VA, may be used with modern electronical instruments consuming a few VA, as well as with electromechanical instruments consuming the full power, 50 VA.

Voltage ratio V	Rated burden VA	Acc. class	Ordering code	Ordering code	Ordering code
			KRES 12 A1–	KRES 24 A2–	KRES 24 A3–
3000: $\sqrt{3}/100$: $\sqrt{3}/100:3$	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	C01 C02 C03 C04 C05	C01 C02	C01 C02
3300: $\sqrt{3}/110$: $\sqrt{3}/110:3$	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	C21 C22 C23 C24 C25	C21 C22	C21 C22
6000: $\sqrt{3}/100$: $\sqrt{3}/100:3$	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	F01 F02 F03 F04 F05	F01 F02	F01 F02
6600: $\sqrt{3}/110$: $\sqrt{3}/110:3$	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	F21 F22 F23 F24 F25	F21 F22	F21 F22
10000: $\sqrt{3}/100$: $\sqrt{3}/100:3$	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	K01 K02 K03 K04 K05	K01 K02	K01 K02
11000: $\sqrt{3}/110$: $\sqrt{3}/110:3$	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	L21 L22 L23 L24 L25	L21 L22	L21 L22
13800: $\sqrt{3}/110$: $\sqrt{3}/110:3$ 60 Hz!	1–15 1–50 1–100	0.2 0.5 1		N13 N14 N15	N13 N14 N15

Preferred transformers for 12 and 24 kV
Single pole insulated transformers
Technical data and ordering information

Voltage ratio V	Rated burden VA	Acc. class	Ordering code KRES 12 A1–	Ordering code KRES 24 A2–	Ordering code KRES 24 A3–
20000: $\sqrt{3}/100$: $\sqrt{3}/100$:3	50	0.5		V01	V01
	25	0.2		V02	V02
	1–15	0.2		V03	V03
	1–50	0.5		V04	V04
	1–100	1		V05	V05
20000: $\sqrt{3}/110$: $\sqrt{3}/110$:3	50	0.5			V21
	25	0.2			V22
22000: $\sqrt{3}/110$: $\sqrt{3}/110$:3	50	0.5		Y21	Y21
	25	0.2		Y22	Y22
	1–15	0.2		Y23	Y23
	1–50	0.5		Y24	Y24
	1–100	1		Y25	Y25

Preferred transformers for 12 and 24 kV
Double pole insulated transformers
Technical data and ordering information

Voltage ratio V	Rated burden VA	Acc. class	Ordering code KRES 12 B1–	Ordering code KRES 24 B2–
3000/100	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	C01 C02 C03 C04 C05	
3300/110	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	C21 C22 C23 C24 C25	
6000/100	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	F01 F02 F03 F04 F05	
6600/110	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	F21 F22 F23 F24 F25	
10000/100	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	K01 K02 K03 K04 K05	
11000/110	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1	L21 L22 L23 L24 L25	
20000/100	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1		V01 V02 V03 V04 V05
22000/110	50 30 1–15 1–50 1–100	0.5 0.2 0.2 0.5 1		Y21 Y22 Y23 Y24 Y25

Custom designed transformers

Rated burdens and accuracy classes

Technical data and ordering information

Single pole insulated voltage transformers

Type	KRES 12 A1				KRES 24 A2 KRES 24 A3							
Primary voltage Terminal marking	3000: $\sqrt{3}$...12000: $\sqrt{3}$ V, A-N, U-X				3000: $\sqrt{3}$...24000: $\sqrt{3}$ V A-N, U-X							
Winding	Measuring winding		Earth-fault winding		Measuring winding		Earth-fault winding					
Secondary voltage	100: $\sqrt{3}$ V 110: $\sqrt{3}$ V		100:3 V 110:3 V		100: $\sqrt{3}$ V 110: $\sqrt{3}$ V		100:3 V 110:3 V					
Terminal marking	a-n, u-x		da-dn, e-n		a-n, u-x		da-dn, e-n					
Accuracy class	0.2	0.5	1	3	3P	6P	0.2	0.5	1	3	3P	6P
	3P								3P			
Rated burden max. VA when e.f. winding fitted	30	75	150	250	100	100	30	75	150	250	100	100
	250				2)		250				2)	
Secondary thermal limiting current 1) U = 1.2 x Un (continuous) U = 1.9 x Un 8h	10.0 A 5.0 A				– 6.0 A		9.8 A 4.6 A				– 6.0 A	
Secondary short circuit current, when U = 1.2 x Un approx. U = 1.9 x Un approx.	max. 160 A -				– max. 280 A		max. 135 A -				– max. 150 A	
Mechanical strength of primary terminal	3 kN						3 kN					
Weight approx.	21 kg						22 kg					

1) For secondary voltages 100: $\sqrt{3}$ and 110: $\sqrt{3}$ V only

2) Max. burden for one transformer. With 3 transformers in open delta connection the burden is max. 3 x 100 VA = 300 VA.

Double pole insulated voltage transformers

Type	KRES 12 B1				KRES 24 B2 KRES 24 A3			
Primary voltage Terminal marking	3000...12000 V A-B				3000...24000 V A-B			
Winding	Measuring winding				Measuring winding			
Secondary voltage	100 V 110 V				100 V 110 V			
Terminal marking	a-b				a-b			
Accuracy class	0.2	0.5	1	3	0.2	0.5	1	3
Rated burden max. VA	40	100	200	400	30	100	200	400
Secondary thermal limiting current 1) U = 1.2 x Un (continuous)	6.2 A				6.0 A			
Secondary short circuit current, when U = 1.2 x Un approx.	max. 120 A				max. 100 A			
Mechanical strength of primary terminal	3 kN				3 kN			
Weight approx.	21 kg				21 kg			

1) For secondary voltages 100 V and 110 V only

Note for Voltage Transformers

Technical data and ordering information

Note

Risk of ferro-resonance should be taken into account when using single pole voltage transformers.

An unearthed network forms a network-to-earth capacitance which is in parallel with the single pole voltage transformers reactance to earth, an oscillating circuit. Under certain conditions the oscillating circuits' own frequency will resonate with an over or under-tone of the network.

At resonance with an under-tone the transformer coil will saturate, causing the magnetizing current to increase manyfold, over-heating and damaging the transformer. At resonance with an over-tone the voltage amplitude can increase to such a high value that the insulation will become damaged.

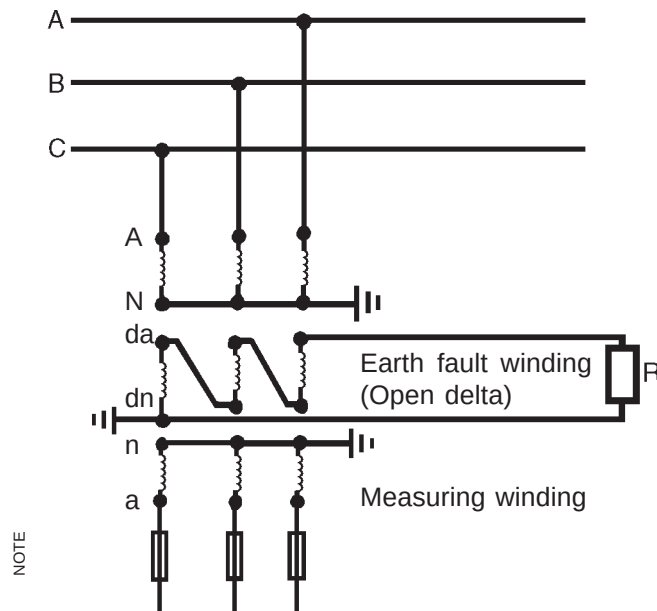
Over and under-tones can be damped with a suitable resistor placed in the earth-fault winding, as shown in the figure. Recommended damping power is 450 W. This means that using an earth fault winding 100:3 V the resistor is 22 Ω and for 110:3 V the resistor is 27 Ω .

Damping resistor type numbers:

22 Ω : DAE GBF 30/330 22R

27 Ω : DAE GBF 30/330 27R

The use of individual single pole voltage transformers is not recommended. This is due to the fact that the required damping power, in the worst case, can be 4 times greater than when using an earth fault winding (open-delta). This power will also continuously load the transformer.

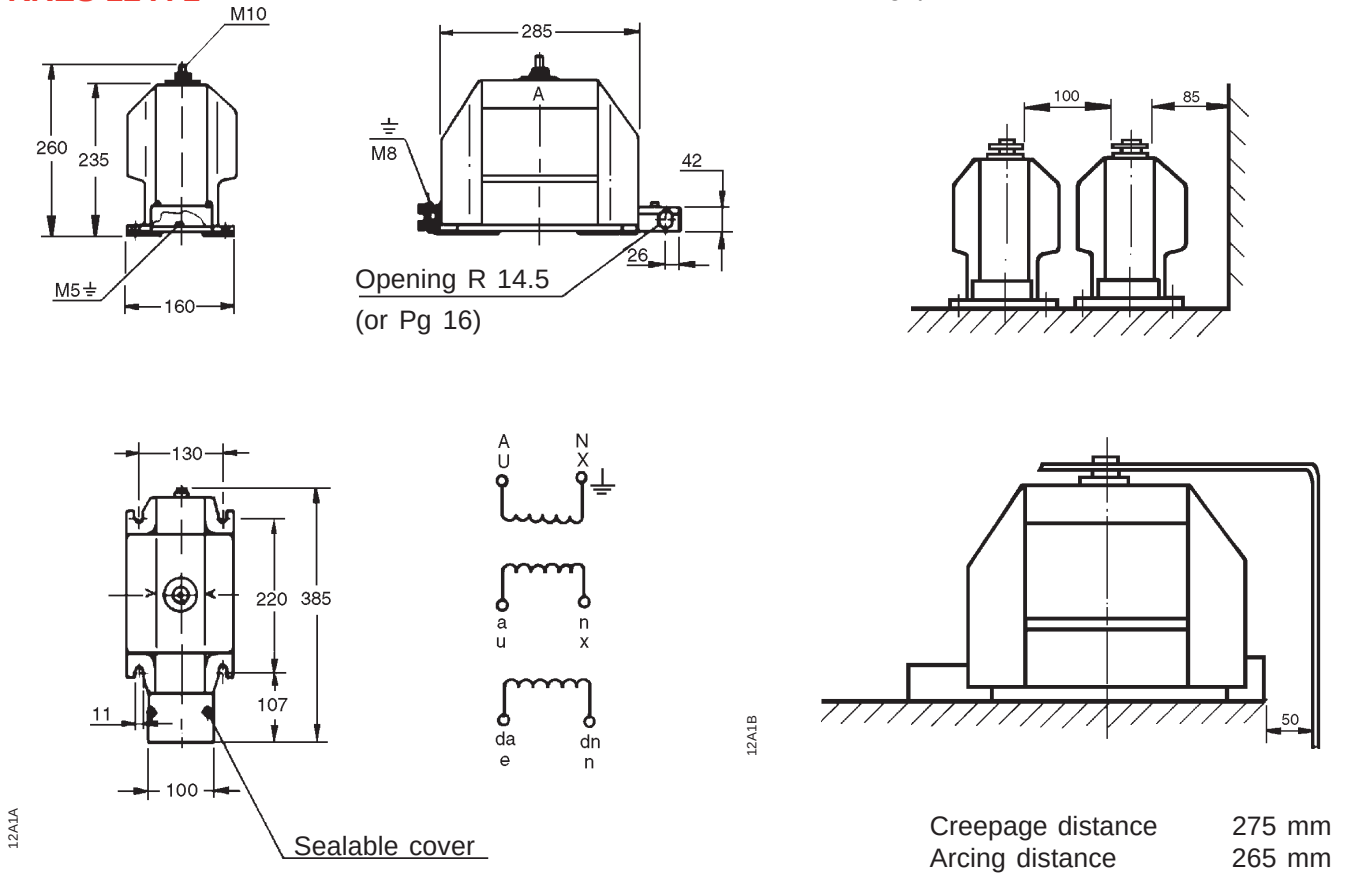


Types KRES 12 A 1 and KRES 24 A 2

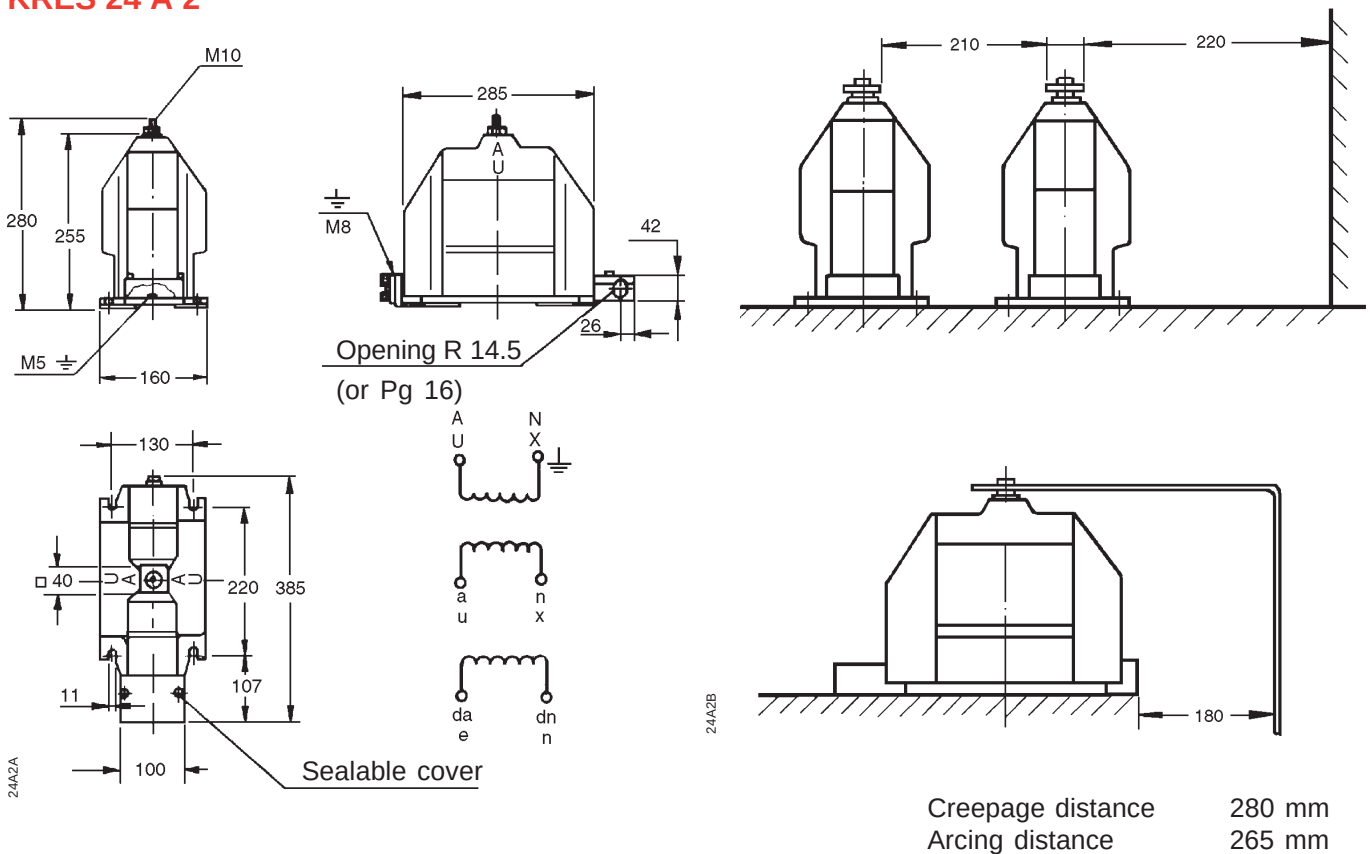
Dimensions

KRES 12 A 1

Tested min. airgap acc. IEC 60 at full insulation level



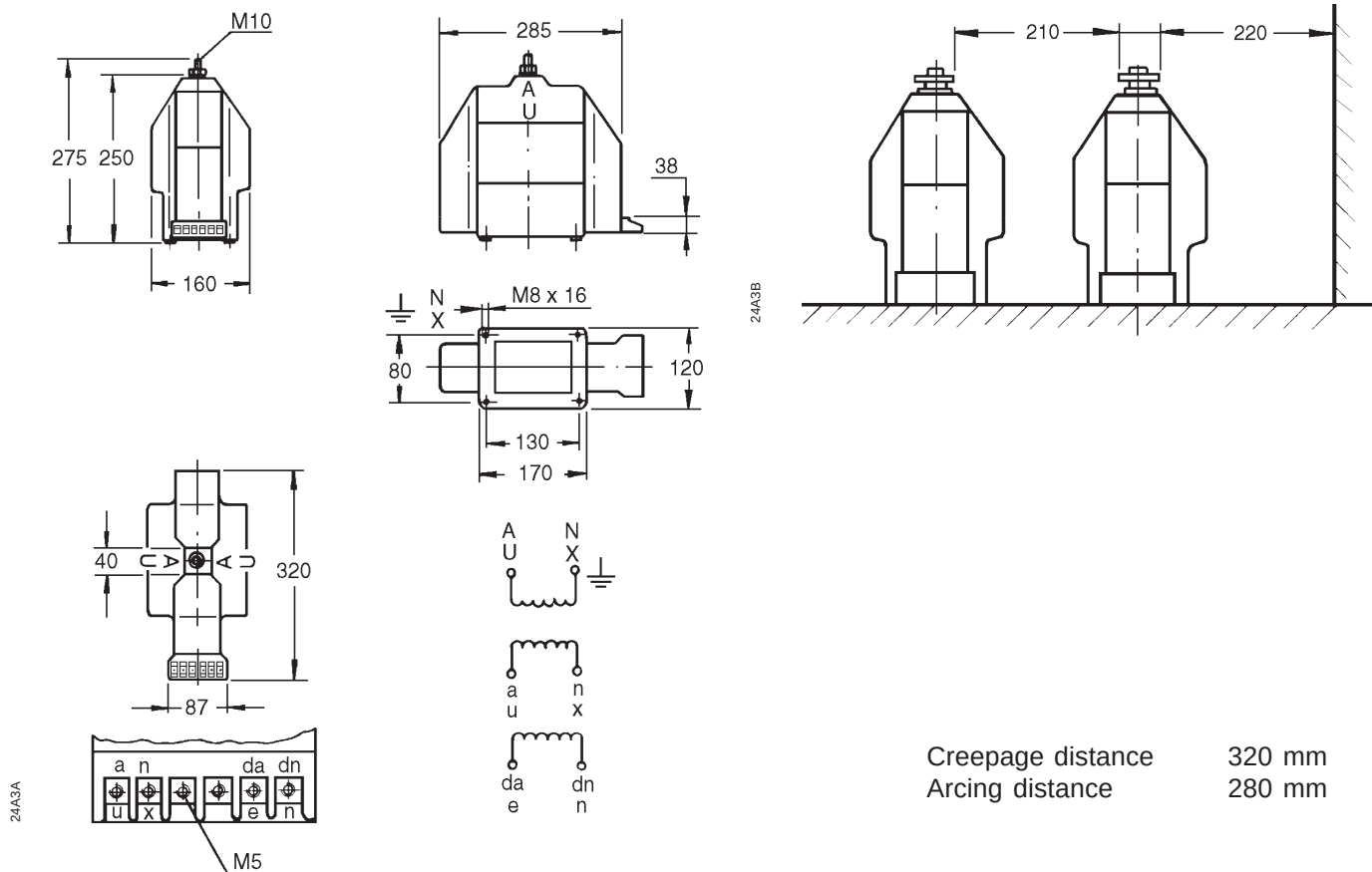
KRES 24 A 2



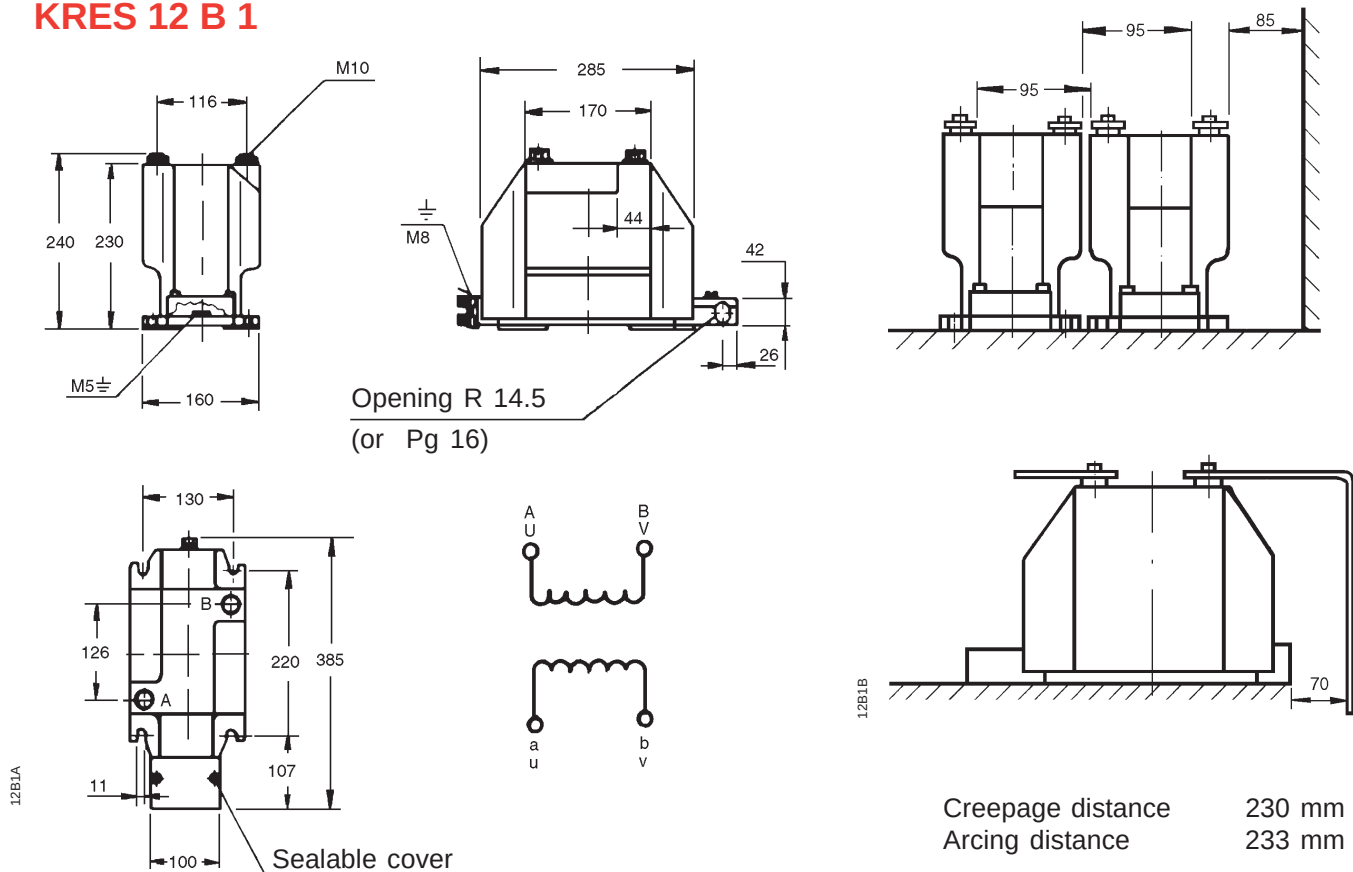
Types KRES 24 A 3 and KRES 12 B 1

Dimensions

KRES 24 A 3

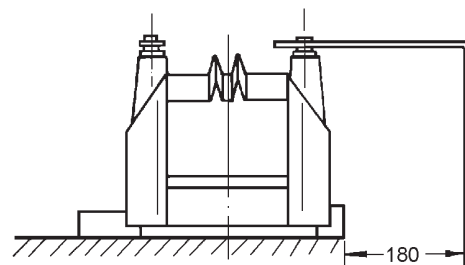
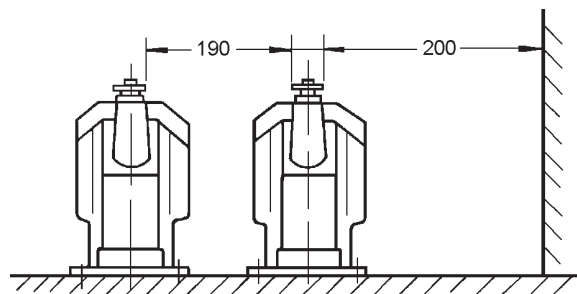


KRES 12 B 1



24B2A

KRES7.TBL



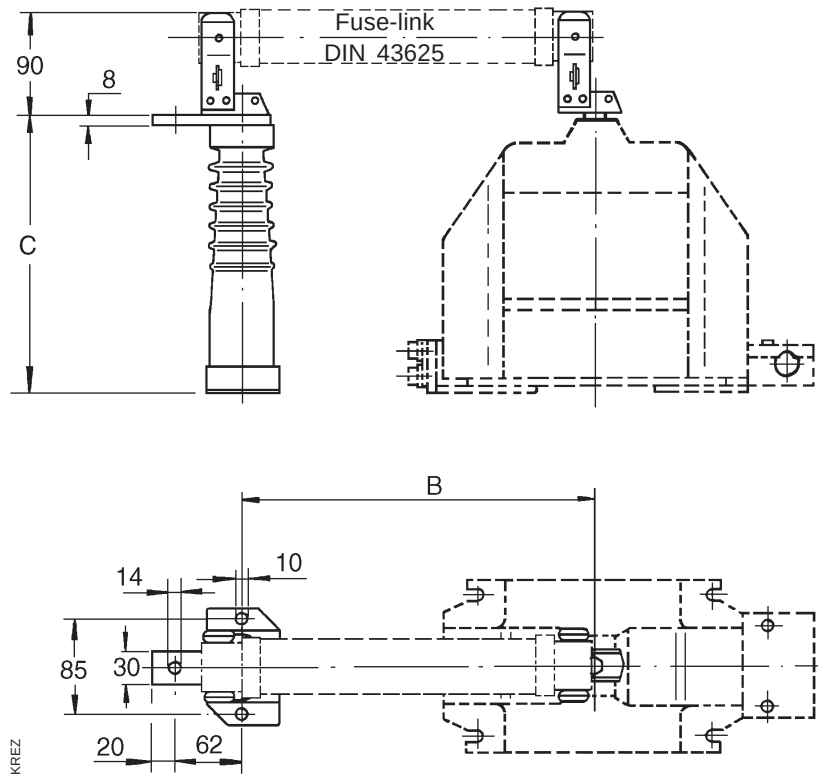
Fuse bases for voltage transformers

KRES7.TBL

Fuse base kit

Dimensions

KREZ 60, 61, 62



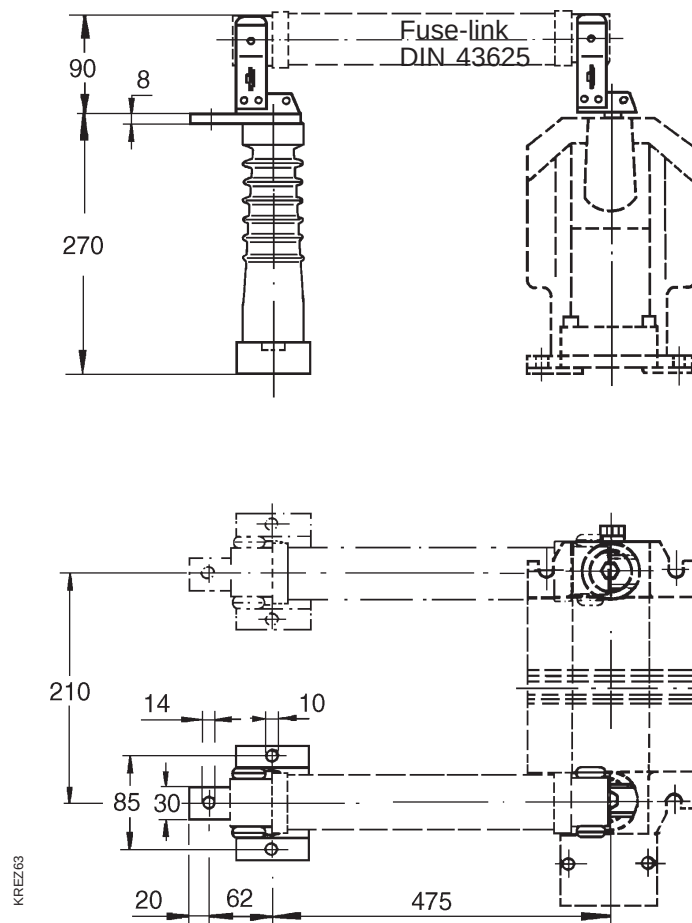
Type	Concerning	B	C
KREZ 60	KRES 12 A 1	325	233
KREZ 61	KRES 24 A 2	475	255
KREZ 62	KRES 24 A 3	475	248

KREZ1.TBL

Fuse base kit

Dimensions

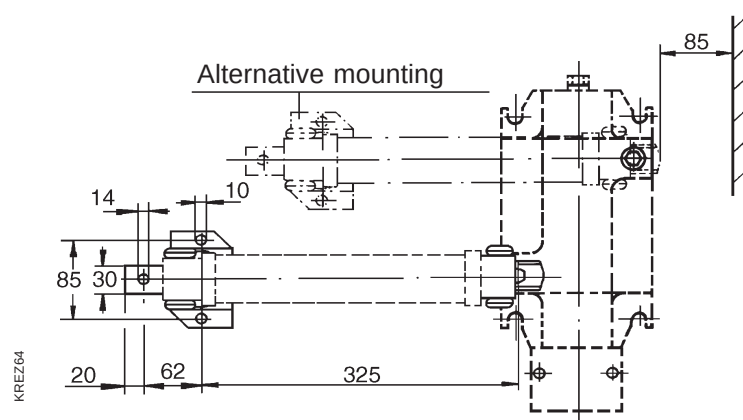
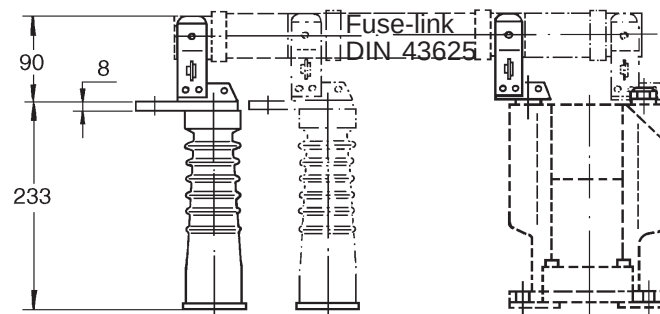
KREZ 63



Fuse base kit

Dimensions

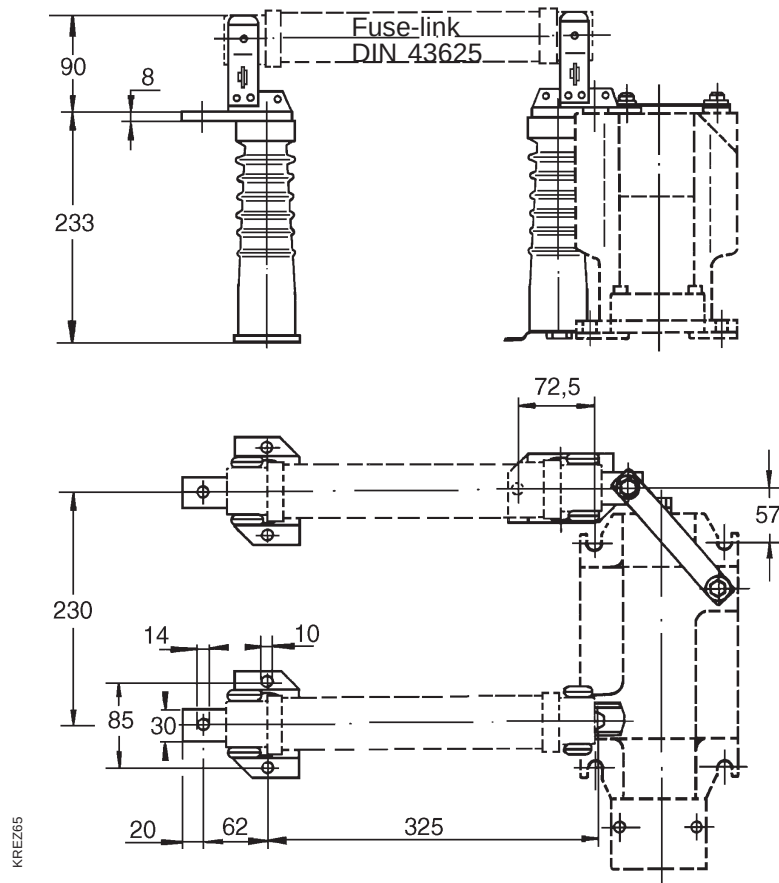
KREZ 64



Fuse base kit

Dimensions

KREZ 65



The kit includes two fuse bases and mounting equipment.



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