Capacitors for High Voltage
Type KLV

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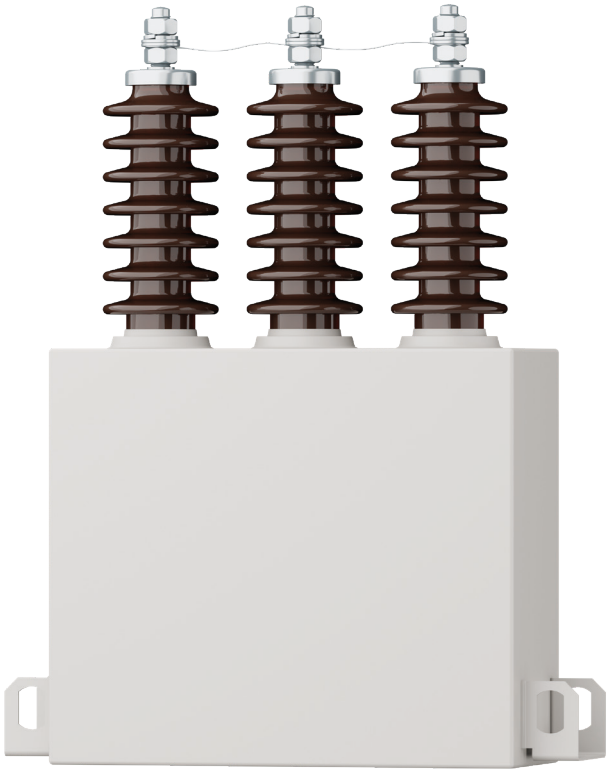
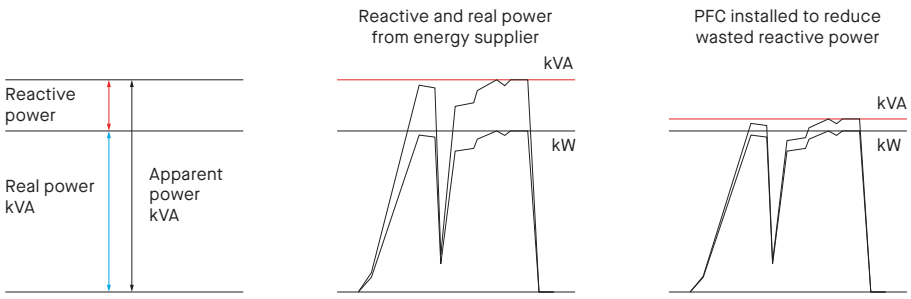


About

PFC (power factor correction) high-voltage KLV capacitors are designed for reactive power compensation in electrical networks and industrial plants, typically as part of shunt capacitor bank systems. They improve energy efficiency and system performance by correcting the lagging current caused by inductive loads such as motors, transformers, welding devices, and fluorescent lighting.

KLV capacitors use advanced all-film capacitor sections with folded foil edges, improved electrical and mechanical connections, and impregnation with environmentally compatible insulating oil. This design ensures very low dielectric losses, reliable operation, and a long service life while helping reduce energy costs and electrical system loading.



Wasted energy

Smaller gap equates to lower power factor and reduced electricity bill suppliers charge for total kVA

General info

High voltage capacitors are composed of partial capacitances (sections) generally connected in several serial-parallel groups used to obtain the required electrical characteristics for the unit:

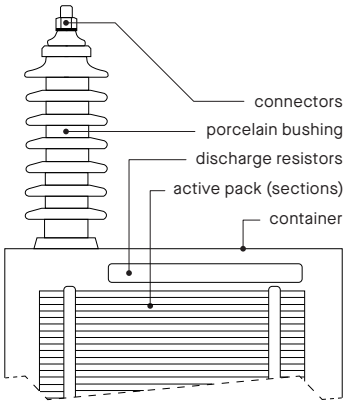
- the nominal voltage of a capacitor depends on the number of groups in series,
- the nominal power of a capacitor depends on the number of partial capacitances in parallel per group.

Each elementary capacitance is produced using two aluminum foils forming the electrodes and high-quality polypropylene films which are rough for easy impregnation, forming part of the insulating layer.

The wired capacitance assembly, called the "active pack" is positioned in the container and equipped with porcelain bushings used to connect the device.

After it has been dried and treated, the "active section" is impregnated under a vacuum with a liquid dielectric of the following type:

- non-chlorinated (NON-PCB),
- non-toxic,
- environmentally compatible.



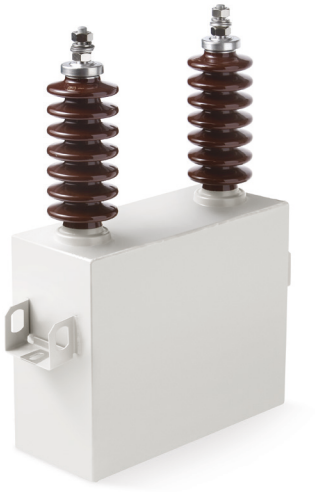
With the polypropylene film, this liquid dielectric, which has remarkably high chemical stability, high gas absorption and partial discharge quenching capacity and a flash point of approximately 150°C, ensures total insulation between electrodes. This "All-film" technology has the following main characteristics:

- high resistance to strong electrical fields,
- low power losses, enabling considerable savings for high power capacitor banks.

Features

- All-film technology
- NON-PCB, non-toxic, environmentally compatible impregnating oil
- Hazy polypropylene dielectric
- Extended foil
- Folded foil design
- Soldering directly to the aluminum foils
- Low losses capacitor, with high resistance to strong electrical fields
- Dimensions and shape could be modified according to existing units
- European quality and design

Single phase capacitors – single bushing



Single phase capacitors – double bushing

Three phase capacitors and single phase capacitors with two outputs (twin)

- **KLV3XXX** – internally fused capacitors. Each capacitor element has a separate internal fuse.
- **KLV1XXX** – capacitors without internal fuses.
- **KLVXXX4** – single phase capacitors with two outputs (twin). Capacitors are supplied in sets of three to provide an economical unbalance detection scheme. This is particularly advantageous in low output capacitor banks.

Technical Data

Rated power (max.)	700 kVar
Rated voltage	1.0 - 25 KV
Rated frequency	50 or 60 Hz
BIL	60, 75, 95, 125, 170 kV
Losses total	max. 0.2 W / kVar (0.08 ... 0.15 average)
Dielectric	All-film (hazy polypropylene)
Impregnating fluid	Environmentally compatible impregnating oil based on M/DBT (non-PCB)
Discharge resistor	Built-in discharge resistor reduces the voltage on a de-energised capacitor from the crest of rated voltage to 75 V in 10 minutes or less (discharge to 50 V in 5 minutes on demand).
Permissible overloads	Maximum permissible current 1,3 x I_n continuously Maximum permissible voltage 1,1 x U_n continuously, 12 h per day
Quality	Iskra is certified according to ISO 9001 (quality) and ISO 14001 (environment)
Standards	IEC 60871-1, IEEE Std 18

Routine Tests

Sealing test	Minimum of 6 hours at 75 °C
Voltage test between terminals	2.0 x rated voltage AC, 10 s or 4.0 x rated voltage DC, 10 s
AC voltage test between terminals and container	According to IEC 60871-1, table 3, 10 s
Discharge resistor test	
Measurement of losses (Tan δ)	

Service Conditions

Temperature categories up to -40 /D		
Upper Temperature category limit	**C**	**D**
Maximum	50 °C	55 °C
Highest mean over 24 h	40 °C	45 °C
Highest mean over 1 year	30 °C	35 °C
Low temperature limit during operation	-25 °C or -40 °C	
Installation	Outdoor or indoor	
Installation Altitude (above sea level)	1000 m standard, up to 4000 m on demand	
Case Material	Stainless steel plate 1.5 mm thick	
Finish / Color	Two-component durable painting RAL 7032 (light grey) on treated surfaces	
Fixing	Depending on the height of capacitor, container is equipped with one or two mounting brackets on the narrower sides. Brackets have mounting slots 11 × 20 mm.	

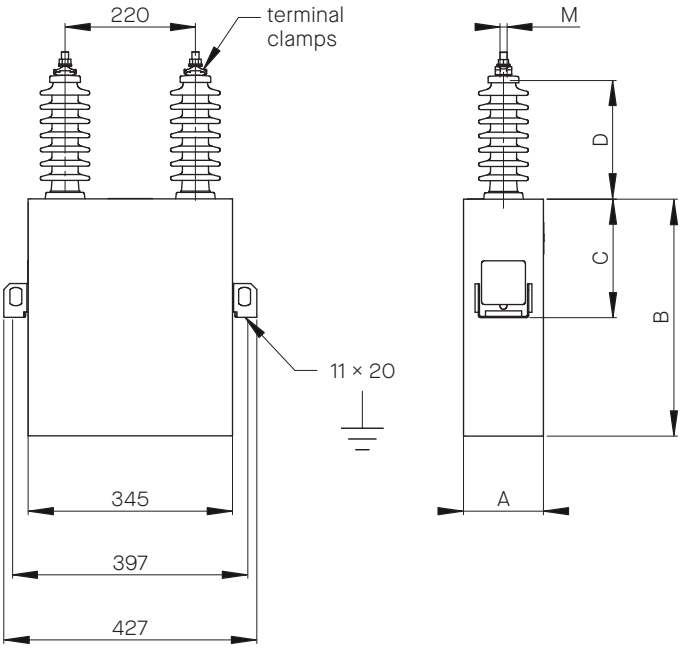
Terminal & Connections

Bushings	Brown or grey porcelain bushings, welded to the container.
Thread of terminal stud	M14 or M16
Current	180 A max.
Connections	Terminal clamps with provision to accommodate any combination of 2 conductors from 4 mm² solid to 50 mm² stranded wire are available on demand*. The capacitor unit grounding is provided by unpainted surface of mounting brackets.
Pressure switch	With terminal cap supplied on demand.
Name Plate	Durable plastic label with permanent printing.

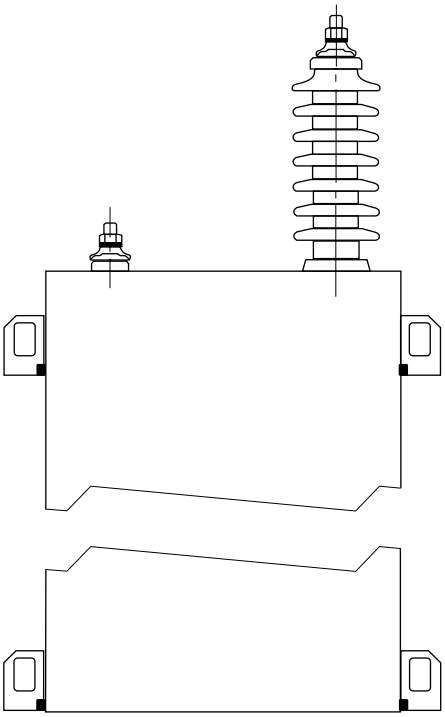
Note

*Terminal clamps 70 mm² also available on demand.

Picture 1
Two - bushing capacitor KLVXXX1
(insulated container)



Picture 2
Single - bushing capacitor KLVXXX0
(voltage on the container)



Typical Dimensions

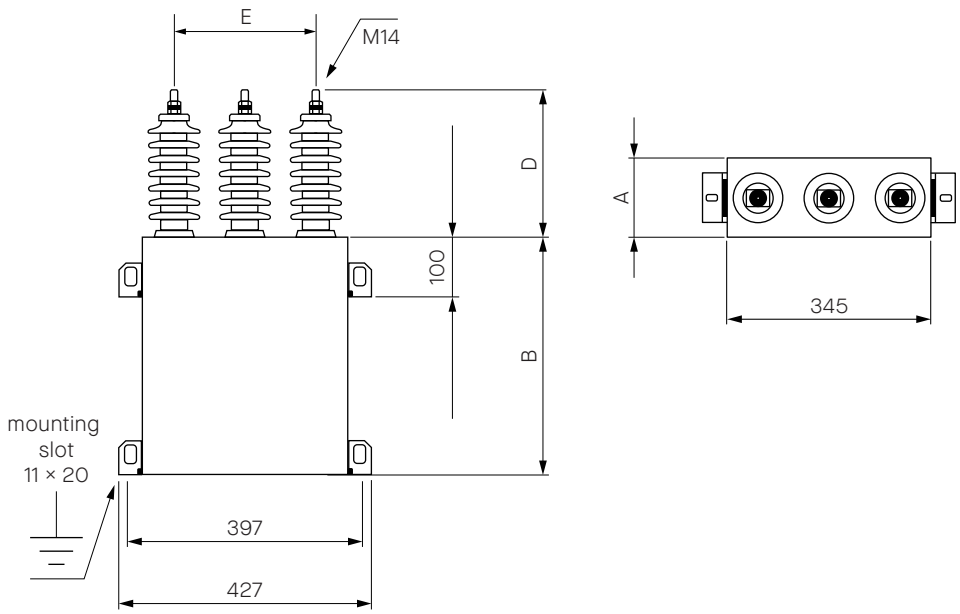
Q_n at 50 Hz (kVar)	U_n KLV 1xxxP (without internal fuses) (kV)	U_n KLV 3xxxP (internally fused) (kV)	Dimensions (mm)						Weight (kg)	Weight* (kg)
			A	B	B*	C	D			
							BIL 75-95 kV	BIL 125 kV		
100	2.0 - 16.5 (20)	2.00 - 2.4	145	240	270	120^{2R}	240	315	20	22
150	2.0 - 16.5 (20)	2.00 - 4.8	145	310	340	200^{2R}	240	315	26	29
200	2.0 - 16.5 (20)	2.00 - 4.8	145	400	420	200^{2R}	240	315	32	36
250	2.27 - 16.5 (20)	2.27 - 7.2	145	470	500	200^{2R}	240	315	39	41
300	2.72 - 16.5 (20)	2.72 - 7.2	145	540	580	200^{2R}	240	315	44	49
350	3.18 - 16.5 (20)	3.18 - 9.6	145	620	670	200^{2R}	240	315	49	53
400	3.64- 16.5 (20)	3.64 - 9.6	145	700	770	200^{2R}	240	315	55	60
450	4.1 - 16.5 (20)	4.10 - 12	145	770	840	100^{4R}	240	315	62	66
500	4.56 - 16.5 (20)	4.56 - 14.4	175	720	770	100^{4R}	240	315	67	73
550	5.00 - 16.5 (20)	5.00 - 14.4	175	770	825	100^{4R}	240	315	75	79
600	5.46 - 16.5 (20)	5.46 - 14.4	175	825	900	100^{4R}	240	315	79	84
670	6.09 - 16.5 (20)	5.46 - 14.4	175	920	960	100^{4R}	240	315	85	90

Notes

* Dimensions with an asterisk (*) refer to internally fused capacitors

1) Voltage in parenthesis ( ) refer to one-bushing capacitors only
2) For output and voltage outside this range, please contact factory
3) Case sizes are typical and actual sizes will be confirmed at the time of order
4) Capacitor container could have 2 or 4 brackets (1 or 2 brackets on narrower side)
   Dimension C – 2R means 1 bracket from each side (capacitor type KLVxx1x); 4R means 2 brackets on each side, one on the top and one on the bottom, except where the height is 310 mm or below, where brackets are on the bottom only (type KLVxx2x)
5) Dim A may expand up to 115% due to thermal flexure
6) Power at 60 Hz = 1.2 x power at 50 Hz

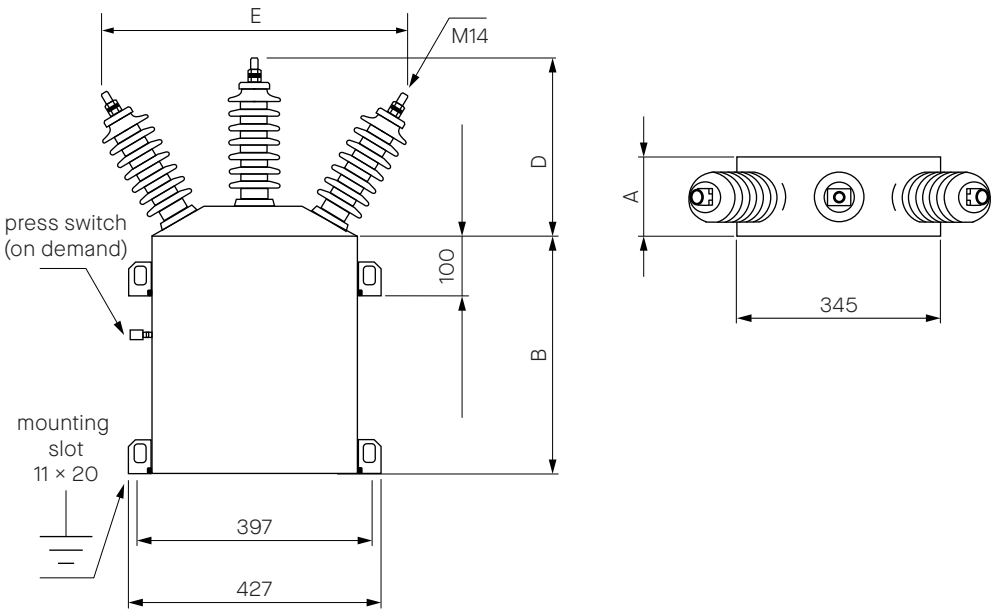
Picture 3



BIL 20/60 kV Typical Dimensions (picture 3)

U_n (kV)	Q_n at 50 Hz (kVar)	Dimensions (mm)					Weight (kg)	Weight* (kg)
		A	B	B*	D	E		
3.3 - 7.2	50	145	200	200	190	240	16	20
	100	145	290	325	190	240	23	26
	150	145	415	430	190	240	30	33
	200	145	520	550	190	240	37	42
	250	145	620	670	190	240	44	49
	300	145	740	770	190	240	51	55
	350	145	825	900	190	240	60	63
	400	145	940	1000	190	240	66	71
	450	175	870	960	190	240	73	78

Picture 4



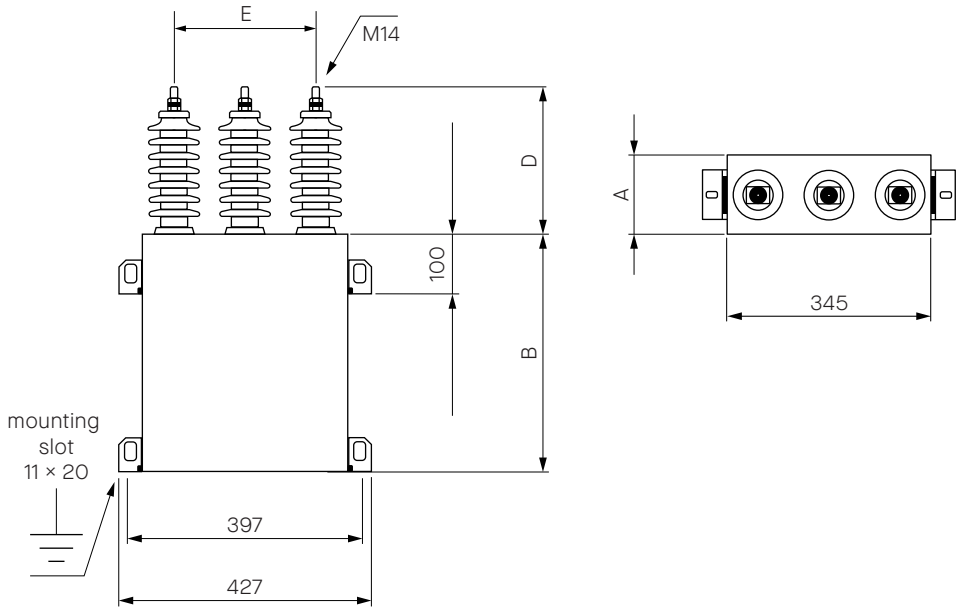
BIL 28/75 kV Typical Dimensions (picture 4)

U_n (kV)	Q_n at 50 Hz (kVar)	Dimensions (mm)					Weight (kg)	Weight* (kg)
		A	B	B*	D	E		
up to 12	50	145	200	200	300	510	22	23
	100	145	290	310	300	510	28	29
	150	145	400	430	300	510	35	37
	200	145	500	550	300	510	42	44
	250	145	600	670	300	510	49	51
	300	145	720	770	300	510	55	60
	350	145	825	870	300	510	63	66
	400	145	940	1000	300	510	69	75
	450	175	840	940	300	510	76	82

Notes

* Dimensions with an asterisk (*) refer to internally fused capacitors
1) For output and voltage outside this range, please contact factory
2) Case sizes are typical and actual sizes will be confirmed at the time of order
3) Pressure switch on demand
4) Either 2 or 4 fixing brackets are used, depending on the height of the unit. Special bracket positions can be provided if required. Please specify at the inquiry stage
5) Dim a may expand up to 115 % due to thermal flexure
6) Power at 60 Hz = 1.2 x power at 50 Hz

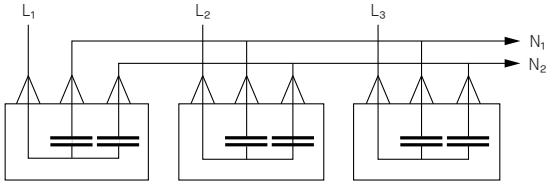
Picture 5



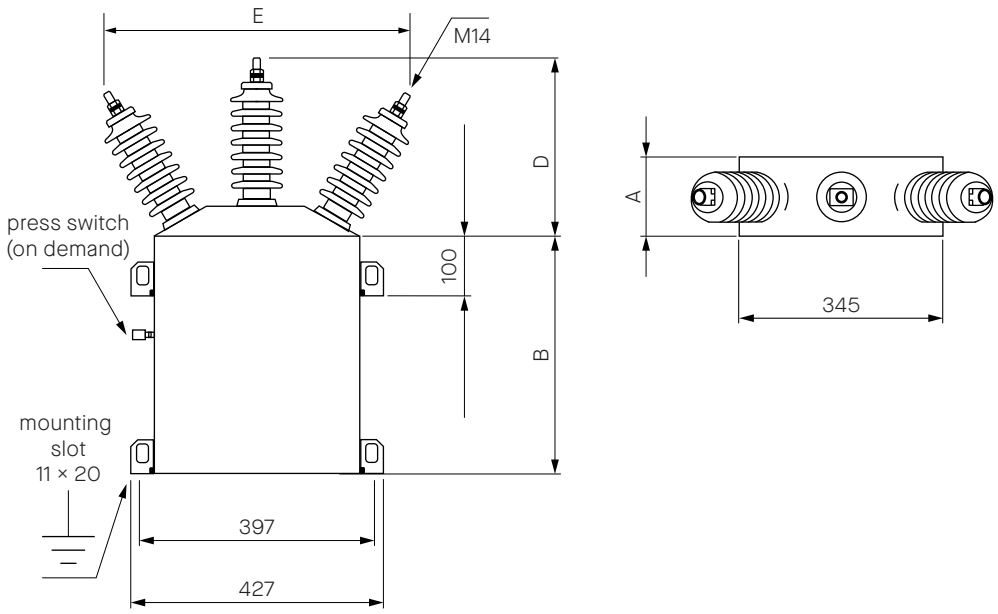
BIL 20/60 kV Typical Dimensions (picture 5)

U_n (kV)	Q_n at 50 Hz (kVar)	Dimensions (mm)					Weight (kg)	Weight* (kg)
		A	B	B*	D	E		
2.0 - 4.16	50 (2×25)	135	200	220	250	240	22	23
	100 (2×50)	145	290	310	250	240	28	29
	150 (2×75)	145	400	430	250	240	35	37
	200 (2×100)	145	500	550	250	240	42	44
	250 (2×125)	145	620	640	250	240	49	51
	300 (2×150)	145	720	770	250	240	51	55
	400 (2×200)	145	940	1000	250	240	66	71

Connection



Picture 6



BIL 28/75 kV Typical Dimensions (picture 6)

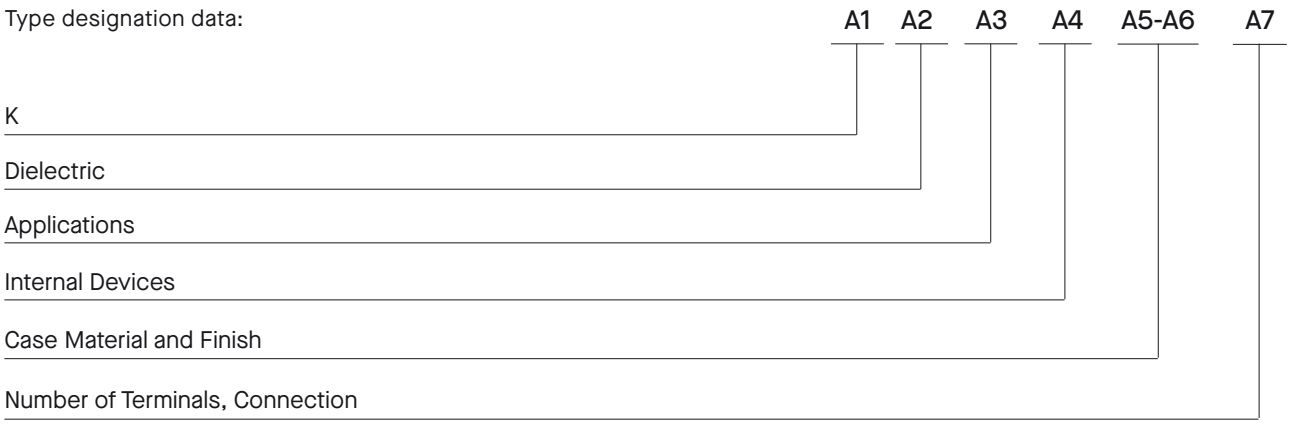
U_n (kV)	Q_n at 50 Hz (kVar)	Dimensions (mm)					Weight (kg)	Weight* (kg)
		A	B	B*	D	E		
up to 7.2	50 (2×25)	145	180	200	300	510	22	23
	100 (2×50)	145	290	330	300	510	28	29
	150 (2×75)	145	400	440	300	510	35	37
	200 (2×100)	145	500	550	300	510	42	44
	250 (2×125)	145	590	670	300	510	49	51
	300 (2×150)	145	690	770	300	510	55	60
	400 (2×200)	145	900	1000	300	510	69	75

Notes

* Dimensions with an asterisk (*) refer to internally fused capacitors
1) For output and voltage outside this range, please contact factory
2) Case sizes are typical and actual sizes will be confirmed at the time of order
3) Pressure switch on demand
4) Either 2 or 4 fixing brackets are used, depending on the height of the unit. Special bracket positions can be provided if required. Please specify at the inquiry stage
5) Dim a may expand up to 115 % due to thermal flexure
6) Power at 60 Hz = 1.2 x power at 50 Hz

Ordering data

Type designation data:



A1	**K**	Capacitor
A2	**L**	Dielectric Polypropylene (all-film)
A3	**V**	High voltage capacitor for power factor correction
A4	**1**	Discharge resistor built-in
	2	Without discharge resistors
	3	Internal fuses and discharge resistors built-in
	4	Internal fuses built-in
A5	**0**	Ordinary steel case coated with primer and top coat (intended for indoor installation)
	2	Stainless steel case coated with primer and top coat (intended for outdoor and aggressive atmosphere installation)
A6	**1**	Case side mounting (2 brackets)
	2	Case side mounting (2 brackets on the top and / or 2 brackets on the bottom)
A7	**0**	Single-phase, one brushing capacitor
	1	Single-phase, two brushing capacitors
	3	Three-phase capacitor
	4	Single-phase capacitor with two outputs

When ordering, please state:	
Rated output	kVar
Rated voltage	V
Rated frequency	Hz
Tolerance of capacitance	- ... % / + ... %
Number of bushings	single bushing, two bushings
Installation	indoor / outdoor
Insulation level	.../...kV, if higher than required by U
Internal fuses	yes / no
Pressure switch	yes / no
Terminal clamps	yes / no

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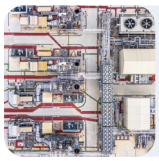

Power Factor Correction Equipment
for Low Voltage

Power Factor Correction Equipment
for High voltage

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