

# PFC CAPACITORS FOR HIGH VOLTAGE

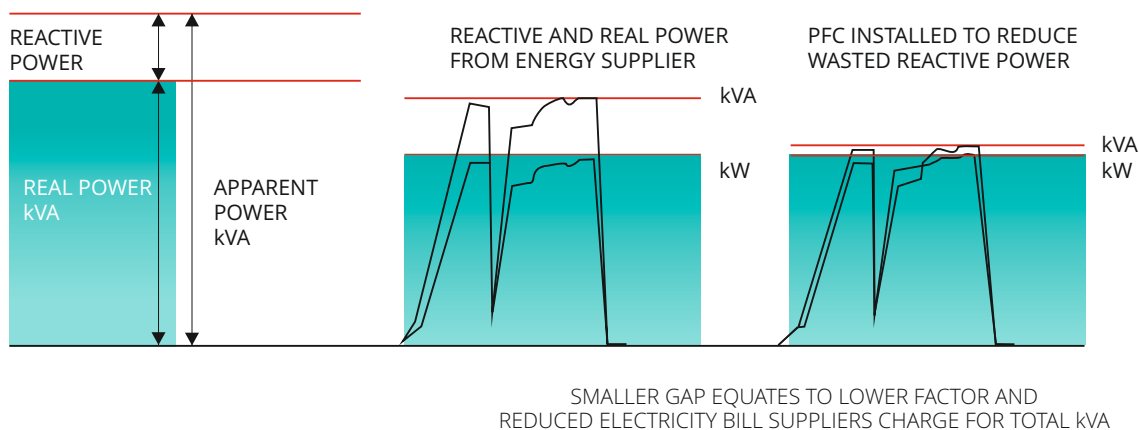
- **LOW LOSSES CAPACITOR**, WITH HIGH RESISTANCE TO STRONG ELECTRICAL FIELDS
- **RELEVANT FOR** REACTIVE POWER COMPENSATION OF ELECTRICAL NETWORKS AND INDUSTRIAL PLANTS

# PFC CAPACITORS FOR HIGH VOLTAGE -

## KLK 12xxP, KLK 32xxP

### INTRODUCTION

PFC (POWER FACTOR CORRECTION) HIGH VOLTAGE KLK-P CAPACITORS ARE CAPACITORS DESIGNED FOR REACTIVE POWER COMPENSATION OF ELECTRICAL NETWORKS AND INDUSTRIAL PLANTS. USUALLY CAPACITORS ARE INTEGRATED INTO SHUNT CAPACITOR BANK SYSTEMS. EFFICIENT USE OF ENERGY IS AN INCREASINGLY IMPORTANT FACTOR. BY USING APPROPRIATE EQUIPMENT, WE CAN ENSURE BETTER QUALITY AND MORE EFFICIENT OPERATION OF SYSTEMS. MOST ELECTRICAL DEVICES, SUCH AS ASYNCHRONOUS MOTORS, TRANSFORMERS, CHOKES, INDUCTION HEATING FURNACES, WELDING DEVICES, FLUORESCENT LAMPS AND MANY OTHERS, DON'T NEED ONLY ACTIVE POWER BUT ALSO REACTIVE POWER FOR THEIR OPERATION. BECAUSE OF THESE INDUCTANCES, THE SYSTEM CURRENT LAGS BEHIND SYSTEM VOLTAGE. AS THE LAGGING ANGLE BETWEEN VOLTAGE AND CURRENT INCREASES, THE POWER FACTOR OF THE SYSTEM DECREASES. IF THE POWER FACTOR DECREASES, AND ACTIVE POWER DEMAND REMAINS, THE SYSTEM REQUIRES MORE CURRENT FROM THE POWER SOURCE. THAT RESULTS NOT ONLY IN ADDITIONAL COSTS FOR ENERGY SUPPLY BUT ALSO IN ADDITIONAL LOADS ON TRANSMISSION LINES AND OTHER CONTACT ELEMENTS.



### 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 ALUMINIUM 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 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 A REMARKABLY HIGH CHEMICAL STABILITY, A 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.

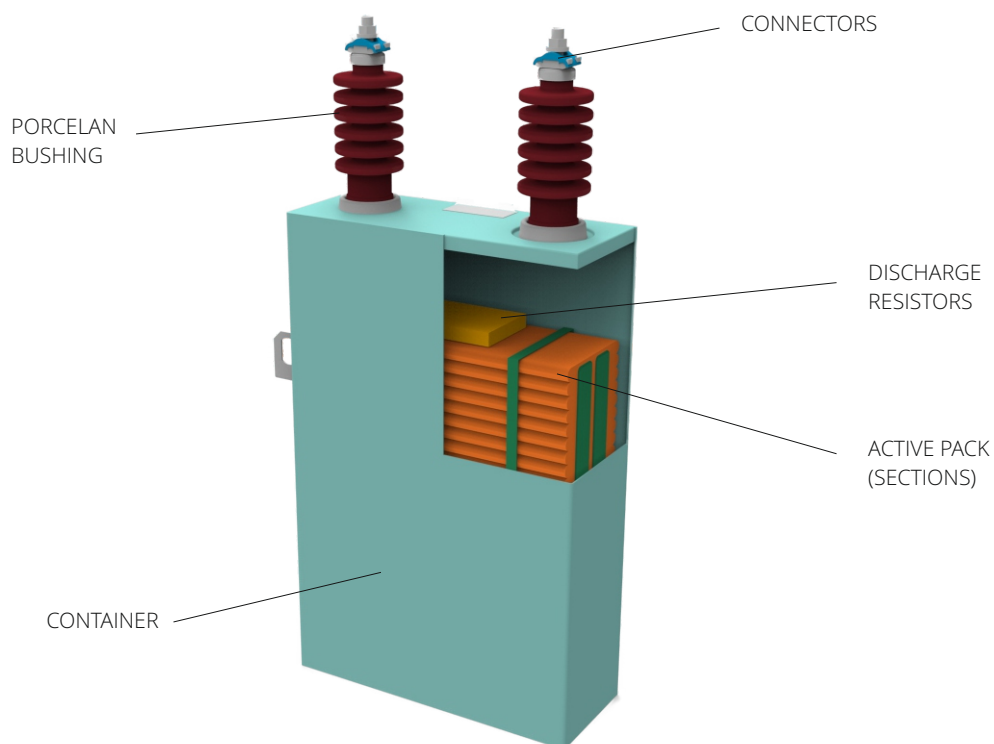
# PFC CAPACITORS FOR HIGH VOLTAGE -

## KLV 12xxP, KLV 32xxP

### GENERAL

ADVANCED TECHNOLOGY OF **KLV-P CAPACITORS** IS BASED ON CONSTRUCTION OF ALL-FILM CAPACITOR SECTIONS, FOLDING FOIL EDGE DESIGN, IMPROVED ELECTRICAL AND MECHANICAL CONNECTIONS BETWEEN SECTIONS AND IMPREGNATION WITH ENVIRONMENTALLY COMPATIBLE INSULATING OIL. **KLV-P CAPACITORS** HAVE VERY LOW DIELECTRIC LOSSES AND ARE SIMPLE, ECONOMICAL AND RELIABLE SOURCE OF COMPENSATING REACTIVE POWER ON ELECTRIC POWER SYSTEMS.

- **KLV3xxxP**  
INTERNALLY FUSED CAPACITORS. EACH CAPACITOR ELEMENT HAS A SEPARATE INTERNAL FUSE.
- **KLV1xxxP**  
CAPACITORS WITHOUT INTERNAL FUSES



### FEATURES

- ALL-FILM TECHNOLOGY
- NON-PCB, NON-TOXIC, ENVIRONMENTALLY COMPATIBLE IMPREGNATING OIL
- HAZY POLYPROPYLENE DIELECTRIC
- EXTENDED FOIL
- FOLDED FOIL DESIGN
- SOLDERING DIRECTLY TO THE ALUMINIUM 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

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### TECHNICAL DATA

RATED POWER (MAX.)	670 kvar
RATED VOLTAGE	1.0 - 25 kV
RATED FREQUENCY	50 OR 60 Hz
LOSSES	TOTAL LOSSES LOWER THAN 0.2 W/kvar
DIELECTRIC	ALL-FILM (HAZY POLYPROPYLENE)
IMPREGNATING FLUID	ENVIRONMENTALLY COMPATIBLE IMPREGNATING OIL BASED ON M/DBT (NON - PCB)
PERMISSIBLE OVERLOADS	
MAXIMUM PERMISSIBLE CURRENT	1.3 x I <sub>n</sub> CONTINUOUSLY
MAXIMUM PERMISSIBLE VOLTAGE	1.1 x U <sub>n</sub> CONTINUOUSLY
ROUTINE TESTS	
SEALING TEST	
DISCHARGE TEST ON INTERNAL FUSES	(INTERNALLY FUSED CAPACITORS ONLY)
VOLTAGE TEST BETWEEN TERMINALS	2.0 x RATED VOLTAGE AC, 10 s OR 4.0 x RATED VOLTAGE DC, 10 s
DISCHARGE RESISTOR TEST	
MEASUREMENT OF LOSSES (TAN δ)	AT RATED VOLTAGE
CAPACITANCE MEASUREMENTS	AT RATED VOLTAGE
SERVICE CONDITIONS	
STANDARD TEMPERATURE CATEGORY -25/B	UPPER AMBIENT TEMPERATURE LIMITS MAXIMUM +45 °C HIGHEST MEAN OVER 24 h +35 °C HIGHEST MEAN OVER 1 YEAR +25 °C LOWEST AMBIENT AIR OPERATING TEMPERATURE -25 °C
INSTALLATION	OUTDOOR OR INDOOR
INSTALLATION ALTITUDE	1000 m MAX. FOR HIGHER ALTITUDES, PLEASE CONTACT FACTORY
CASE MATERIAL	STAINLESS STEEL PLATE 1.5 mm THICK, W.Nr. 1.4301
FINISH/COLOUR	TWO-COMPONENT DURABLE PAINTING RAL 6027 OR PANTONE 3262C (LIGHT GREEN) OR RAL 7032 (LIGHT GRAY), ON TREATED SURFACE
FIXING	DEPENDING ON THE HEIGHT OF CAPACITOR, CONTAINER IS EQUIPED WITH ONE OR TWO MOUNTING BRACKETS ON THE NARROWER SIDES. BRACKETS HAVE MOUNTING SLOTS 11 X 20 mm
TERMINALS AND CONNECTIONS	
BUSHINGS	BROWN OR GRAY PORCELAIN BUSHINGS, WELDED TO THE CONTAINER AND HAVING SOLID TERMINAL STUDS, PREVENT FLUID LEAKS
THREAD OF TERMINAL STUD	M14 OR M16
CURRENT	MAX. 180 A
CONNECTIONS	TERMINAL CLAMPS WITH PROVISION TO ACCOMMODATE ANY COMBINATION OF 2 CONDUCTORS FROM 4 mm <sup>2</sup> SOLID TO 50 mm <sup>2</sup> STRANDED WIRE ARE AVAILABLE ON DEMAND. TERMINAL CLAMPS FOR 70 mm <sup>2</sup> CONDUCTORS ARE ALSO AVAILABLE.
NAMEPLATES	DURABLE PLASTIC LABEL WITH PERMANENT PRINTING
QUALITY	ISKRA D.D. IS CERTIFIED ACCORDING TO ISO 9001 (QUALITY) AND ISO 14001 (ENVIRONMENT)
STANDARDS	IEC 60871-1: 2014 ; IEEE Std 18: 2012

# PFC CAPACITORS FOR HIGH VOLTAGE -

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### TYPICAL DIMENSIONS

### KLV 1xx1P (1xxoP) in 3xx1P, SINGLE-PHASE CAPACITORS

Q <sub>N</sub>	U <sub>N</sub>	U <sub>N</sub>	DIMENSIONS (mm)						WEIGHT	WEIGHT*
AT 50 Hz	KLV 1xxxP (without internal fuses)	KLV 3xxxP (internally fused)	A	B	B*	C	D			
(kvar)	(kV)	(kV)					BIL 75 - 95 kV	BIL 125 kV	(kg)	(kg)
100	2.0 - 16.5 (20)	2.0 - 2.4	145	240	270	120 <sup>2R</sup>	240	315	20	22
150	2.0 - 16.5 (20)	2.0 - 4.8	145	325	370	200 <sup>2R</sup>	240	315	26	29
200	2.0 - 16.5 (20)	2.0 - 4.8	145	415	450	200 <sup>2R</sup>	240	315	32	36
250	2.27 - 16.5 (20)	2.27 - 7.2	145	500	540	200 <sup>2R</sup>	240	315	39	41
300	2.72 - 16.5 (20)	2.72 - 7.2	145	570	640	200 <sup>2R</sup>	240	315	44	49
350	3.18 - 16.5 (20)	3.18 - 9.6	145	640	700	200 <sup>2R</sup>	240	315	49	53
400	3.64 - 16.5 (20)	3.64 - 9.6	145	720	800	200 <sup>2R</sup>	240	315	55	60
450	4.1 - 16.5 (20)	4.1 - 12	175	680	725	100 <sup>4R</sup>	240	315	62	66
500	4.56 - 16.5 (20)	4.56 - 14.4	175	740	800	100 <sup>4R</sup>	240	315	67	73
550	5.00 - 16.5 (20)	5.00 - 14.4	175	825	880	100 <sup>4R</sup>	240	315	75	79
600	5.46 - 16.5 (20)	5.46 - 14.4	175	880	940	100 <sup>4R</sup>	240	315	79	84
670	6.09 - 16.5 (20)	5.46 - 14.4	175	940	1000	100 <sup>4R</sup>	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 narrow side)

Dimension C - 2R means 1 bracket from each side (capacitor type KLVxxx1P); 4R means 2 brackets on each side, one on the top and one on the bottom, except where the height is 310mm or below, where brackets are on the bottom only (type KLVxxx2 P).

5) Dim A may expand up to 115% due to thermal flexure

6) Power at 60Hz = 1,2 x power at 50Hz

