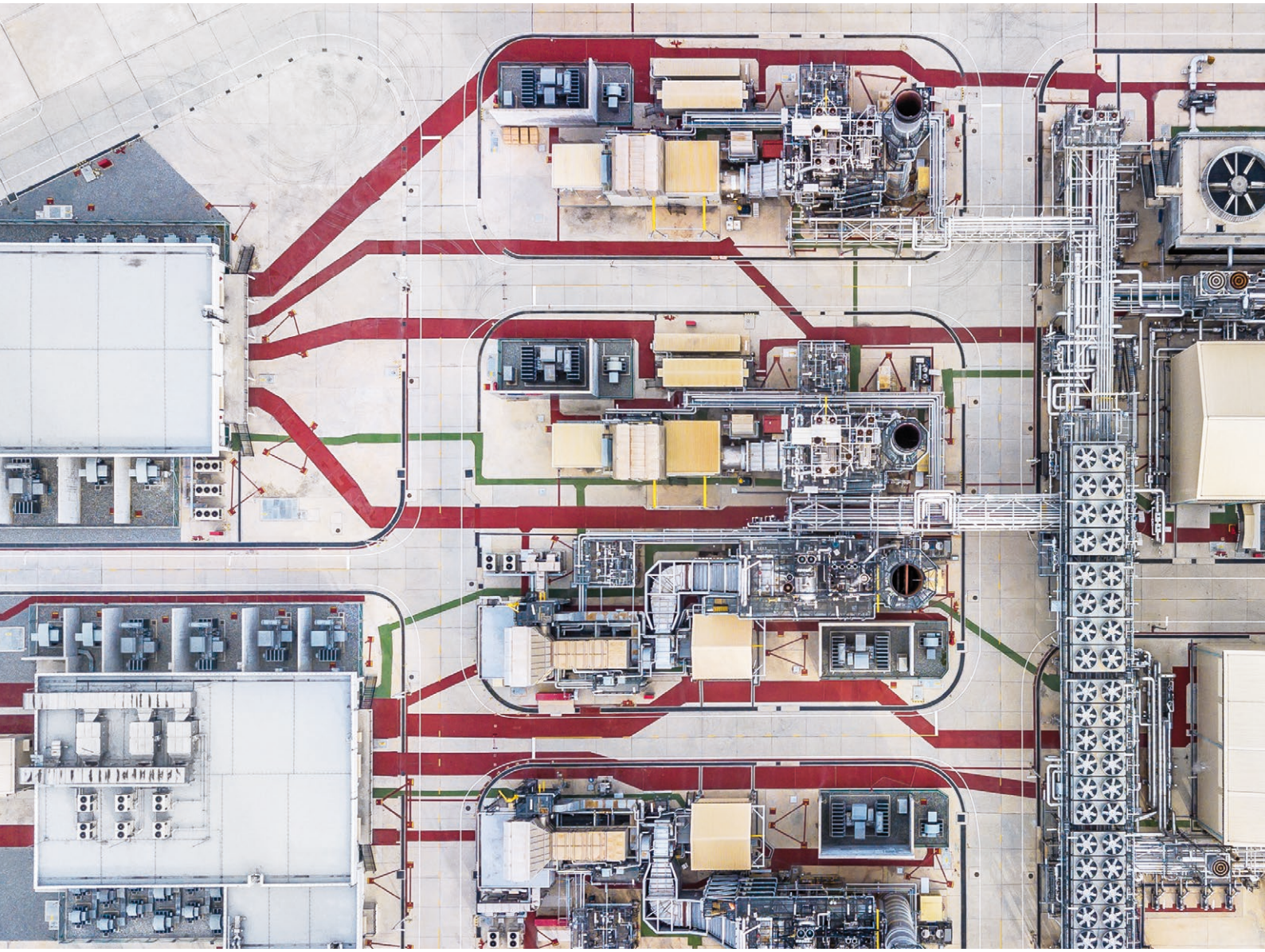
Power Factor Correction Equipment
for Low Voltage



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PFC CAPACITORS FOR LOW VOLTAGE
Type KNK

Applications

The KNK capacitors are used for power factor correction of inductive consumers (transformers, electric motors, rectifiers in industrial networks for voltages of up to 1000 V.

C US * C22.2 No. 190 PROTECTED, 10 000 AI-C

D V E * Reg.-No.F010

UK CA

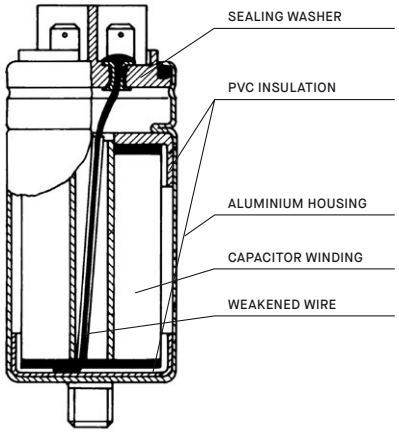
CE

* selected models only

Design

Iskra KNK capacitors are constructed by the MKP system of low-loss, metalized polypropylene films with a special metalization, whose purpose is to favor the self–healing process and reduce dielectric losses.

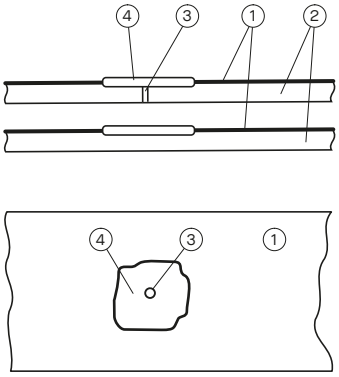
On the end of the element is zinc metal sprayed to make continuous good electrical contact with electrode metalization on the electric. Three single-phase element are delta connected. Afterwards are hermetically sealed in al cases. Capacitors are filled with vegetable oil based, non toxic, PCB free, biodegradable, environmentally friendly or/and dry type.



Self-healing capacity

Damage may occur on the dielectric due to fatigue which results in local breakdowns on certain points. The resultant electric current devaporizes the thin metalized layer and isolates the damaged spot from the rest of the capacitor.

Capacitance loss is almost negligible (some pF) during this process. This self-healing property guarantees operating reliability and long life expectancy of the capacitor.

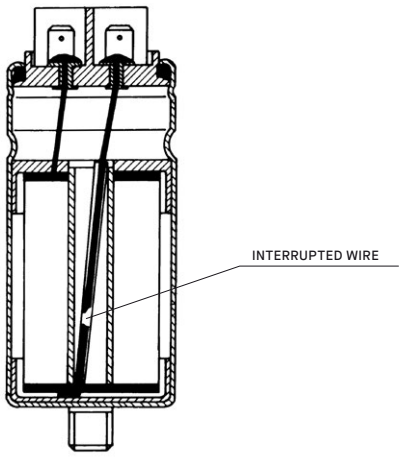


Discharge resistor

Capacitors should be discharged to ≤ 10 % of the rated voltage prior to being re-energized. KNK capacitors are equipped with a resistor that discharges the capacitor to 75 V under 3 min.

Over-pressure disconnector

Every capacitor is protected against breaking by the overpressure disconnector, which ensures safe disconnection of the capacitor from the network in the event of overloading and at the end of its operational life.



Terms and definitions

Rated capacitance of a capacitor — C_n

Capacitance value for which the capacitor has been designed.

Rated output of a capacitor — Q_n

Reactive power derivered from the rated values of capacitance, frequency and voltage.

Rated voltage of a capacitor — U_n

Mean of the max. permissible value of sinusoidal AC voltage in continuous operation.

Rated frequency of a capacitor — f_n

Frequency for which the capacitor has been designed.

Rated current of a capacitor — I_n

RMS value of the current at rated voltage and frequency, excluding harmonic distortion, capacitance tolerance and switching transients.

Maximum permissible AC voltage of a capacitor — U_{max}

Maximum RMS voltage, which the capacitor can be exposed to permanently.

Maximum permissible AC current of a capacitor — I_{max}

Maximum RMS value of permissible current in continuous operating. The exact value for each capacitor can be found in the data charts.
—
Higher RMS value than stated in the data charts require adjustments in construction and are available on request.

Ambient air temperature

Temperature of the air at the proposed location of the capacitor. The lowest ambient temperature at which a capacitor may operate, for all KNK capacitors, is -40 °C. The upper limit temperature is indicated by the letter:

Temperature class	Ambient temperature °C		
	Maximum	Maximum mean for 24 h	Maximum mean for 1 year
A	40 °C	30 °C	20 °C
B	45 °C	35 °C	25 °C
C	50 °C	40 °C	30 °C
D	55 °C	45 °C	35 °C

Temperature classes (according to IEC 60831-1)

Instruction for installation, maintenance and safe handling of capacitors type KNK

Capacitors can operate safely during its life time only if all electrical and thermal conditions are in compliance with the label, data sheet or catalogue.

Receiving
When you receive capacitor, make sure that no mechanical damage occurred during transport. Small damages, such as scratches will have no affect on quality and performance of capacitor. If you receive capacitors with large dents or broken parts, please inform the nearest sales office for instructions regarding the disposition before installation.
Check the capacitor nameplate to make sure that the specifications are in accordance with the contract.

Installation
In general capacitors must be installed indoors. Type KNK105x, KNK305x, can be mounted in vertical or horizontal position. Type KNK50xx, KNK405x, KNK905x must be mounted vertically with terminals upright. While installing make sure that the minimum space between capacitors is 20 mm and there is minimum 25 mm above upper side of capacitor to enable the extension of aluminum case (in case of abnormal operation) and consequential normal operation of the overpressure disconnector. At the bottom of each capacitor case is a male screw M12, which is intended for mounting and protection earth. Maximum allowed torque at tightening a screw is 10 Nm.

Inrush current
Switching capacitors, especially when they are in parallel with others can cause high inrush currents of up to 200 times of nominal current. These shocks cause additional stress to capacitor and have bad influence on useful life. It is necessary to limit inrush currents.

Electrical connection
Connections to the capacitor terminals must be made with insulated flexible copper conductors. Conductors must have a proper cross section for expected capacitor currents including overloads. Conductors have to be equipped with end sleeves or cable lugs in case of screw terminals. When coupling the capacitors in parallel do not exceed the maximal current per contact.
Do not solder leads to the terminals. Check connections periodically to avoid weak connections and overheating of the connecting points. With our 16 and 25 mm² terminals use only PH1 screwdrivers.

Ambient temperature
The capacitors are designed to operate continuously in a temperature range -25 °C to 55 °C. Capacitors can also operate continuously at lower temperature, down to -40 °C. If the temperature drops to less than -40 °C the capacitors should not be energized, because there is possibility of damage. Maintain proper ambient temperatures and take care of sufficient heat dissipation.

Discharge of capacitors
Because of the residual voltage always discharge and short circuit the capacitor before touching the terminals. Our capacitors are discharged to 75 V under 3 min and they must be discharged to 10 % of the rated voltage before re-energizing. Discharge resistor may become very hot during operation.
In case the required time between switching off and repeated switching on have to be shorter than 3 minutes (mostly application in automatic capacitor banks), capacitors must be additionally discharged by other measures, example fast discharge reactors or fast discharge resistors.

Harmonics
Higher harmonics may be present in some applications and can affect the useful life of a capacitor. In such cases capacitors or capacitor devices must be connected with suitable reactors.

Protection against shock
Before maintenance or any contact of the capacitors make sure that capacitors or capacitor device are physically disconnected from the power source. Capacitors have an internal or external discharge resistors to reduce voltage to 75 V or less in three minutes, after the power is switched off.
Wait five minutes, then the capacitors must be shorted and grounded by using a short stick with insulated handle. Make sure that all safety precautions are made before handling the capacitor.

Fire hazard
Capacitors are not flammable, but there is a possibility of ignition in a case of explosion, if the electrical current is present.
It must be considered, that the capacitors and capacitor devices are located in such position that possible damage of capacitor will not damage the surrounding area.

Explosion hazard
All capacitors have internal overpressure disconnectors on all three terminals. In extreme situations it is possible to get an explosive case rupture, even with proper fusing.
These facts should be considered when locating the capacitors and capacitor devices.

Handling of failed capacitors
Failed capacitors should be short circuited before handling. Capacitors which are visually damaged must be carefully removed from the place of installation. Capacitors do not contain ecologically harmful substances and can be deposited to an industrial dump.

Warranty
In case of a claim in an in-warranty period, the user should provide all information in accordance with the terms of the warranty, to the seller.
This information are:
manufacturing date, description of the failure, time of the operation, date and time of the failure, whether the capacitor was operating continuously or there were multiple switching conditions at the time of the failure.
Do not dispose of an in-warranty capacitor before getting an approval from a person authorized by the manufacturer.

Technical data

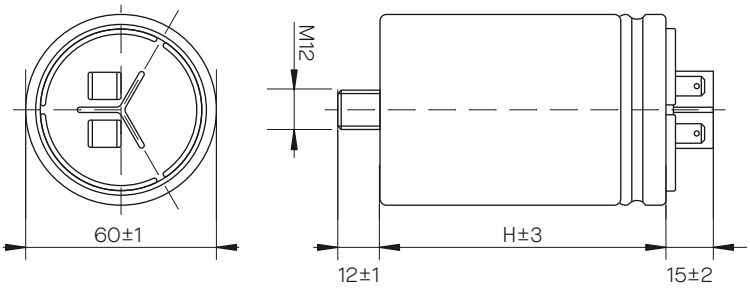
Type	Symbol	Unit	KNK 5015	KNK 5065
Standards			IEC/EN 60831-1/2, UL 810 APPROVAL (E163120)	
Connection			Single phase	Delta (three-phase)
Rated reactive power	Q_n	kVar	Up to 7.5	
Rated voltage	U_n	V	400 ~ 525	
Rated frequency	f_n	Hz	50 or 60	
Capacitance tolerance			-5/10 % (other on request)	
Dielectric loses		W/kVar	≤ 0.2	
Total loses		W/kVar	≤ 0.45	
Temperature category			-25/D	
Max. humidity			95 %	
Cooling			Forced ventilation or natural air cooled	
Max. overvoltage			1.1 × U_n (8 h/day) 1.15 × U_n (30 min/day) 1.2 × U_n (5 min - 200 times per life time) 1.3 × U_n (1 min - 200 times per life time)	
Max. overcurrent			1.3 × I_n (including combined effects of overvoltages, harmonics and capacitance tolerance)	
Inrush current			150 × I_n	
Expected life time			> 100000 h (temp. category D) > 120000 h (temp. category C)	
Discharge resistor			To 75 V ≤ 3 min	
Altitude			Up to 4000 m	
Insulation level		kV	3.6/-	
Routine tests				
Terminal to terminal			2.15 × U_n, 2 s	
Terminal to case			3600 V, 10 s	
Sealing test			75 °C, 6 h	
Mechanical parameters				
Terminal per phase / Max. current			2.5 m² / 15 A	
Mounting and grounding / Max. torque			Threaded M12 bolt / 10 Nm	
Mounting position			Vertical with terminal pointing upwards or horizontal	
Protection			IP00	
Clearance distance			> 10 mm	
Creepage distance			> 10 mm	
Safety device			Overpressure disconnector	
Material parameters				
Dielectric			Self healing metallized polypropylene film	
Filling			Non-PCB biodegradable vegetable oil	
Case			Aluminium	
Reference standard				
c UL us C22.2 No. 190 PROTECTED, 10 000 AI-C			UL-CSA approved (File No. 163120)	

Note

On request, capacitors with other power and voltage ratings, shapes, and connections are available.

In-rush current must be limited to maximal permitted value.

230 ... 525 V 1.67 ... 6.25 kVar



f_n = 50 Hz

U_n (V)	Q_n (kVar)	C_n (µF)	I_n (A)	H (mm)	Weight (kg)	Packing unit (pcs)	c UL us C22.2 No. 190
400	1.67	33.2	4.2	75	0.22	36	•
400	2.1	41.6	5.2	87	0.27	36	•
400	2.5	49.7	6.2	87	0.27	36	•
400	3.33	66.3	8.3	110	0.32	36	•
400	4.17	82.9	10.4	125	0.40	36	•
400	5	99.5	12.5	150	0.45	36	•
440	1.67	27	3.8	75	0.22	36	•
440	2.5	41.1	5.7	110	0.32	36	•
440	3.33	54.8	7.6	110	0.32	36	•
440	4.17	68.5	9.5	150	0.45	36	•
440	5	82.2	11.4	150	0.45	36	•
480	1.67	23.1	3.5	75	0.22	36	•
480	2.1	29	4.4	75	0.22	36	•
480	2.5	34.5	5.2	87	0.27	36	•
480	3.33	46	6.9	100	0.30	36	•
480	4.17	57.6	8.7	125	0.40	36	•
480	5	69.1	10.4	150	0.45	36	•
525	1.67	19.3	3.1	75	0.22	36	•
525	2.5	28.0	4.8	100	0.30	36	•
525	3.33	38.5	6.3	125	0.40	36	•
525	4.17	48.2	7.3	150	0.45	36	•

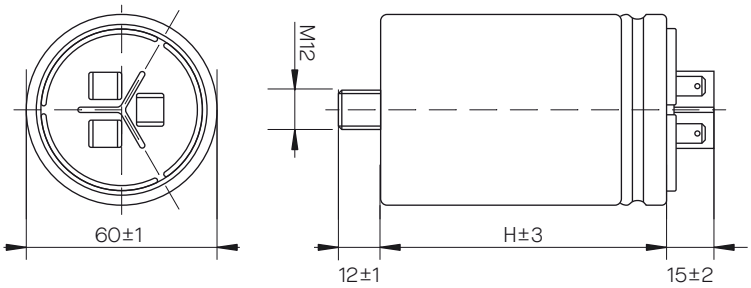
f_n = 60 Hz

U_n (V)	Q_n (kVar)	C_n (µF)	I_n (A)	H (mm)	Weight (kg)	Packing unit (pcs)	c UL us C22.2 No. 190
400	1.67	27.2	4.2	75	0.22	36	•
400	3.33	55.2	8.3	100	0.30	36	•
400	4.17	69.1	10.4	110	0.32	36	•
400	5	82.9	12.5	125	0.40	36	•
440	1.67	22.8	3.8	75	0.22	36	•
440	3.33	45.4	7.5	110	0.32	36	•
440	4.17	56.9	9.4	125	0.40	36	•
440	5	68.4	11.3	150	0.45	36	•
480	1.67	19.2	3.5	75	0.22	36	•
480	3.33	38.3	6.9	87	0.27	36	•
480	4.17	48	8.7	100	0.30	36	•
480	5	57.6	10.4	125	0.40	36	•
525	1.67	16.1	3.2	75	0.22	36	•
525	3.33	32	6.3	100	0.30	36	•
525	4.17	40.1	7.9	110	0.32	36	•
525	5	48.1	9.5	125	0.40	36	•
525	6.25	60.2	11.9	150	0.45	36	•

THREE PHASE

KNK 5065
CYLINDRICAL ALU. HOUSING, DELTA CONNECTION

400 ... 525 V 2.5 ... 7.5 kVar



f_n = 50 Hz

U_n (V)	Q_n (kVar)	C_n (µF)	I_n (A)	H (mm)	Weight (kg)	Packing unit (pcs)	c UL us C22.2 No. 190
400	2.5	3 × 16.6	3.6	145	0.45	36	•
400	3	3 × 19.9	4.3	145	0.45	36	•
400	4	3 × 26.5	5.8	185	0.55	36	•
400	5	3 × 33.2	7.2	185	0.55	36	•
400	7.5	3 × 49.7	10.8	185	0.55	36	•
440	2.5	3 × 13.7	3.3	145	0.45	36	•
440	3	3 × 16.5	3.9	145	0.45	36	•
440	4	3 × 21.9	5.3	185	0.55	36	•
440	5	3 × 27.4	6.6	185	0.55	36	•
480	2.5	3 × 11.5	3.0	145	0.45	36	•
480	3	3 × 13.8	3.6	145	0.45	36	•
480	4	3 × 18.4	4.8	145	0.45	36	•
480	5	3 × 23	6.0	185	0.55	36	•
480	6.25	3 × 28.8	7.5	185	0.55	36	•
525	2.5	3 × 9.6	2.7	145	0.45	36	•
525	3	3 × 11.5	3.3	145	0.45	36	•
525	4	3 × 15.4	4.4	185	0.55	36	•
525	5	3 × 19.3	5.5	185	0.55	36	•
525	7.5	3 × 28.9	8.2	185	0.55	36	•

THREE PHASE

KNK 1053, KNK 9053
CYLINDRICAL ALU. HOUSING, DELTA CONNECTION

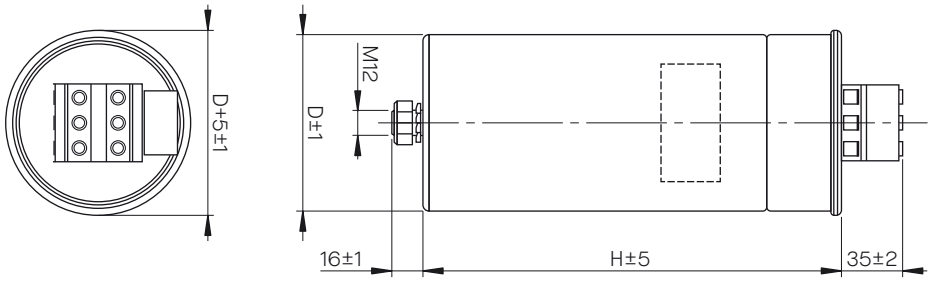
Technical data

Type	Symbol	Unit	KNK 1053	KNK 9053
Standards			IEC/EN 60831-1/2	
Connection			Delta (three-phase)	
Rated reactive power	Q_n	kVar	Up to 30	
Rated voltage	U_n	V	400 ~ 690	
Rated frequency	f_n	Hz	50 or 60	
Capacitance tolerance			-5/10 % (other on request)	
Dielectric loses		W/kVar	≤ 0.2	
Total loses		W/kVar	≤ 0.45	
Temperature category			-25/D	
Max. humidity			95 %	
Cooling			Forced ventilation or natural air cooled	
Max. overvoltage			1.1 × U_n (8 h/day) 1.15 × U_n (30 min/day) 1.2 × U_n (5 min - 200 times per life time) 1.3 × U_n (1 min - 200 times per life time)	
Max. overcurrent			1.7 × I_n (including combined effects of overvoltages, harmonics and capacitance tolerance)	
Inrush current			200 × I_n	
Expected life time			> 130000 h	
Discharge resistor			To 75 V ≤ 3 min	
Altitude			Up to 2000 m	
Insulation level		kV	3.6/-	
Routine tests				
Terminal to terminal			2.15 × U_n, 2 s	
Terminal to case			3600 V, 10 s	
Sealing test			N/A	75 °C, 6 h
Mechanical parameters				
Terminal per phase / Max. torque / Max. current			2 × 2.5 m² / 3 Nm / 60 A	
Mounting and grounding / Max. torque			Threaded M12 bolt / 10 Nm	
Mounting position			Vertical with terminal pointing upwards or horizontal	Vertical with terminal pointing upwards
Protection			IP20	
Clearance distance			> 16 mm	
Creepage distance			> 16 mm	
Safety device			Overpressure disconnector (all phases)	
Material parameters				
Dielectric			Self healing metallized polypropylene film	
Filling			Dry	Non-PCB biodegradable vegetable oil
Case			Aluminium	
Reference standard				
c UL us C22.2 No. 190 PROTECTED, 10 000 AI-C			/	UL-CSA approved (File No. 163120)

THREE PHASE

KNK 1053
CYLINDRCAL ALUMINIUM HOUSING

400 ... 690 V 10 ... 40 kVar



f_n = 50 Hz – Delta connection

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)
U_n = 400 V	**U_n = 400 V**		**U_n = 380 V**							
3 × 66.3	10	14.4	9	13.7			205	90	1.2	16
3 × 83.3	12.5	18	11.3	17.2			205	90	1.2	16
3 × 100	15	21.7	13.6	20.7			240	90	1.4	16
3 × 133	20	28.9	18.1	27.5			205	116	1.6	9
3 × 165.8	25	36.1	22.6	34.3			240	116	1.9	9
3 × 198.9	30	43.3	27.1	41.2			240	116	1.9	9
U_n = 440 V	**U_n = 440 V**		**U_n = 420 V**		**U_n = 400 V**					
3 × 54.9	10	13.1	9.1	12.5	8.3	12	205	90	1.2	16
3 × 68.6	12.5	16.4	11.5	15.8	10.4	15	205	90	1.2	16
3 × 82.3	15	19.7	13.7	18.8	12.4	17.9	240	90	1.4	16
3 × 110	20	26.2	18.3	25.2	16.6	24	205	116	1.6	9
3 × 137.1	25	32.8	22.8	31.3	20.7	29.9	240	116	1.9	9
3 × 164.4	30	39.4	27.3	37.5	24.8	35.8	280	116	2.3	9
U_n = 480 V	**U_n = 480 V**		**U_n = 440 V**		**U_n = 440 V**					
3 × 46.1	10	12	8.4	11	7	10.1	160	90	0.9	16
3 × 57.6	12.5	15	10.5	13.8	8.6	12.4	205	90	1.2	16
3 × 69.1	15	18	12.7	16.7	10.5	15.2	205	90	1.2	16
3 × 92.1	20	24	16.9	22.2	13.9	20.1	205	116	1.6	9
3 × 115.1	25	30.1	21	27.6	17.4	25.1	205	116	1.6	9
3 × 138.2	30	36.1	25.2	33.1	20.8	30	240	116	1.9	9
U_n = 525 V	**U_n = 525 V**		**U_n = 460 V**		**U_n = 440 V**					
3 × 38.5	10	11	7.7	9.7	7	9.2	205	90	1.2	16
3 × 48.2	12.5	13.8	9.6	12	8.8	11.5	240	90	1.4	16
3 × 57.8	15	16.5	11.5	14.4	10.5	13.8	240	90	1.4	16
3 × 77	20	22	15.3	19.2	14	18.4	205	116	1.6	9
3 × 96.3	25	27.5	19.2	24.1	17.6	23.1	240	116	1.9	9
3 × 115.5	30	33	23	28.9	21.1	27.7	240	116	1.9	9
3 × 154	40	44	30.6	38.4	28	36.8	305	136	2.3	1
U_n = 690 V	**U_n = 440 V**									
3 × 11.1	5	4.2					160	90	1.1	16
3 × 16.7	7.5	6.3					160	90	1.1	16
3 × 22.3	10	8.4					205	90	1.6	16
3 × 28	12.5	10.5					240	90	1.6	16
3 × 44.6	20	17					205	116	1.9	9
3 × 56	25	21					240	116	1.9	9
3 × 74	33	27.7					280	116	2.5	9

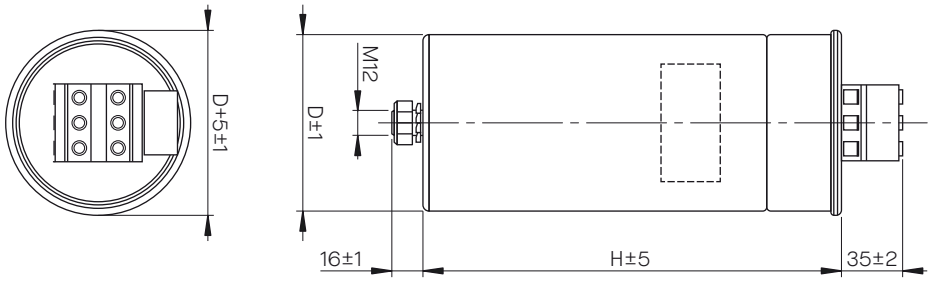
THREE PHASE

KNK 1053
CYLINDRICAL ALUMINIUM HOUSING

f_n = 60 Hz

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)
U_n = 400 V	**U_n = 400 V**		**U_n = 380 V**							
3 × 55.3	10	14.4	9	13.7			160	90	0.9	16
3 × 69.7	12.5	18	11.3	17.2			205	90	1.2	16
3 × 82.9	15	21.7	13.6	20.7			205	90	1.2	16
3 × 110.5	20	28.9	18.1	27.5			280	90	1.4	16
3 × 138.2	25	36.1	22.6	34.3			205	116	1.6	9
3 × 165.8	30	43.3	27.1	41.2			240	116	1.9	9
U_n = 440 V	**U_n = 440 V**		**U_n = 420 V**		**U_n = 400 V**					
3 × 45.7	10	13.1	9.1	12.5	8.3	12	160	90	0.9	16
3 × 57.1	12.5	16.4	11.5	15.8	10.4	15	205	90	1.2	16
3 × 68.5	15	19.7	13.7	18.8	12.4	17.9	205	90	1.2	16
3 × 91.3	20	26.2	18.3	25.2	16.6	24	240	90	1.4	16
3 × 114.2	25	32.8	22.8	31.3	20.7	29.9	205	116	1.6	9
3 × 137	30	39.4	27.3	37.5	24.8	35.8	240	116	1.6	9
U_n = 480 V	**U_n = 480 V**		**U_n = 440 V**		**U_n = 440 V**					
3 × 38.4	10	12	8.5	11.1	7	10	160	90	0.9	16
3 × 48	12.5	15	10.7	14	8.8	12.7	205	90	1.2	16
3 × 57.6	15	18	12.8	16.7	10.3	14.9	205	90	1.2	16
3 × 76.7	20	24	17	22.3	14	20.2	240	90	1.4	16
3 × 96	25	30	21	27.6	17.3	25	205	116	1.6	9
3 × 115.1	30	36	25	33	21	30	205	116	1.6	9
U_n = 525 V	**U_n = 525 V**		**U_n = 460 V**		**U_n = 440 V**					
3 × 21.1	10	11	7.7	9.7	7	9.2	160	90	0.9	16
3 × 40.1	12.5	13.8	9.6	12	8.8	11.5	205	90	1.2	16
3 × 48.1	15	16.5	11.5	14.4	10.5	13.8	205	90	1.2	16
3 × 64.2	20	22	15.3	19.2	14	18.4	240	90	1.4	9
3 × 80.2	25	27.5	19.2	24.1	17.6	23.1	205	116	1.6	9
3 × 115.5	30	33	23	28.9	21.1	27.7	240	116	1.9	9
3 × 128.3	40	44	30.6	38.4	28	36.8	305	136	3.1	1

400 ... 690 V 10 ... 30 kVar



f_n = 50 Hz – Delta connection

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)	cULus C22.2 No. 190
U_n = 400 V	**U_n = 400 V**		**U_n = 380 V**								
3 × 66.3	10	14.4	9	13.7			205	90	1.35	16	•
3 × 83.3	12.5	18	11.3	17.2			205	90	1.35	16	•
3 × 100	15	21.7	13.6	20.7			240	90	1.6	16	•
3 × 133	20	28.9	18.1	27.5			205	116	1.9	9	•
3 × 165.8	25	36.1	22.6	34.3			240	116	2.2	9	•
3 × 198.9	30	43.3	27.1	41.2			240	116	2.2	9	•
U_n = 440 V	**U_n = 440 V**		**U_n = 420 V**		**U_n = 400 V**						
3 × 54.9	10	13.1	9.1	12.5	8.3	12	205	90	1.35	16	•
3 × 68.6	12.5	16.4	11.5	15.8	10.4	15	205	90	1.35	16	•
3 × 82.3	15	19.7	13.7	18.8	12.4	17.9	240	90	1.6	16	•
3 × 110	20	26.2	18.3	25.2	16.6	24	205	116	1.9	9	•
3 × 137.1	25	32.8	22.8	31.3	20.7	29.9	240	116	2.2	9	•
3 × 164.4	30	39.4	27.3	37.5	24.8	35.8	280	116	2.6	9	•
U_n = 480 V	**U_n = 480 V**		**U_n = 440 V**		**U_n = 440 V**						
3 × 46.1	10	12	8.4	11	7	10.1	205	90	1.35	16	•
3 × 57.6	12.5	15	10.5	13.8	8.6	12.4	205	90	1.35	16	•
3 × 69.1	15	18	12.7	16.7	10.5	15.2	240	90	1.6	16	•
3 × 92.1	20	24	16.9	22.2	13.9	20.1	205	116	1.9	9	•
3 × 115.1	25	30.1	21	27.6	17.4	25.1	240	116	2.2	9	•
3 × 138.2	30	36.1	25.2	33.1	20.8	30	240	116	2.2	9	•
U_n = 525 V	**U_n = 525 V**		**U_n = 460 V**		**U_n = 440 V**						
3 × 38.5	10	11	7.7	9.7	7	9.2	205	90	1.35	16	•
3 × 48.2	12.5	13.8	9.6	12	8.8	11.5	205	90	1.6	16	•
3 × 57.8	15	16.5	11.5	14.4	10.5	13.8	240	90	1.6	16	•
3 × 77	20	22	15.3	19.2	14	18.4	205	116	1.9	9	•
3 × 96.3	25	27.5	19.2	24.1	17.6	23.1	240	116	2.2	9	•
3 × 115.5	30	33	23	28.9	21.1	27.7	240	116	2.2	9	•
U_n = 690 V											
3 × 11	5	4.2					160	90	1.1	16	
3 × 16	7.5	6.3					160	90	1.1	16	
3 × 22	10	8.4					240	90	1.6	16	
3 × 28	12.5	10.5					240	90	1.6	16	
3 × 46	20	17					240	116	1.9	9	
3 × 56	25	21					240	116	1.9	9	
3 × 74	33	27.7					280	116	2.5	9	

THREE PHASE

KNK 9053
CYLINDRCAL ALUMINIUM HOUSING

f_n = 60 Hz

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)	c UL us C22.2 No. 190
U_n = 400 V	**U_n = 400 V**		**U_n = 380 V**								
3 × 55.3	10	14.4	9	13.7			160	90	1.05	16	•
3 × 69.7	12.5	18	11.3	17.2			205	90	1.35	16	•
3 × 82.9	15	21.7	13.6	20.7			205	90	1.35	16	•
3 × 110.5	20	28.9	18.1	27.5			280	90	1.6	16	•
3 × 138.2	25	36.1	22.6	34.3			205	116	1.9	9	•
3 × 165.8	30	43.3	27.1	41.2			240	116	2.2	9	•
U_n = 440 V	**U_n = 440 V**		**U_n = 420 V**		**U_n = 400 V**						
3 × 45.7	10	13.1	9.1	12.5	8.3	12	160	90	1.05	16	•
3 × 57.1	12.5	16.4	11.5	15.8	10.4	15	205	90	1.35	16	•
3 × 68.5	15	19.7	13.7	18.8	12.4	17.9	205	90	1.35	16	•
3 × 91.3	20	26.2	18.3	25.2	16.6	24	240	90	1.6	16	•
3 × 114.2	25	32.8	22.8	31.3	20.7	29.9	205	116	1.9	9	•
3 × 137	30	39.4	27.3	37.5	24.8	35.8	240	116	2.2	9	•
U_n = 480 V	**U_n = 480 V**		**U_n = 440 V**		**U_n = 440 V**						
3 × 38.4	10	12	8.5	11.1	7	10	160	90	1.05	16	•
3 × 48	12.5	15	10.7	14	8.8	12.7	205	90	1.35	16	•
3 × 57.6	15	18	12.8	16.7	10.3	14.9	205	90	1.35	16	•
3 × 76.7	20	24	17	22.3	14	20.2	240	90	1.6	16	•
3 × 96	25	30	21	27.6	17.3	25	205	116	1.9	9	•
3 × 115.1	30	36	25	33	21	30	205	116	2.2	9	•
U_n = 525 V	**U_n = 525 V**		**U_n = 460 V**		**U_n = 440 V**						
3 × 14.3	4.5	5	3.4	4.3	4.1		160	90	1.2	16	•
3 × 16.8	5.2	5.7	4	5	4.9		160	90	1.2	16	•
3 × 32.1	10	11	7.7	9.7	7	9.2	160	90	1.2	16	•
3 × 40.1	12.5	13.8	9.6	12	8.8	11.5	205	90	1.35	16	•
3 × 48.1	15	16.5	11.5	14.4	10.5	13.8	205	90	1.35	16	•
3 × 64.2	20	22	15.3	19.2	14	18.4	205	116	1.9	9	•
3 × 80.2	25	27.5	19.2	24.1	17.6	23.1	240	116	2.2	9	•
3 × 96.2	30	33	23	28.9	21.1	27.7	240	116	2.2	9	•
U_n = 690 V											
3 × 18.6	10	8.4					160	90	1.6	16	
3 × 23.2	12.5	10.5					205	90	1.6	16	
3 × 37.1	20	16.7					205	90	2.2	9	
3 × 46.4	25	21					240	90	2.6	9	
3 × 55.7	33	25.1					205	116	2.6	9	

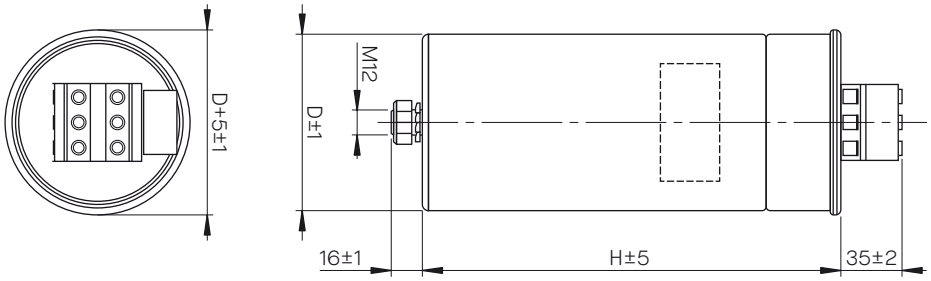
Technical data

Type	Symbol	Unit	KNK3053	KNK4053
Standards			IEC/EN 60831-1/2	
Connection			Delta (three-phase)	
Rated reactive power	Q_n	kVar	Up to 50	
Rated voltage	U_n	V	220 ~ 800	
Rated frequency	f_n	Hz	50 or 60	
Capacitance tolerance			-5/10 % (other on request)	
Dielectric loses		W/kVar	< 0.2	
Total loses		W/kVar	< 0.45	
Temperature category			-40/d	
Max. humidity			95 %	
Cooling			Forced ventilation or natural air cooled	
Max. overvoltage			1.1 × U_n (8 h/day)	
			1.15 × U_n (30 min/day)	
			1.2 × U_n (5 min - 200 times per life time)	
			1.3 × U_n (1 min - 200 times per life time)	
Max. overcurrent			1.5 × I_n (normal duty) or 2 × I_n (heavy duty) (including combined effects of overvoltages, harmonics and capacitance tolerance)	
Inrush current			200 × I_n	
Expected life time			> 120000 h (normal duty)	
			> 150000 h (heavy duty)	
Discharge resistor			to 75 V < 3 min	
Altitude		kV	up to 4000 m	
Insulation level			4/-	
Routine tests				
Terminal to terminal			2.15 × U_n, 2 s	
Terminal to case			4000 V, 10 s	
Sealing test			n/a	75 °C, 6 h
Mechanical Parameters				
Terminal per phase / terminal height (th) / max. torque / max. hurrent			2 × 25 mm² / 35 mm / 3 Nm / 60 A for D > 90 mm	
			2 × 16 mm² / 30 mm / 2 Nm / 35 A for D = 75 mm	
Mounting and grounding / max. Torque			Threaded M12 bolt /10 Nm	
Mountining position			Vertical with terminal pointing upwards or horizontal	Vertical with terminal pointing upwards
Protection			IP20	
Clearance distance			> 16 mm	
Creepage distance			> 16 mm	
Safety device			Overpressure disconnector (all phases)	
Material Parameters				
Dielectric			Self healing metallized polypropylene film	
Filling			Dry (filled with non-PCB polyurethane resin)	Non-PCB biodegradable vegetable oil
Case			Aluminium	
Reference Standard				
c UL us C22.2 No. 190 PROTECTED, 10 000 AF-C			UI-CSA approved (file no. 163120)	
VDE Reg.-No.F010			VDE approved (Cerificate No. 40052154)	

THREE PHASE

KNK 3053, KNK4053
CYLINDRCAL ALUMINIUM HOUSING

220 ... 800 V 5 ... 50 kVar



f_n = 50 Hz - Normal Duty

Cn (µF)	Qn (kVar)	In (A)	Qn (kVar)	In (A)	Qn (kVar)	In (A)	D (mm)	H (mm)	Weight (kg)		Packing unit (pcs)		
	U_n = 400 V		U_n = 380 V						KNK3053	KNK4053			
3 × 33.2	5	7.2	4.5	6.8			75	165	0.9	0.8	**16**	•	
3 × 49.7	7.5	10.8	6.7	10.2			75	210	1.1	1.0	16	•	
3 × 66.3	10	14.4	9	13.7			75	210	1.1	1.0	16	•	
3 × 82.9	12.5	18	11.3	17.2			75	245	1.4	1.2	16	•	
3 × 99.5	15	21.7	13.5	20.5			90	210	1.5	1.3	16	•	
3 × 132.5	20	28.9	18	27.3			90	245	1.8	1.5	16	•	
3 × 165.8	25	36.1	22.5	34.2			90	285	2.1	1.8	16	•	
3 × 198.9	30	43.1	27	41			116	245	3.0	2.6	9	•	
3 × 265.3	40	57.7	36.1	54.8			116	285	3.6	3.2	9	•	
3 × 331.6	50	72.2	45.1	68.6			136	245	4	3.6	2	•	
	U_n = 440 V		U_n = 400 V		U_n = 380 V				KNK3053	KNK4053			
3 × 27.4	5	6.6	4.1	5.9	3.7	5.6	75	165	0.9	0.8	16	•	•
3 × 41.1	7.5	9.8	6.2	8.9	5.6	8.5	75	210	1.1	1.0	16	•	•
3 × 54.8	10	13.1	8.3	12	7.4	11.2	75	245	1.4	1.2	16	•	•
3 × 68.5	12.5	16.4	10.4	15	9.3	14.1	90	210	1.5	1.3	16	•	•
3 × 82.2	15	19.7	12.4	17.9	11.2	17	90	245	1.8	1.5	16	•	•
3 × 109.6	20	26.2	16.6	24	15	22.8	90	285	2.1	1.8	16	•	•
3 × 137	25	32.8	20.7	29.9	18.6	28.3	116	210	2.5	2.2	9	•	•
3 × 164.4	30	39.4	24.8	35.8	22.4	34	116	245	3.0	2.6	9	•	•
3 × 219.2	40	52.5	33.1	47.6	29.8	45.3	116	285	3.6	3.2	9	•	•
3 × 274	50	65.6	41.3	59.6	37.3	56.7	136	245	4	3.6	2	•	•
	U_n = 480 V		U_n = 440 V		U_n = 400 V				KNK3053	KNK4053			
3 × 23	5	6	4.2	5.5	3.5	5.1	75	165	0.9	0.8	16	•	
3 × 34.5	7.5	9	6.3	8.3	5.2	7.5	75	210	1.1	1.0	16	•	
3 × 46.1	10	12	8.4	11	7	10.1	75	210	1.1	1.0	16	•	
3 × 57.6	12.5	15	10.5	13.8	8.6	12.4	75	245	1.4	1.2	16	•	
3 × 69.1	15	18	12.7	16.7	10.5	15.2	90	210	1.5	1.3	16	•	
3 × 92.1	20	24.1	16.9	22.2	13.9	20.1	90	245	1.8	1.5	16	•	
3 × 115.1	25	30.1	21	27.6	17.4	25.1	90	285	2.1	1.8	16	•	
3 × 138.2	30	36.1	25.2	33.1	20.8	30	116	210	2.5	2.2	9	•	
3 × 184.2	40	48.1	33.5	44	27.7	40.1	116	285	3.6	3.2	9	•	
3 × 230.3	50	60.1	42	55.1	34.7	50.1	136	245	4	3.6	2	•	
	U_n = 525 V		U_n = 480 V		U_n = 440 V				KNK3053	KNK4053			
3 × 19.3	5	5.5	4.4	5.1	3.5	4.6	75	165	0.9	0.8	16	•	
3 × 28.9	7.5	8.2	6.2	7.5	5.3	7	75	210	1.1	1.0	16	•	
3 × 38.5	10	11	8.4	10	7	9.2	75	245	1.4	1.2	16	•	
3 × 48.1	12.5	13.7	10.5	12.6	8.8	11.5	75	245	1.4	1.2	16	•	
3 × 57.7	15	16.5	12.5	15	10.5	13.8	90	210	1.5	1.3	16	•	
3 × 77	20	22	16.7	20.1	14	18.4	90	285	2.1	1.8	16	•	
3 × 96.2	25	27.5	20.9	25.1	17.6	23.1	116	210	2.5	2.2	9	•	
3 × 115.5	30	33	25	30.1	21.1	27.7	116	245	3.0	2.6	9	•	
3 × 154	40	44	33.4	40.2	28.1	36.9	116	285	3.6	3.2	9	•	
3 × 192.5	50	55	41.8	50.3	35.1	46.1	136	245	4	3.6	2	•	

f_n = 50 Hz - Normal Duty

C_n (µF)	Q (kVar)	I (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	D (mm)	H (mm)	Weight (kg)		Packing unit (pcs)	
	U_n = 690 V								KNK3053	KNK4053		
3 × 11.1	5	4.2					75	165	0.9	**0.8**	**16**	
3 × 16.7	7.5	6.3					75	210	1.1	1.0	16	
3 × 22.3	10	8.4					75	210	1.1	1.0	16	
3 × 27.9	12.5	10.5					75	245	1.4	1.2	16	
3 × 33.4	15	12.6					90	210	1.5	1.3	16	
3 × 44.6	20	16.7					90	245	1.8	1.5	16	
3 × 55.7	25	20.9					116	210	2.5	2.2	16	
3 × 66.9	30	25.1					116	245	3.0	2.6	9	
3 × 89.1	40	33.5					116	285	3.6	3.2	9	
	U_n = 800 V								KNK3053	KNK4053		
3 × 27.4	5	6.6					75	165	0.9	0.8	16	
3 × 41.1	7.5	9.8					75	210	1.1	1.0	16	
3 × 54.8	10	13.1					75	245	1.4	1.2	16	
3 × 68.5	12.5	16.4					75	245	1.4	1.2	16	
3 × 82.2	15	19.7					90	210	1.5	1.3	16	
3 × 109.6	20	26.2					90	285	2.1	1.8	16	
3 × 137	25	32.8					116	210	2.5	2.2	9	
3 × 164.4	30	39.4					116	245	3.0	2.6	9	
3 × 219.2	40	52.5					116	285	3.6	3.2	9	

f_n = 50 Hz - Heavy Duty

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	D (mm)	H (mm)	Weight (kg)		Packing unit (pcs)	
	U_n = 400 V		U_n = 380 V						KNK3053	KNK4053		
3 × 33.2	5	7.2	4.5	6.8			75	165	0.9	**0.8**	**16**	•
3 × 49.7	7.5	10.8	6.7	10.2			75	210	1.1	1.0	16	•
3 × 66.3	10	14.4	9	13.7			90	210	1.5	1.3	16	•
3 × 82.9	12.5	18	11.3	17.2			90	245	1.8	1.5	16	•
3 × 99.5	15	21.7	13.5	20.5			90	245	1.8	1.5	16	•
3 × 132.5	20	28.9	18	27.3			116	210	2.5	2.2	16	•
3 × 165.8	25	36.1	22.5	34.2			116	245	3.0	2.6	9	•
3 × 198.9	30	43.1	27	41			116	285	3.6	3.2	9	•
3 × 265.3	40	57.7	36.1	54.8			136	285	4.6	4.1	9	•
3 × 331.6	50	72.2	45.1	68.6			136	310	5	4.5	1	•
	U_n = 440 V		U_n = 400 V		U_n = 380 V				KNK3053	KNK4053		
3 × 27.4	5	6.6	4.1	5.9	3.7	5.6	75	210	1.1	1.0	16	•
3 × 41.1	7.5	9.8	6.2	8.9	5.6	8.5	75	245	1.4	1.2	16	•
3 × 54.8	10	13.1	8.3	12	7.4	11.2	90	210	1.5	1.3	16	•
3 × 68.5	12.5	16.4	10.4	15	9.3	14.1	90	245	1.8	1.5	16	•
3 × 82.2	15	19.7	12.4	17.9	11.2	17	90	285	2.1	1.8	16	•
3 × 109.6	20	26.2	16.6	24	15	22.8	116	245	3.0	2.6	9	•
3 × 137	25	32.8	20.7	29.9	18.6	28.3	116	245	3.0	2.6	9	•
3 × 164.4	30	39.4	24.8	35.8	22.4	34	116	285	3.6	3.2	9	•
3 × 219.2	40	52.5	33.1	47.6	29.8	45.3	136	285	4.6	4.1	1	•
3 × 274	50	65.6	41.3	59.6	37.3	56.7	136	310	5	4.5	1	
	U_n = 480 V		U_n = 440 V		U_n = 400 V				KNK3053	KNK4053		
3 × 23	5	6	4.2	5.5	3.5	5.1	75	165	0.9	0.8	16	•
3 × 34.5	7.5	9	6.3	8.3	5.2	7.5	75	210	1.1	1.0	16	•
3 × 46.1	10	12	8.4	11	7	10.1	75	245	1.4	1.2	16	•
3 × 57.6	12.5	15	10.5	13.8	8.6	12.4	90	210	1.5	1.3	16	•
3 × 69.1	15	18	12.7	16.7	10.5	15.2	90	245	1.8	1.5	16	•
3 × 92.1	20	24.1	16.9	22.2	13.9	20.1	90	285	2.1	1.8	16	•
3 × 115.1	25	30.1	21	27.6	17.4	25.1	116	245	3.0	2.6	9	•
3 × 138.2	30	36.1	25.2	33.1	20.8	30	116	285	3.6	3.2	9	•
3 × 184.2	40	48.1	33.5	44	27.7	40.1	136	245	4.0	3.6	1	•
3 × 230.3	50	60.1	42	55.1	34.7	50.1	136	285	4.6	4.1	2	•

f_n = 50 Hz - Heavy Duty

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	D (mm)	H (mm)	Weight (kg)		Packing unit (pcs)	cULus C22.2 No. 190
	U_n = 525 V		U_n = 480 V		U_n = 440 V				KNK3053	KNK4053		
3 × 19.3	5	5.5	4.4	5.1	3.5	4.6	75	165	0.9	0.8	16	•
3 × 28.9	7.5	8.2	6.2	7.5	5.3	7	75	210	1.2	1.1	16	•
3 × 38.5	10	11	8.4	10	7	9.2	90	210	1.5	1.3	16	•
3 × 48.1	12.5	13.7	10.5	12.6	8.8	11.5	90	245	1.8	1.5	16	•
3 × 57.7	15	16.5	12.5	15	10.5	13.8	90	245	2.1	1.8	16	•
3 × 77	20	22	16.7	20.1	14	18.4	116	210	2.5	2.2	16	•
3 × 96.2	25	27.5	20.9	25.1	17.6	23.1	116	245	3.0	2.6	9	•
3 × 115.5	30	33	25	30.1	21.1	27.7	116	285	3.6	3.2	9	•
3 × 154	40	44	33.4	40.2	28.1	36.9	136	245	4.6	4.1	1	•
3 × 192.5	50	55	41.8	50.3	35.1	46.1	136	285	4.6	4.1	2	•
	U_n = 690 V								KNK3053	KNK4053		
3 × 11.1	5	4.2					75	165	0.9	0.8	**16**	
3 × 16.7	7.5	6.3					90	165	1.2	1.1	16	
3 × 22.3	10	8.4					90	210	1.5	1.3	16	
3 × 27.9	12.5	10.5					90	245	1.8	1.5	16	
3 × 33.4	15	12.6					90	285	2.1	1.8	16	
3 × 44.6	20	16.7					116	210	2.5	2.2	9	
3 × 55.7	25	20.9					116	245	3.0	2.6	9	
3 × 66.9	30	25.1					116	285	3.6	3.2	9	
3 × 89.1	40	33.5					136	285	4.6	4.1	1	
	U_n = 800 V								KNK3053	KNK4053		
3 × 8.3	5	3.6					75	210	1.1	1.0	16	
3 × 12.4	7.5	5.4					75	245	1.4	1.2	16	
3 × 16.6	10	7.2					90	210	1.5	1.3	16	
3 × 20.7	12.5	9					90	245	1.8	1.5	16	
3 × 24.9	15	10.8					90	285	2.1	1.8	16	
3 × 33.2	20	14.4					116	210	2.5	2.2	9	
3 × 41.5	25	18					116	245	3.0	2.6	9	
3 × 49.7	30	21.7					116	285	3.6	3.2	9	
3 × 66.3	40	28.9					136	285	4.6	4.1	1	

f_n = 60 Hz - Normal Duty

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	D (mm)	H (mm)	Weight (kg)		Packing unit (pcs)	cULus C22.2 No. 190	VDE Reg.-No.F010
	U_n = 400 V		U_n = 380 V						KNK3053	KNK4053			
3 × 27.6	5	7.2	4.5	6.8			75	165	0.9	0.8	**16**	•	
3 × 41.5	7.5	10.8	6.7	10.2			75	165	0.9	0.8	16	•	
3 × 55.3	10	14.4	9	13.7			75	210	1.1	1.0	16	•	
3 × 69.1	12.5	18	11.3	17.2			75	245	1.4	1.2	16	•	
3 × 82.9	15	21.7	13.5	20.5			75	245	1.4	1.2	16	•	
3 × 110.5	20	28.9	18	27.3			90	245	1.8	1.5	16	•	
3 × 138.2	25	36.1	22.6	34.3			90	285	2.1	1.8	16	•	
3 × 165.8	30	43.1	27	41			116	210	2.5	2.2	9	•	
3 × 221.1	40	57.7	36.1	54.8			116	245	3.0	2.6	9	•	
3 × 276.3	50	72.2	45.1	68.6			116	285	3.6	3.2	4	•	
	U_n = 440 V		U_n = 400 V		U_n = 380 V				KNK3053	KNK4053			
3 × 22.8	5	6.6	4.1	5.9	3.7	5.6	75	165	0.9	0.8	16	•	•
3 × 34.3	7.5	9.8	6.2	8.9	5.6	8.5	75	210	1.1	1.0	16	•	•
3 × 45.7	10	13.1	8.3	12	7.5	11.4	75	210	1.1	1.0	16	•	•
3 × 57.1	12.5	16.4	10.4	14.9	9.3	14.1	75	245	1.4	1.2	16	•	•
3 × 68.5	15	19.7	12.4	17.9	11.2	17	90	210	1.5	1.3	16	•	•
3 × 91.3	20	26.2	16.6	23.8	14.9	22.6	90	245	1.8	1.5	16	•	•
3 × 114.2	25	32.8	20.7	29.9	18.7	28.4	90	285	2.1	1.8	16	•	•
3 × 137	30	39.4	24.8	35.8	22.4	34	116	210	2.5	2.2	9	•	•
3 × 182.7	40	52.5	33.1	47.6	29.8	45.3	116	285	3.6	3.2	9	•	•
3 × 228.4	50	65.6	41.3	59.6	37.3	56.7	116	285	3.6	3.2	4	•	•

f_n = 60 Hz - Normal Duty

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	D (mm)	H (mm)	Weight (kg)		Packing unit (pcs)	cULus C22.2 No. 190
	U_n = 480 V		U_n = 440 V		U_n = 400 V				KNK3053	KNK4053		
3 × 19.2	5	6	4.2	5.5	3.5	5.1	75	165	0.9	0.8	16	•
3 × 28.8	7.5	9	6.3	8.3	5.2	7.5	75	165	0.9	0.8	16	•
3 × 38.4	10	12	8.4	11	7	10.1	75	210	1.1	1.0	16	•
3 × 50	12.5	15	11	14.4	9	13	75	245	1.4	1.2	16	•
3 × 57.6	15	18	12.8	16.8	10.4	15	75	245	1.4	1.2	16	•
3 × 76.8	20	24.1	16.8	22	13.9	20.1	90	210	1.5	1.3	16	•
3 × 95.9	25	30.1	21	27.6	17.4	25.1	90	245	1.8	1.5	16	•
3 × 115.1	30	36.1	25.2	33.1	20.8	30	90	285	2.1	1.8	16	•
3 × 153.5	40	48.1	33.6	44.1	27.8	40.1	116	245	3.0	2.6	9	•
3 × 191.9	50	60.1	42	55.1	34.7	50.1	116	285	3.6	3.2	4	•
	U_n = 525 V		U_n = 480 V		U_n = 440 V				KNK3053	KNK4053		
3 × 16	5	6.5	4.4	5.1	3.5	4.6	75	165	0.9	0.8	16	•
3 × 24.1	7.5	8.2	6.3	7.6	5.3	7	75	165	0.9	0.8	16	•
3 × 32.1	10	11	8.4	10.1	7	9.2	75	210	1.1	1.0	16	•
3 × 40.1	12.5	13.7	10.5	12.6	8.8	11.5	75	245	1.4	1.2	16	•
3 × 48.1	15	16.5	12.5	15	10.5	13.8	75	245	1.4	1.2	16	•
3 × 64.2	20	22	16.7	20.1	14.1	18.5	90	245	1.8	1.5	16	•
3 × 80.2	25	27.5	21	25.3	17.5	23	90	285	2.1	1.8	16	•
3 × 96.2	30	33	25.1	30.2	21	27.6	116	210	2.5	2.2	9	•
3 × 128.3	40	44	33.5	40.3	28.1	36.9	116	245	3.0	2.6	9	•
3 × 160.4	50	55	41.8	50.3	35.1	46.1	116	285	3.6	3.2	4	•
	U_n = 690 V								KNK3053	KNK4053		
3 × 9.3	5	4.2					75	165	0.9	**0.8**	**16**	
3 × 13.9	7.5	6.3					75	165	0.9	0.8	16	
3 × 18.6	10	8.4					75	210	1.1	1.0	16	
3 × 23.2	12.5	10.5					75	245	1.4	1.2	16	
3 × 27.9	15	12.6					75	245	1.4	1.2	16	
3 × 37.1	20	16.7					90	245	1.8	1.5	16	
3 × 46.4	25	20.9					90	245	1.8	1.5	16	
3 × 55.7	30	25.1					90	285	2.1	1.8	16	
3 × 74.3	40	33.5					116	245	3.0	2.6	9	
	U_n = 800 V								KNK3053	KNK4053		
3 × 6.9	5	3.6					75	165	0.9	0.8	16	
3 × 10.4	7.5	5.4					75	165	0.9	0.8	16	
3 × 13.8	10	7.2					75	210	1.1	1.0	16	
3 × 17.3	12.5	9					75	245	1.4	1.2	16	
3 × 20.7	15	10.8					90	210	1.5	1.3	16	
3 × 27.6	20	14.4					90	245	1.8	1.5	16	
3 × 34.5	25	18					90	285	2.1	1.8	16	
3 × 41.6	30	21.7					116	210	2.5	2.2	9	
3 × 55.3	40	28.9					116	245	3.0	2.6	9	

f_n = 60 Hz - Heavy Duty

C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	D (mm)	H (mm)	Weight (kg)		Packing unit (pcs)	cULus C22.2 No. 190
	U_n = 400 V		U_n = 380 V						KNK3053	KNK4053		
3 × 27.6	5	7.2	4.5	6.8			75	165	0.9	**0.8**	**16**	•
3 × 41.5	7.5	10.8	6.7	10.2			75	210	1.1	1.0	16	•
3 × 55.3	10	14.4	9	13.7			75	245	1.4	1.2	16	•
3 × 69.1	12.5	18	11.3	17.2			90	210	1.5	1.3	16	•
3 × 82.9	15	21.7	13.5	20.5			90	245	1.8	1.5	16	•
3 × 110.5	20	28.9	18	27.3			90	285	2.1	1.8	16	•
3 × 138.2	25	36.1	22.6	34.3			116	210	2.5	2.2	16	•
3 × 165.8	30	43.1	27	41			116	245	3.0	2.6	9	•
3 × 221.1	40	57.7	36.1	54.8			136	245	4.0	3.6	9	•
3 × 276.3	50	72.2	45.1	68.6			136	285	4.6	4.1	2	•

THREE PHASE

KNK 3053, KNK4053
CYLINDRCAL ALUMINIUM HOUSING

f_n = 60 Hz - Heavy Duty

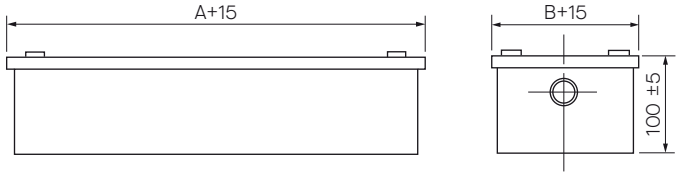
C_n (µF)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	Q_n (kVar)	I_n (A)	D (mm)	H (mm)	Weight (kg)		Packing unit (pcs)	cULus C22.2 No. 190
	U_n = 440 V		U_n = 400 V		U_n = 380 V				KNK3053	KNK4053		
3 × 22.8	5	6.6	4.1	5.9	3.7	5.6	75	165	0.9	0.8	16	•
3 × 34.3	7.5	9.8	6.2	8.9	5.6	8.5	75	210	1.1	1.0	16	•
3 × 45.7	10	13.1	8.3	12	7.5	11.4	75	245	1.4	1.2	16	•
3 × 57.1	12.5	16.4	10.3	14.9	9.3	14.1	90	210	1.5	1.3	16	•
3 × 68.5	15	19.7	12.4	17.9	11.2	17	90	245	1.8	1.5	16	•
3 × 91.3	20	26.2	16.5	23.8	14.9	22.6	90	285	2.1	1.8	16	•
3 × 114.2	25	32.8	20.7	29.9	18.7	28.4	116	245	3.0	2.6	9	•
3 × 137	30	39.4	24.8	35.8	22.4	34	116	245	3.0	2.6	9	•
3 × 182.7	40	52.5	33.1	47.6	29.8	45.3	136	245	4.0	3.6	1	•
3 × 228.4	50	65.6	41.3	59.6	37.3	56.7	136	285	4.6	4.1	2	•
	U_n = 480 V		U_n = 440 V		U_n = 400 V				KNK3053	KNK4053		
3 × 19.2	5	6	4.2	5.5	3.5	5.1	75	165	0.9	0.8	16	•
3 × 28.8	7.5	9	6.3	8.3	5.2	7.5	75	210	1.1	1.0	16	•
3 × 38.4	10	12	8.4	11	7	10.1	75	245	1.4	1.2	16	•
3 × 50	12.5	15	11	14.4	9	13	90	210	1.5	1.3	16	•
3 × 57.6	15	18	12.8	16.8	10.4	15	90	210	1.5	1.3	16	•
3 × 76.8	20	24.1	16.8	22	13.9	20.1	90	245	1.8	1.5	16	•
3 × 95.9	25	30.1	21	27.6	17.4	25.1	116	210	2.5	2.2	9	•
3 × 115.1	30	36.1	25.2	33.1	20.8	30	116	245	3.0	2.6	9	•
3 × 153.5	40	48.1	33.6	44.1	27.8	40.1	116	285	3.6	3.2	9	•
3 × 191.9	50	60.1	42	55.1	34.7	50.1	136	245	4.0	3.6	2	•
	U_n = 525 V		U_n = 480 V		U_n = 440 V				KNK3053	KNK4053		
3 × 16	5	6.5	4.2	5.1	3.5	4.6	75	165	0.9	0.8	16	•
3 × 24.1	7.5	8.2	6.3	7.6	5.3	7	75	210	1.1	1.0	16	•
3 × 32.1	10	11	8.4	10.1	7	9.2	75	245	1.4	1.2	16	•
3 × 40.1	12.5	13.7	10.5	12.6	8.8	11.5	90	210	1.5	1.3	16	•
3 × 48.1	15	16.5	12.5	15	10.5	13.8	90	245	1.8	1.5	16	•
3 × 64.2	20	22	16.7	20.1	14.1	18.5	90	285	2.1	1.8	16	•
3 × 80.2	25	27.5	21	25.3	17.5	23	116	210	2.5	2.2	9	•
3 × 96.2	30	33	25.1	30.2	21	27.6	116	245	3.0	2.6	9	•
3 × 128.3	40	44	33.5	40.3	28.1	36.9	116	285	3.6	3.7	9	•
3 × 160.4	50	55	41.8	50.3	35.1	46.1	136	285	4.6	4.1	2	•
	U_n = 690 V								KNK3053	KNK4053		
3 × 9.3	5	4.2					75	165	0.9	**0.8**	**16**	
3 × 13.9	7.5	6.3					75	210	1.1	1.0	16	
3 × 18.6	10	8.4					75	245	1.4	1.2	16	
3 × 23.2	12.5	10.5					90	210	1.5	1.3	16	
3 × 27.9	15	12.6					90	245	1.8	1.5	16	
3 × 37.1	20	16.7					90	285	2.1	1.8	16	
3 × 46.4	25	20.9					116	245	3.0	2.6	9	
3 × 55.7	30	25.1					116	245	3.0	2.6	9	
3 × 74.3	40	33.5					116	285	4.0	3.6	1	
	U_n = 800 V								KNK3053	KNK4053		
3 × 6.9	5	3.6					75	165	0.9	0.8	16	
3 × 10.4	7.5	5.4					75	210	1.1	1.0	16	
3 × 13.8	10	7.2					75	245	1.4	1.2	16	
3 × 17.3	12.5	9					90	210	1.5	1.3	16	
3 × 20.7	15	10.8					90	245	1.8	1.5	16	
3 × 27.6	20	14.4					90	285	2.1	1.8	16	
3 × 34.5	25	18					116	245	3.0	2.6	9	
3 × 41.6	30	21.7					116	245	3.0	2.6	9	
3 × 55.3	40	28.9					136	245	4.0	3.6	1	

Technical data

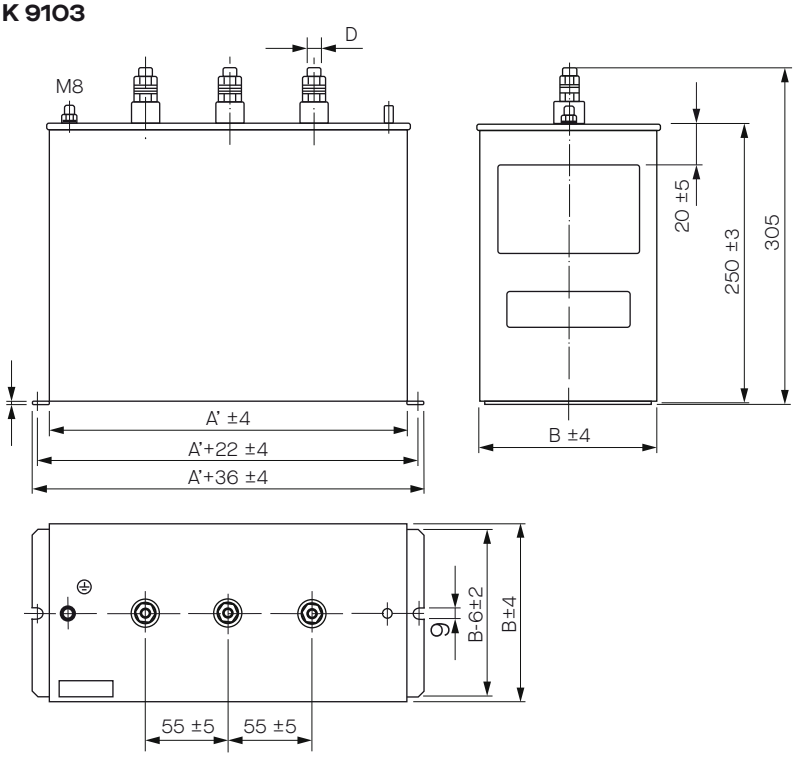
Type	Symbol	Unit	KNK 9103, KNK9143	KNK9101, KNK9141
Standards			IEC/EN 60831-1/2	
Connection			Delta (Three-Phase)	Single-Phase
Rated reactive power	Q_n	kVar	up to 60	
Rated voltage	U_n	V	220 ~ 525	
Rated frequency	F_n	Hz	50 or 60	
Capacitance tolerance			-5/10 % (other on request)	
Dielectric loses		W/kVar	< 0.2	
Total loses		W/kVar	< 0.5	
Temperature category			-25/d	
Max. humidity			95 %	
Cooling			Forced ventilation or natural air cooled	
Max. overvoltage			1.1 × U_n (8 h/day)	
			1.15 × U_n (30 min/DAY)	
			1.2 × U_n (5 min - 200 TIMES PER LIFE TIME)	
			1.3 × U_n (1 min - 200 TIMES PER LIFE TIME)	
Max. overcurrent			1.5 × I_n (including combined effects of overvoltages, harmonics and capacitance tolerance)	
Inrush current			200 × I_n	
Expected life time			> 100000 h (normal duty)	
			> 120000 h (heavy duty)	
Discharge resistor			to 75 V < 3 min	
Altitude			up to 2000 m	
Insulation level		kV	3.6/-	
Routine tests				
Terminal to terminal			2.15 × U_n, 2 s	
Terminal to case			3600 V, 10 s	
Sealing test			75 °C, 6 h	
Mechanical parameters				
Terminal per phase / max. torque / max. current			M8 / 5 Nm / 50 A	
			M12 / 10 Nm / 90 A	
Mounting and grounding / max. Torque			Threaded M8 bolt /5 Nm	
Mountining position			Vertical with terminal pointing upwards	
Protection			IP00 - KNK9103, KNK9101	
			IP55 - KNK9143, KNK9141	
Clearance distance			> 40 mm	
Creepage distance			> 20 mm	
Safety device			Overpressure disconnector	
Material parameters				
Dielectric			Self healing metallized polypropylene film	
Filling			Non-PCB biodegradable vegetable oil	
Case			Painted metal housing RAL7032	

230 ... 525 V 5 ... 60 kVar

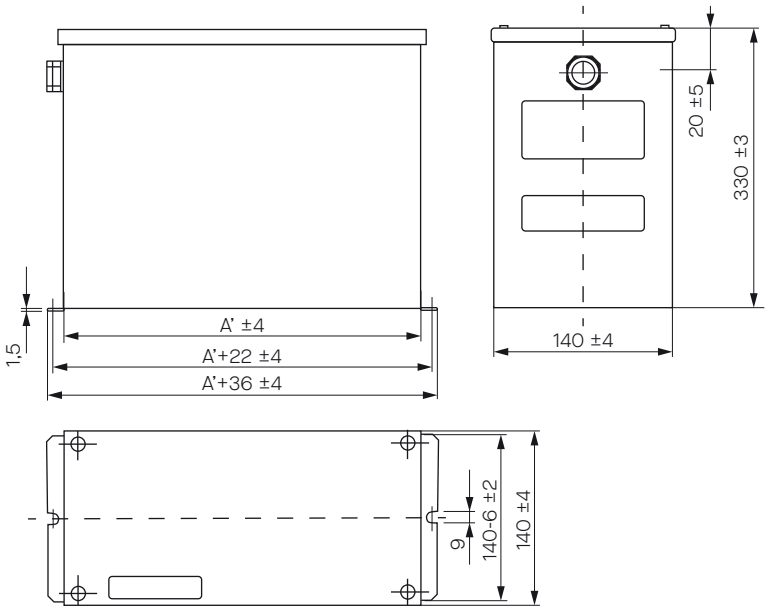
KNK 9103 Cap (Type KNK9153)



KNK 9103



KNK 9143



f_n = 50 Hz

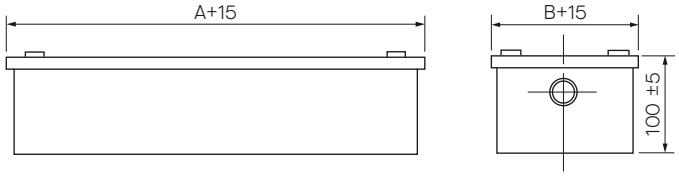
U_n (V)	Q_n (kVar)	C_n (µF)	I_n (A)	A (mm)	A' (mm)	B (mm)	D	Weight (kg) KNK9103	Weight (kg) KNK9143
230	5	3 × 100.3	12.5	190	190	70	M8	3.65	6.40
230	10	3 × 200.7	25.1	380	190	70	M8	5.65	7.30
230	12.5	3 × 250.7	32.1	380	190	70	M8	5.95	7.80
230	15	3 × 301	37.6	380	380	140	M12	8.30	12.40
230	20	3 × 401.2	50.2	380	380	140	M12	9.65	13.20
230	25	3 × 501.5	62.7	380	380	140	M12	10.25	13.80
400	5	3 × 33.2	7.2	190	190	70	M8	2.95	6.00
400	7.5	3 × 49.7	10.8	190	190	70	M8	3.05	6.10
400	10	3 × 66.3	14.4	190	190	70	M8	3.25	6.25
400	12.5	3 × 82.9	18	190	190	70	M8	3.30	6.30
400	15	3 × 99.5	21.7	190	190	70	M8	3.65	6.45
400	20	3 × 132.6	28.9	380	190	70	M8	5.65	7.30
400	25	3 × 165.8	36.1	380	190	70	M8	5.95	7.80
400	30	3 × 198.9	43.3	380	190	70	M8	6.25	8.10
400	40	3 × 265.3	57.7	380	380	140	M12	8.30	12.20
400	50	3 × 331.6	72.2	380	380	140	M12	9.65	13.20
400	60	3 × 397.9	86.6	380	380	140	M12	10.25	13.80
440	5	3 × 27.4	6.5	190	190	70	M8	2.95	6.00
440	7.5	3 × 41.1	9.8	190	190	70	M8	3.05	6.10
440	10	3 × 54.8	13.1	190	190	70	M8	3.25	6.25
440	12.5	3 × 68.5	16.4	190	190	70	M8	3.30	6.30
440	15	3 × 82.2	19.7	190	190	70	M8	3.65	6.45
440	20	3 × 109.6	26.3	380	190	70	M8	5.65	7.30
440	25	3 × 137	32.8	380	190	70	M8	5.95	7.80
440	30	3 × 164.4	39.4	380	190	70	M8	6.25	8.10
440	40	3 × 219.2	52.6	380	380	140	M12	8.30	12.20
440	50	3 × 272	65.6	380	380	140	M12	9.65	13.20
440	60	3 × 328.8	78.8	380	380	140	M12	10.25	13.80
480	5	3 × 23	6	190	190	70	M8	2.95	6.10
480	7.5	3 × 34.5	9	190	190	70	M8	3.05	6.10
480	10	3 × 46	12	190	190	70	M8	3.25	6.30
480	12.5	3 × 57.6	15	190	190	70	M8	3.30	6.40
480	15	3 × 69.1	18	190	190	70	M8	3.65	7.30
480	20	3 × 92.1	24.1	380	190	70	M8	5.65	7.30
480	25	3 × 115.1	30.1	380	190	70	M8	5.95	7.80
480	30	3 × 138.2	36.1	380	190	70	M8	6.25	8.10
480	40	3 × 184.2	48.1	380	380	140	M12	8.30	12.20
480	50	3 × 230.3	60.1	380	380	140	M12	9.65	13.20
480	60	3 × 276.3	72.2	380	380	140	M12	10.25	13.80
525	7.5	3 × 28.9	8.2	190	190	70	M8	3.05	6.25
525	10	3 × 39	11	190	190	70	M8	3.25	6.30
525	12.5	3 × 48.1	13.8	190	190	70	M8	3.30	6.45
525	15	3 × 57.7	16.5	190	190	70	M8	3.65	7.30
525	20	3 × 77	22	380	190	70	M8	5.65	7.80
525	25	3 × 92.2	27.5	380	190	70	M8	5.95	8.10
525	30	3 × 115.5	33	380	190	70	M8	6.25	12.20
525	40	3 × 154	44	380	380	140	M12	8.30	13.20
525	50	3 × 192.5	55	380	380	140	M12	9.65	13.80

f_n = 60 Hz

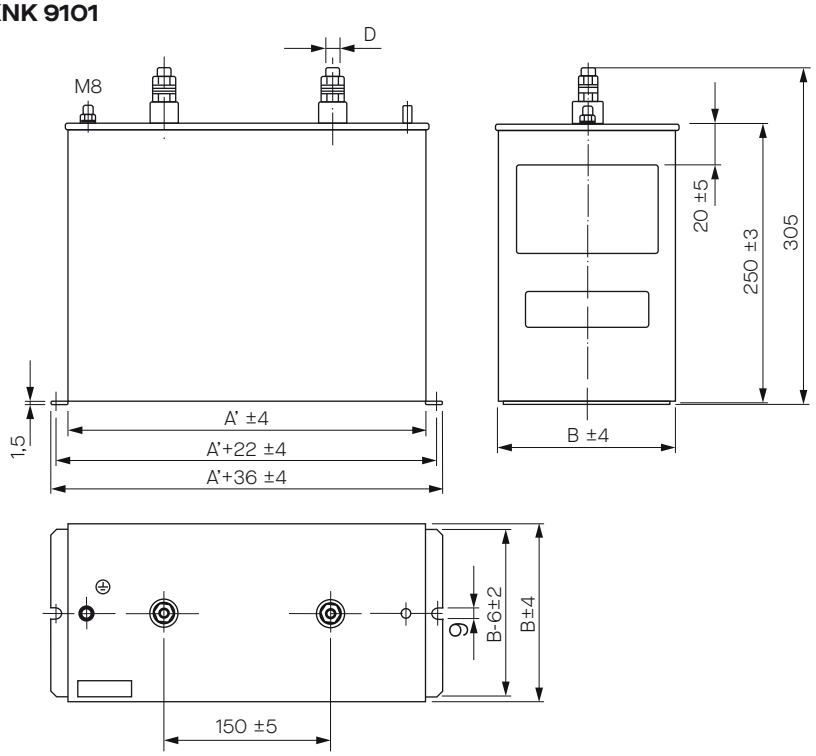
U_n (V)	Q_n (kVar)	C_n (µF)	I_n (A)	A (mm)	A' (mm)	B (mm)	D	Weight (kg) KNK9103	Weight (kg) KNK9143
220	5	3 × 91.3	13.13	190	190	70	M8	3.65	6.40
220	10	3 × 182.6	26.27	380	190	70	M8	5.95	7.30
220	15	3 × 273.9	39.41	380	190	70	M8	6.25	7.75
220	20	3 × 365.2	52.54	380	380	140	M12	8.30	12.10
220	25	3 × 456.5	65.68	380	380	140	M12	9.65	13.10
220	30	3 × 547.8	78.82	380	380	140	M12	10.25	13.70
420	5	3 × 25	6.88	190	190	70	M8	2.95	6.10
420	10	3 × 50.1	13.7	190	190	70	M8	3.25	6.20
420	15	3 × 75.2	20.64	190	190	70	M8	3.65	6.40
420	20	3 × 100.2	27.5	380	190	70	M8	5.65	7.25
420	25	3 × 125.3	34.4	380	190	70	M8	5.95	7.70
420	30	3 × 150.4	41.28	380	190	70	M8	6.25	8.00
420	50	3 × 250.6	68.8	380	380	140	M12	9.65	13.10
420	60	3 × 300.8	82.57	380	380	140	M12	10.25	13.70
440	5	3 × 22.8	6.5	190	190	70	M8	2.95	6.10
440	10	3 × 45.7	13.1	190	190	70	M8	3.25	6.20
440	15	3 × 68.5	19.6	190	190	70	M8	3.65	6.40
440	20	3 × 91.3	26	380	190	70	M8	5.65	7.25
440	25	3 × 114.2	32.8	380	190	70	M8	5.95	7.70
440	30	3 × 137	39.4	380	190	70	M8	6.25	8.00
440	50	3 × 228.4	65.6	380	380	140	M12	9.65	13.10
440	60	3 × 274	78.7	380	380	140	M12	10.25	13.70
480	5	3 × 19.2	6	190	190	70	M8	2.95	6.10
480	10	3 × 38.4	12	190	190	70	M8	3.25	6.20
480	15	3 × 57.6	18	190	190	70	M8	3.65	6.40
480	20	3 × 76.8	24.1	380	190	70	M8	5.65	7.25
480	25	3 × 99	30.1	380	190	70	M8	5.95	7.70
480	30	3 × 115.1	36.1	380	190	70	M8	6.25	8.00
480	40	3 × 153.5	48.1	380	380	140	M12	8.30	13.20
480	50	3 × 192	60.1	380	380	140	M12	9.65	13.50
480	60	3 × 230.3	72.2	380	380	140	M12	10.25	13.80

230 ... 525 V 5 ... 60 kVar

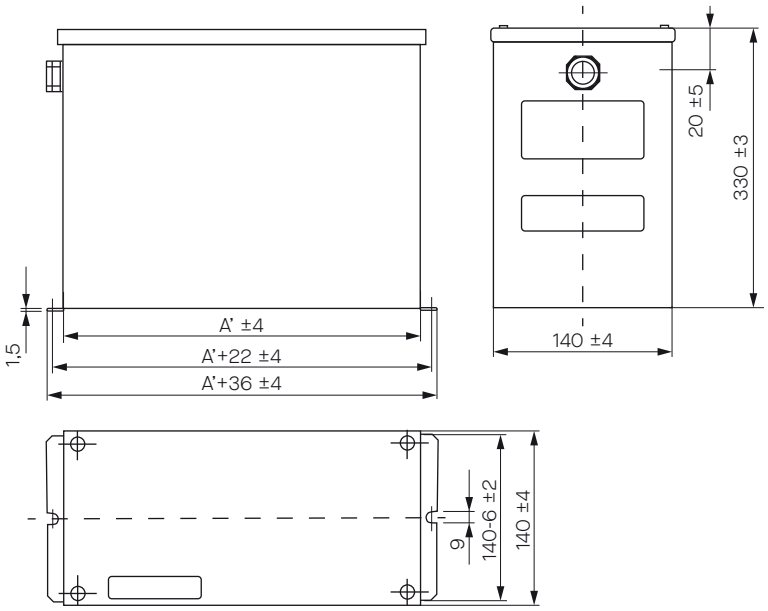
KNK 9101 Cap (Type KNK9151)



KNK 9101



KNK 9141



fn = 50 Hz

U_n (V)	Q_n (kVar)	C_n (µF)	I_n (A)	A (mm)	A' (mm)	B (mm)	D	Weight (kg) KNK9101	Weight (kg) KNK9141
230	5	300.9	21.7	190	190	70	M8	3.60	6.40
230	7.5	450.6	32.6	380	190	70	M8	5.30	7.25
230	10	602.1	43.4	380	190	70	M8	5.60	7.70
230	12.5	725.1	54.3	380	190	70	M8	5.90	8.00
230	15	903	65.2	380	380	140	M12	8.25	12.10
230	20	1203.6	86.9	380	380	140	M12	9.60	13.10
230	25	1504.4	108.6	380	380	140	M12	10.20	13.70
400	5	99.5	12.5	190	190	70	M8	2.90	5.90
400	7.5	149.1	18.7	190	190	70	M8	3.00	6.00
400	10	198.8	25	190	190	70	M8	3.20	6.10
400	12.5	248.5	31.2	190	190	70	M8	3.25	6.20
400	15	298.2	37.5	190	190	70	M8	3.60	6.40
400	20	397.6	50	380	190	70	M8	5.60	7.25
400	25	497	62.5	380	190	70	M8	5.90	7.70
400	30	596.4	75	380	190	70	M8	6.25	8.00
400	40	795.2	100	380	380	140	M12	8.25	12.10
400	50	994	125	380	380	140	M12	9.60	13.10
440	5	82.2	11.4	190	190	70	M8	2.90	5.30
440	7.5	123.3	17.1	190	190	70	M8	3.00	6.00
440	10	164.4	22.7	190	190	70	M8	3.20	6.10
440	12.5	205.5	28.4	190	190	70	M8	3.25	6.20
440	15	246.6	34.1	190	190	70	M8	3.60	6.40
440	20	328.8	45.5	380	190	70	M8	5.00	6.00
440	25	411	56.8	380	190	70	M8	5.90	7.70
440	30	493.2	68.2	380	190	70	M8	6.25	8.00
440	40	657.7	90.9	380	380	140	M12	8.25	12.10
440	50	822.1	113.6	380	380	140	M12	9.60	13.10
440	60	986.5	136.4	380	380	140	M12	10.20	13.70
480	5	69.1	10.4	190	190	70	M8	2.90	5.30
480	7.5	103.6	15.6	190	190	70	M8	3.00	6.00
480	10	138.1	20.8	190	190	70	M8	3.20	6.10
480	12.5	172.7	26	190	190	70	M8	3.25	6.20
480	15	207.2	31.2	190	190	70	M8	3.60	6.40
480	20	276.3	41.6	380	190	70	M8	5.00	6.00
480	25	354.4	52.1	380	190	70	M8	5.90	7.70
480	30	414.5	62.5	380	190	70	M8	6.25	8.00
480	40	552.6	83.3	380	190	140	M12	8.25	12.10
480	50	690.8	104.1	380	190	140	M12	9.60	13.10
480	60	830	125	380	380	140	M12	10.20	13.70
525	5	57.7	9.5	190	190	70	M8	2.90	5.30
525	7.5	86.6	14.3	190	190	70	M8	3.00	6.00
525	10	115.5	19	190	190	70	M8	3.20	6.10
525	12.5	144.4	23	190	190	70	M8	3.25	6.20
525	15	173.2	28.6	190	190	70	M8	3.60	6.40
525	20	231	38.1	380	190	70	M8	5.00	6.00
525	25	288.7	47.6	380	190	70	M8	5.90	7.70
525	30	346.5	57.5	380	190	70	M8	6.25	8.00
525	40	462	72.2	380	190	140	M12	8.25	12.10
525	50	577.4	95.2	380	380	140	M12	9.60	13.10
525	50	692.9	114.3	380	380	140	M12	10.20	13.70

CAPACITOR DUTY CONTACTORS
Type KC

Features

- Conforms to utilization category AC-6B
- Standard control voltages:
  - 24 V 50/60 Hz
  - 220 V 50/60 Hz
  - 230 V 50/60 Hz
  - 415 V 50/60 Hz
- Saves costs of expensive replacement
- Long electrical life
- High safety
- Reduces watt losses during "ON" condition, saves energy
- No risk of dangerous voltage
- Switching of capacitor bank in parallel without de-rating
- Less maintenance and downtime
- Approvals: UL, CSA (UL not available for KC75 - KC100), EAC

C US * C22.2 No. 190 PROTECTED, 10 000 AI-C

* selected models only

Technical data

Type	Rating at 50/60 Hz (kVar)	Current carrying capacity							Power dissipation per pole	Mechanical life		Electrical life
		220 - 240 V		400 - 440 V		kVar / Current rating as per UL (kVar/A)				50 or 60 Hz	50/60 Hz	
	≤ 50 °C *	kVar	Current at 230 V (A)	kVar	Current at 400 V (A)	240 V	480 V	600 V	W	Million		Operations
KC12-11	12.5	6.7	17.6	12.5	18.1	6 / 15	12.5 / 15	15 / 15	0.36	17	15	200.000
KC16-11	16.7	8.5	22.3	16.7	24.1	8 / 20	16.7 / 20	20 / 20	0.8	20	15	200.000
KC20-11	20	10	26.2	20	28.9	10 / 24	20 / 24	25 / 24	1.25	16	12	100.000
KC25-11	25	15	39.4	25	36.1	12.5 / 30	25 / 30	30 / 30	2	16	12	100.000
KC33-12	33.3	20	52.5	33.3	48.1	16.5 / 40	33.3 / 40	40 / 40	4.2	16	6	100.000
KC40-12	40	25	65.6	40	57.7	20 / 48	40 / 48	50 / 48	4.2	16	6	100.000
KC50-12	50	27	70.9	50	72.3	25 / 60	50 / 60	60 / 608	4.8	16	6	100.000
KC60-12	60	40	104.9	60	86.6	30 / 72	60 / 72	80 / 77	5.1	10	4	100.000
KC75-12	75	45	118	75	108.3	UL certification not available			7.2	8 (50 Hz only)	4	100.000
KC100-12	100	60	157.9	100	143.3				13.5		NA	100.000

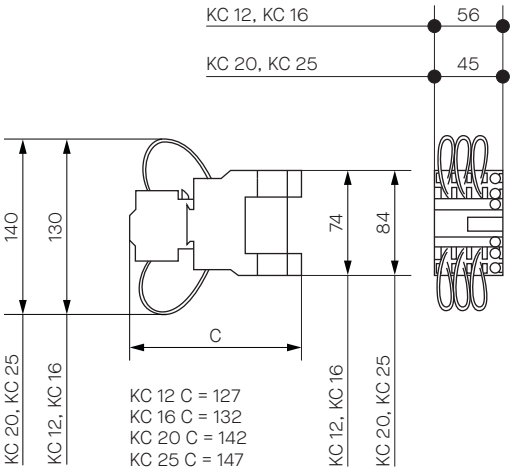
Technical data

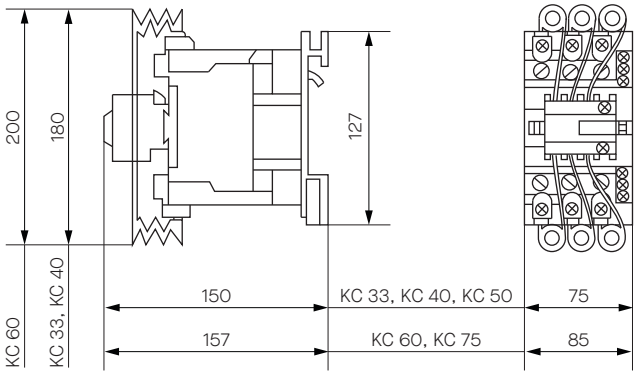
Type	Rating at 50/60 Hz (kVar)	Upper Block		Wire details						Electrical life		
	≤ 55 °C *	Time lag between make contacts of aux. block and contactor	Holding time of main contacts of aux. block	Cross-sectional area	Length	Material	Lugs at contractor end	Lugs at aux. block end	Tightening Torque	50 Hz	60 Hz	50 / 60 Hz
		ms	ms	mm²	mm				Nm	VA	VA	VA
KC12-11	12.5	2 - 10	5 - 12	0.292	174	PTFE coated resis-tance wire	Ring Type Lug	Pin Type Lug	1.2	7	7.5	8
KC16-11	16.7	2 - 10	5 - 12	0.292	174				1.7	7	7.5	8
KC20-11	20	2 - 10	5 - 12	0.292	174				1.85	7.5	7.5	8.5
KC25-11	25	2 - 10	5 - 12	0.292	174				2.5	7.5	7.5	8.5
KC33-12	33.3	2 - 10	5 - 12	0.196	245				5	20	22	26
KC40-12	40	2 - 10	5 - 12	0.196	245				5	20	22	26
KC50-12	50	2 - 10	5 - 12	0.196	245				5	20	22	26
KC60-12	60	2 - 10	5 - 12	0.196	245				9	20	22	26
KC75-12	75	2 - 10	5 - 12	0.196	245		Pin type lug with connector		9	20	22	26
KC100-12	100	2 - 10	5 - 12	0.196	245				11.3	28	NA	NA

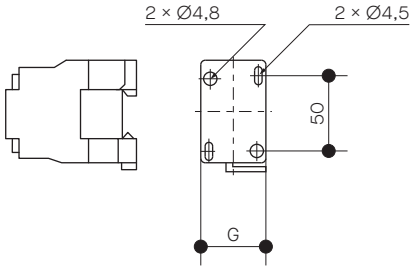
Note

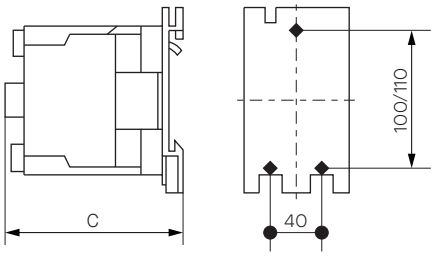
KC12 to KC25 clip-on mounting on 35 mm wide rail
KC33 to KC100 clip-on mounting on 75 mm wide rail

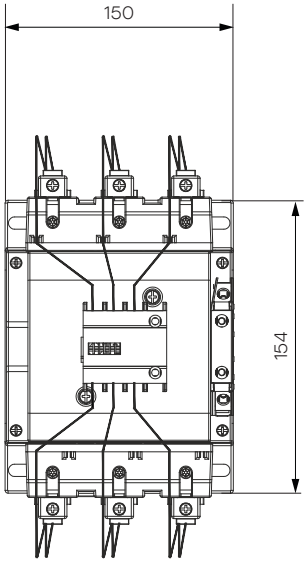
* Average ambient temperature should not exceed 45 °C within the 24-hour period in acc. with IEC 60 070 and IEC 60 831.

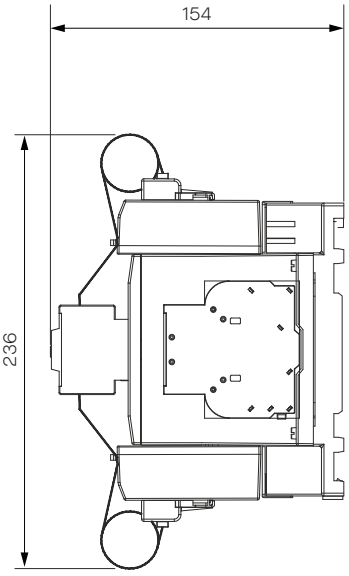

KC 12, KC 16
56
KC 20, KC 25
45
140
130
74
84
C
KC 20, KC 25
KC 12, KC 16
KC 12 C = 127
KC 16 C = 132
KC 20 C = 142
KC 25 C = 147
KC 12, KC 16
KC 20, KC 25

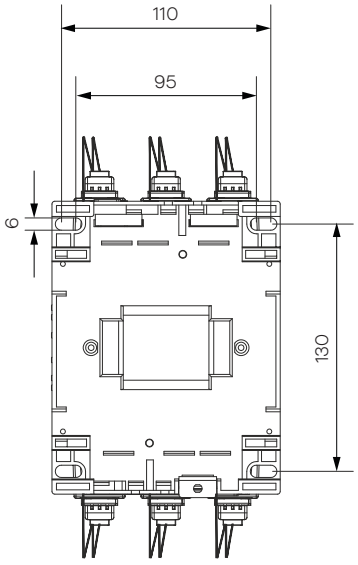

200
180
127
KC 60
KC 33, KC 40
150
157
KC 33, KC 40, KC 50
KC 60, KC 75
75
85


2 × Ø4,8
2 × Ø4,5
50
G

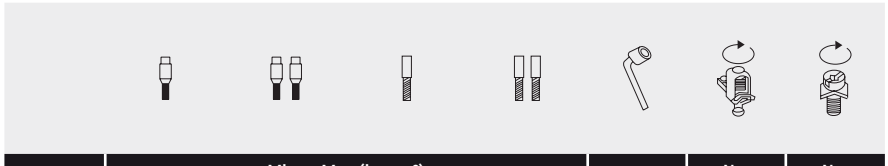

C
100/110
40


150
154

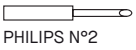

154
236


110
95
6
130

KC 100



	Min ... Max (in mm²)				mm	Nm	Nm
KC12	1 ... 4	1 ... 2.5	1 ... 4	1 ... 4			1.2
KC16	1 ... 6	1 ... 4	1.5 ... 6	1.5 ... 6			1.7
KC20	1 ... 6	1 ... 4	1.5 ... 10	1.5 ... 6			1.85
KC25	1 ... 10	1.5 ... 6	1.5 ... 10	2.5 ... 10			2.5
KC33	2.5 ... 25	2.5 ... 10	2.5 ... 25	2.5 ... 16		5	
KC40	2.5 ... 25	2.5 ... 10	2.5 ... 25	2.5 ... 16		5	
KC50	2.5 ... 25	2.5 ... 10	2.5 ... 25	2.5 ... 16		5	
KC60	4 ... 50	4 ... 16	4 ... 50	4 ... 25	10	9	
KC75	4 ... 50	4 ... 16	4 ... 50	4 ... 25	10	9	
KC100	10 ... 95	10 ... 95	10 ... 95	10 ... 95	13	11.3	



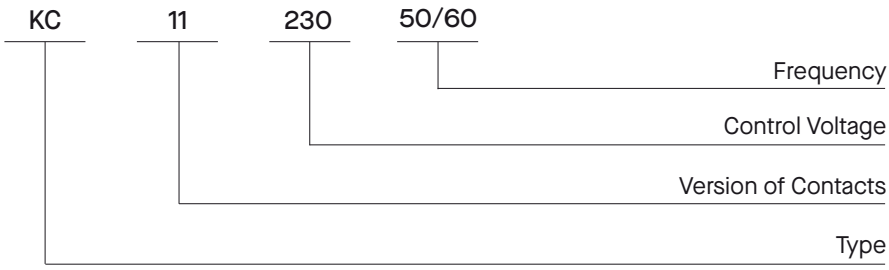
PHILIPS N°2

Ø6 ... Ø8

AWG 16 = 1,31 mm²
AWG 14 = 2,08 mm²
AWG 12 = 3,31 mm²
AWG 10 = 5,26 mm²
AWG 8 = 8,37 mm²
AWG 5 = 13,3 mm²
AWG 4 = 21,15 mm²
AWG 3 = 26,31 mm²
AWG 2 = 33,62 mm²
AWG 1 = 42,41 mm²
AWG 1/0 = 53,49 mm²

Ordering data

Type designation data and control voltage are stated when ordering the contactors.



POWER FACTOR REGULATORS
Type iPFC max

Overview

iPFC max is a device that measures the mains's cosine parameters and controls capacitor connection and disconnection to correct it. The device also measures and displays every other basic parameter of a mains.

There are 2 versions of the device, depending on the number of output relays:

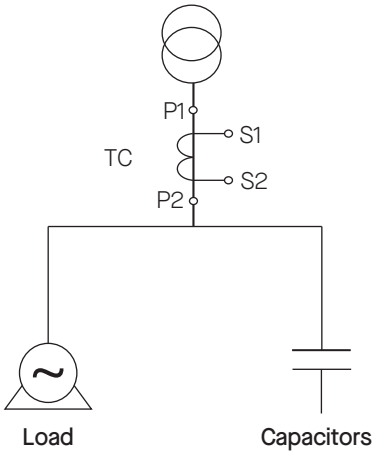
- **iPFC max 6** with six output relays
- **iPFC max 12** with twelve output relays

Technical data

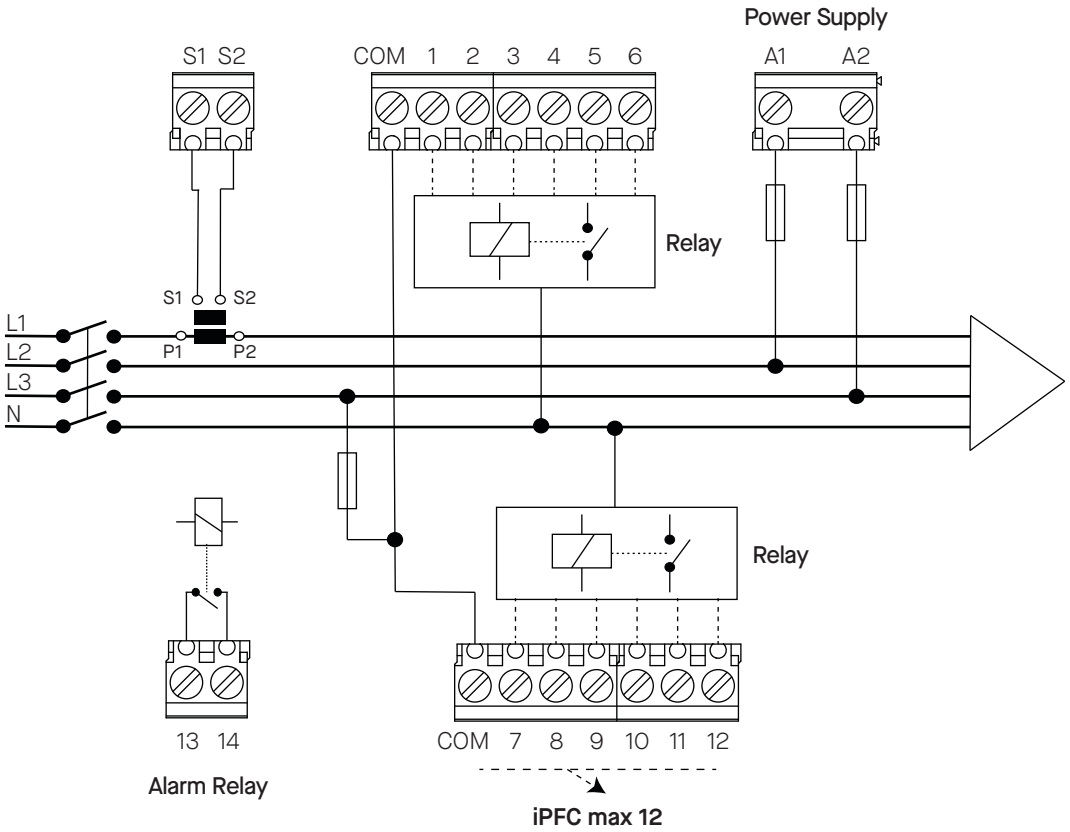
AC Power supply			
Connection	Connect preferably to phases L2-L3		
Rated voltage [1]	230 V ~ ± 10 % , 400 V ~ ± 10 %		
Frequency	50 ... 60 Hz		
Consumption	230 V~ 4.7 VA		
	400 V~ 13 VA		
Installation category	CAT III 300 V		
Voltage measurement circuit			
Connection	Connect preferably to phases L2-L3		
Rated voltage (U_n)	230 V~, 400 V~		
Voltage measurement margin	- 10 % ... +10 %		
Frequency measurement margin	50 ... 60 Hz		
Installation category	CAT III 300 V		
Connection	Connect preferably to phase L1		
Rated current (I_n)	... / 5 A		
Current measurement margin	0.05 ... 5 A (Maximum overload + 20 %)		
Installation category	CAT III 300 V		
Voltage measurement	1%		
Current measurement	1%		
Cos φ measurement	2% ± 1 digit		
Quantity	6 + 1 (Alarm) 1	2 + 1 (Alarm)	
Max. switching voltage	250 V~		
Max. current	1 A~		
Maximum switching power	250 W		
Electrical life (maximum load)	1×10^5 cycles		
Mechanical life	1×10^7 cycles		
Radio	NZIF receiver with -97 dBm sensitivity		
	Class-1, Class-2 and Class-3 transmitter		
	Adaptive Frequency Hopping (AFH)		
Display	4 digits		
Keyboard	3 keys		
Operating temperature	- 20 °C ... + 60 °C		
Storage temperature	- 20 °C ... + 70 °C		
Relative humidity (non-condensing)	5 ... 95 %		
Maximum altitude	2000 m		
Protection degree IP	IP30		
	Front panel: IP40		
Protection degree IK	IK08		
Pollution degree	2		
Use	Interior / Indoor		
Safety category Clase II / Class II	Class II ⧈		
Terminals			
S1, S2, COM, 1 ... 14, A1, A2	≥ 1.5 mm²	0.5 Nm	flat
Dimensions	144 × 144 × 54.85 mm		
Weight	iPFC max 6	230 V~	555 g
		400 V~	447 g
	iPFC max 12	230 V~	608 g
		400 V~	500 g
Enclosure	Self-extinguishing V0 plastic		
Attachment	Panel		

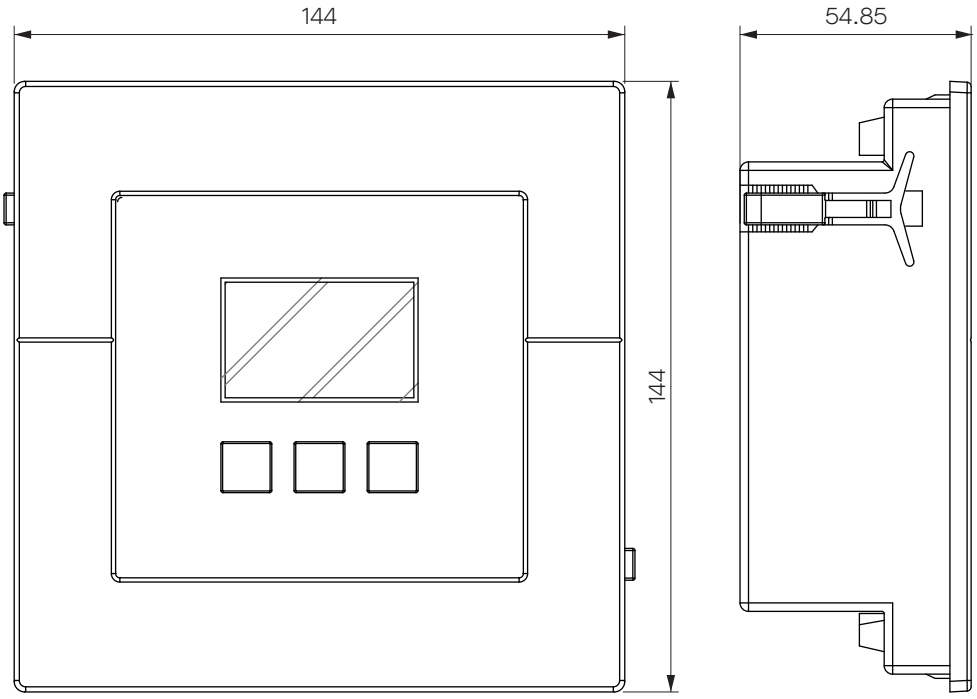
[1] Depending on model

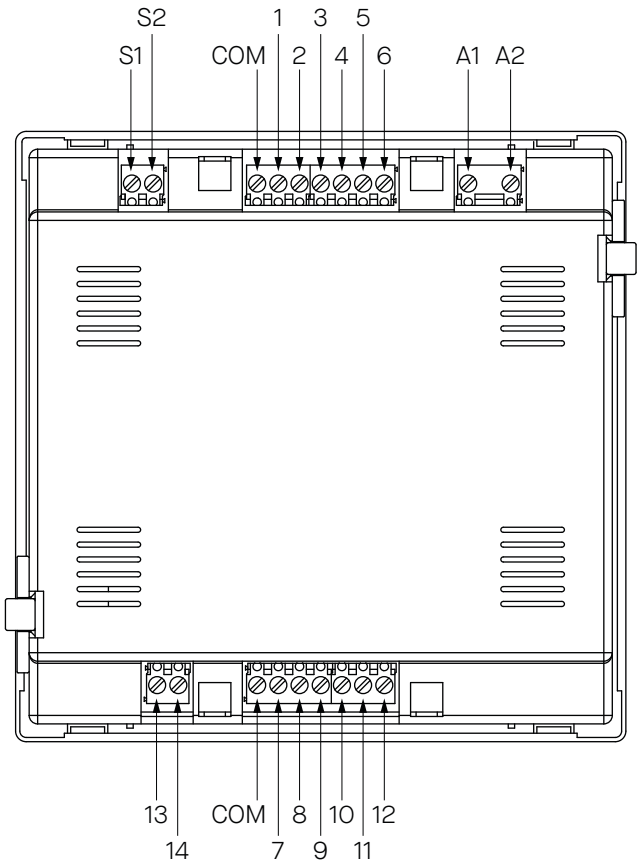
Current Transformer connection (CT)



Connections







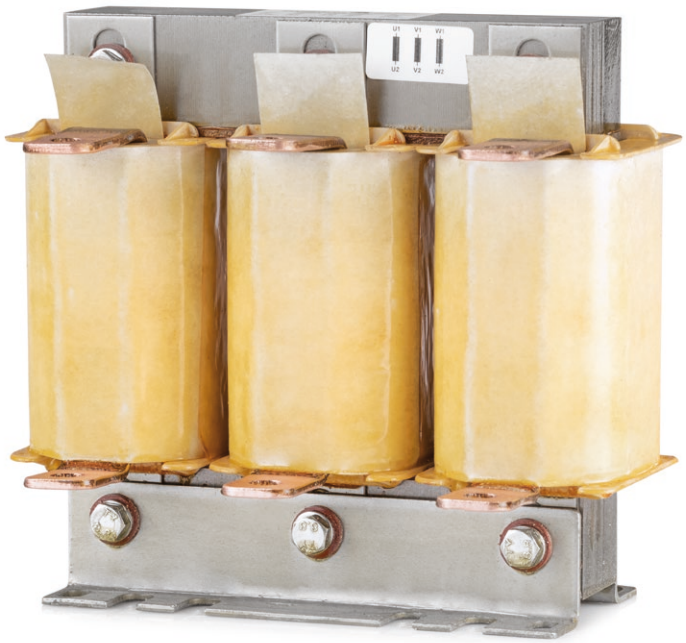
Terminal connections designations	
A1	~, Power supply
A2	~, Power supply
S1	Current input
S2	Current input
COM	Common of relays 1 ... 12
1	Relay output 1
2	Relay output 2
3	Relay output 3
4	Relay output 4
5	Relay output 5
6	Relay output 6
7	iPFC max 12: Relay output 7
8	iPFC max 12: Relay output 8
9	iPFC max 12: Relay output 9
10	iPFC max 12: Relay output 10
11	iPFC max 12: Relay output 11
12	iPFC max 12: Relay output 12
13	Alarm relay (C)
14	Alarm relay (NO)

Note: device images are for illustrative purposes only and may differ from the actual device.

HARMONIC FILTER REACTORS
Type 3UI

Overview

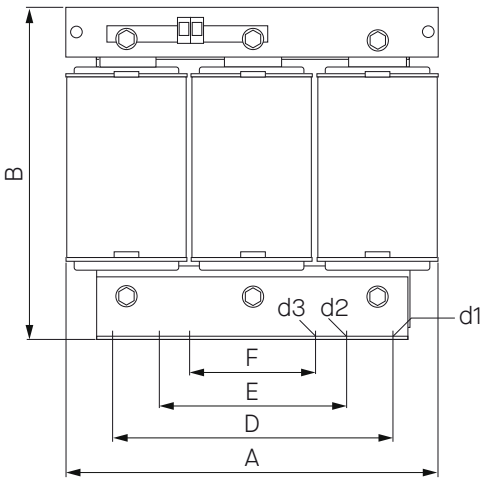
Since it is impossible to predict conditions prevailing in the network where the reactor will do its job, all reactors have to be designed for a defined worst-case scenario, meeting all tolerances laid down by the **international standard IEC 60076**. In the absence of an appropriate standard relating to network quality, this worst-case scenario had to be agreed between leading power factor capacitor suppliers.

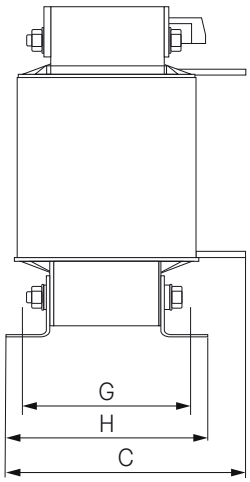


Design parameters of proven reliability	
Tolerance for inductance fundamental current I_1	-2 % ... + 3 % of L_n
Assumed harmonic voltage distortion	1.06 × I_{cn} or 1.10 x I_{cn} (for 6 % or 10 % overvoltage respectively)
Thermal current I_{th}	UH3 = 0,5 %; UH5 = UH7 = 5,0 %; based on U_n
Limit of core linearity I_{lin}	1.05 × I_{rms} (relative to worst-case tolerances and capacitor aging) 1.20 × I1 ... 7 (relative to switching procedures at full harmonic load)
Assumed ambient temperature	40 °C

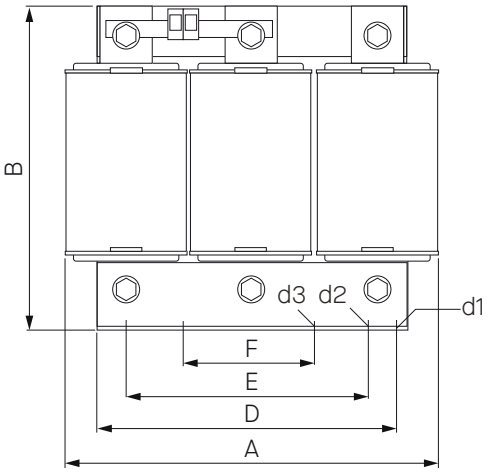
Against a background of deteriorating network quality, standards have now been launched, making corresponding adjustments to the 3UI reactors design for low voltage reactors necessary as follows:

Design parameters remain unchanged for medium-voltage reactors	
Design	Three-phase, Iron-core, Polygap® core construction
Enclosure	IP00 for indoor use
Cooling	Air cooled, AN
Lay-out	Acc. to IEC 76 and 289
Tolerances of the inductances	-2 % ... + 3 % of L_n
Fundamental current	1,06 I_{cn}
Harmonic load	Standard values (VH3 = 0.5 %, VH5 = 5.0 %, VH7 = 5.0 % based on U_n)
Limit of Linearity	$L(I_{lin})^3$ 0.95 L_n
Insulation level	LI / AC -- / 3.0 kV acc. to IEC 76-3
Impregnation	Completed unit impregnated under vacuum and over-pressure in impregnation, resin acc. to temperature class H
Windings	Copper wire or aluminium band with copper bar terminals
Temperature sensor	Temperature switch normally closed (TNC_{180}) positioned in middle coil
Earthing	One fixation hole is simultaneous earthing

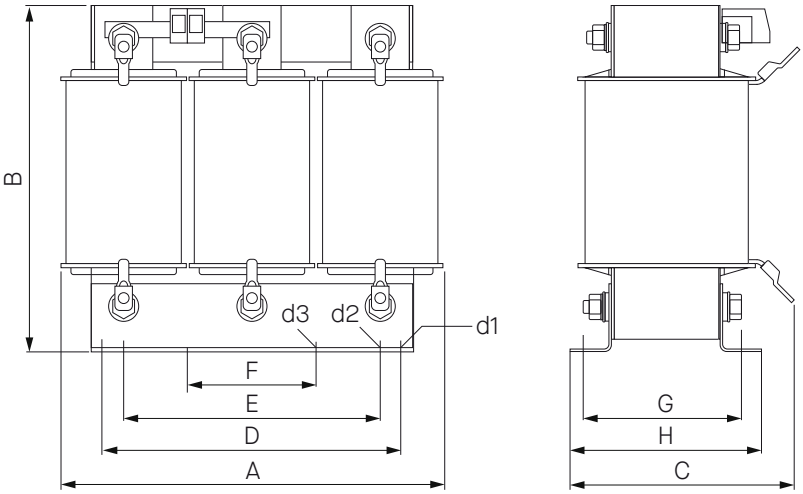




	A	B	C	D	E	F	G	H	d1	d2	d3
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
3UI150/90V	300	235	180	224	150	100	134	162	10	11	11



	A	B	C	D	E	F	G	H	d1	d2	d3
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
3UI114/62V	230	160	135	176	150	76	95	114	7	11	11
3UI114/62	230	205	135	176	150	76	95	114	7	11	11
3UI120/75	240	210	155	185	150	80	107	127	9	11	11
3UI132/72V	260	185	150	200	150	88	102	132	10	11	11
3UI132/72	260	240	150	200	150	88	102	132	10	11	11
3UI150/75V	300	235	165	224	150	100	119	147	10	11	11



	A	B	C	D	E	F	G	H	d1	d2	d3
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
3UI60/30	120	110	80	90	-	-	49	64	4.8	-	-
3UI75/25	150	135	90	113	-	50	50	64	6	-	6
3UI75/40	150	135	105	113	-	50	65	84	6	-	6
3UI90/30	180	160	100	136	100	60	57	76	7	9	9
3UI90/50	180	160	120	136	100	60	77	96	7	9	9

Note: preliminary drawings and approximate dimensions.

Harmonic Filter Reactors 400 V

Item	ph	Type of core	U_n (V)	f_n (Hz)	p (%)	N_c (kVar)	L_n (mH)	I_{rms} (A)	I_{lin} (A)	N_v (I_{rms}) (A)
1	3	3UI60/30	400	50	5.67 (210 Hz)	1.5	3 × 20.409	2.6	4	30
2	3	3UI75/25	400	50	5.67 (210 Hz)	2.5	3 × 12.245	4.4	7	30
3	3	3UI75/40	400	50	5.67 (210 Hz)	5	3 × 6.123	8.8	15	50
4	3	3UI90/50	400	50	5.67 (210 Hz)	7.5	3 × 4.082	13.2	23	70
5	3	3UI114/62V	400	50	5.67 (210 Hz)	10	3 × 3.061	17.5	31	90
6	3	3UI114/62V	400	50	5.67 (210 Hz)	12.5	3 × 2.449	21.9	39	110
7	3	3UI114/62V	400	50	5.67 (210 Hz)	15	3 × 2.041	26.3	47	130
8	3	3UI114/62	400	50	5.67 (210 Hz)	20	3 × 1.531	35.1	63	150
9	3	3UI114/62	400	50	5.67 (210 Hz)	25	3 × 1.225	43.9	79	180
10	3	3UI132/72V	400	50	5.67 (210 Hz)	30	3 × 1.020	52.6	95	190
11	3	3UI132/72	400	50	5.67 (210 Hz)	40	3 × 0.765	70.2	127	260
12	3	3UI132/72	400	50	5.67 (210 Hz)	50	3 × 0.612	87.7	159	280
13	3	3UI60/30	400	50	7 (189 Hz)	1.5	3 × 25.556	2.4	4	20
14	3	3UI75/25	400	50	7 (189 Hz)	2.5	3 × 15.334	4	6	30
15	3	3UI75/40	400	50	7 (189 Hz)	5	3 × 7.667	8	13	50
16	3	3UI90/30	400	50	7 (189 Hz)	7.5	3 × 5.111	12.1	20	70
17	3	3UI90/50	400	50	7 (189 Hz)	10	3 × 3.833	16.1	26	70
18	3	3UI114/62V	400	50	7 (189 Hz)	12.5	3 × 3.067	20.1	33	80
19	3	3UI114/62V	400	50	7 (189 Hz)	15	3 × 2.556	24.1	40	90
20	3	3UI114/62	400	50	7 (189 Hz)	20	3 × 1.917	32.1	53	140
21	3	3UI114/62	400	50	7 (189 Hz)	25	3 × 1.533	40.2	66	170
22	3	3UI114/62	400	50	7 (189 Hz)	30	3 × 1.278	48.2	80	190
23	3	3UI120/75	400	50	7 (189 Hz)	40	3 × 0.958	64.3	106	220
24	3	3UI132/72	400	50	7 (189 Hz)	50	3 × 0.767	80.3	133	240
25	3	3UI75/25	400	50	14 (134 Hz)	1.5	3 × 55.272	2.3	3	30
26	3	3UI75/40	400	50	14 (134 Hz)	2.5	3 × 33.163	3.8	5	40
27	3	3UI90/30	400	50	14 (134 Hz)	5	3 × 16.582	7.7	10	80
28	3	3UI90/50	400	50	14 (134 Hz)	7.5	3 × 11.054	11.5	16	80
29	3	3UI132/72V	400	50	14 (134 Hz)	10	3 × 8.291	15.4	21	80
30	3	3UI132/72V	400	50	14 (134 Hz)	12.5	3 × 6.633	19.2	27	90
31	3	3UI132/72V	400	50	14 (134 Hz)	15	3 × 5.527	23.1	32	110
32	3	3UI132/72V	400	50	14 (134 Hz)	20	3 × 4.145	30.8	43	150
33	3	3UI132/72	400	50	14 (134 Hz)	25	3 × 3.316	38.5	53	190
34	3	3UI150/75V	400	50	14 (134 Hz)	30	3 × 2.764	46.2	64	210
35	3	3UI150/90V	400	50	14 (134 Hz)	40	3 × 2.073	61.5	86	270
36	3	3UI150/90V	400	50	14 (134 Hz)	50	3 × 1.658	76.9	107	290

ACTIVE HARMONIC FILTERS
IAF-Multi

Key features

- Supports three-wire (3W) and four-wire (4W) installations
- Filtering capacity up to 225 A for each cabinet
- 3 level inverter structure
- DSP + FPGA controller
- High efficiency – low energy consumption
- Dynamic reaction time of 25 µs
- Instantaneous reactive power compensation
- Both inductive and capacitive solutions
- Selective harmonic filtering up to 51st harmonic with each harmonic individually selectable
- Four-wire system eliminates neutral currents
- Balances unbalanced loads
- Open/Closed Loop
- Resonance Protection
- Hot swap supported on rack-modules

50 A and 75 A active filter module

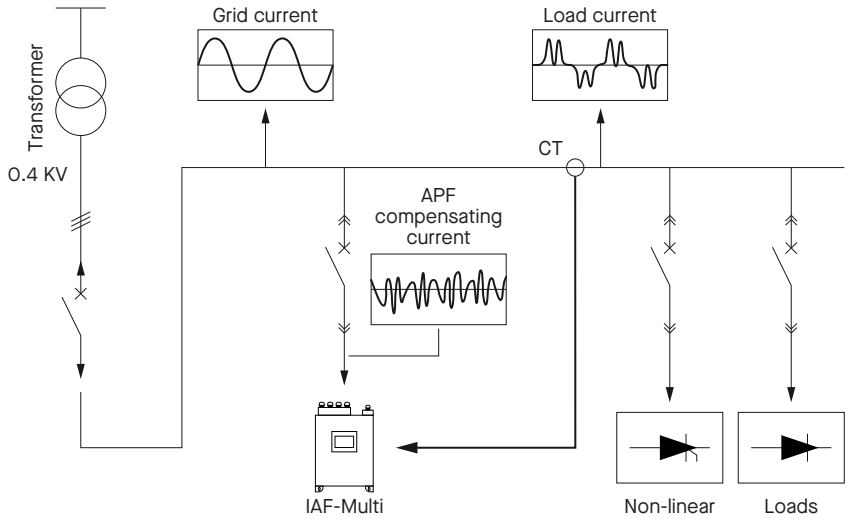
100 A active filter module

Iskra Active Harmonic Filters offer a complete solution for industrial and commercial facilities having power quality problems.

Iskra IAF-Multi series active harmonic filters are distinguished from the most of the active filter available in the market, by being equipped with resonance detection functionality. Most of active harmonic filters in the market has limited harmonic filtering performance when operated with load balancing and reactive power compensation.

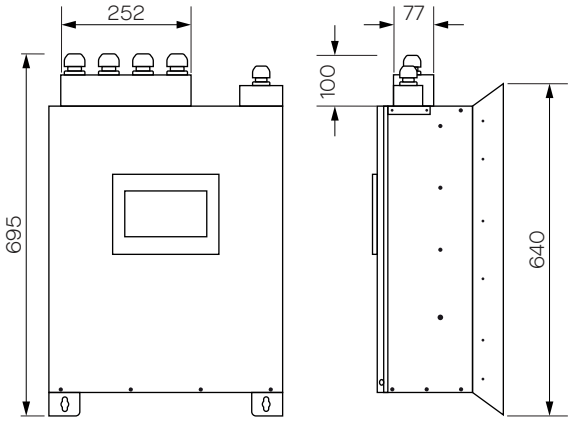
Principle of operation

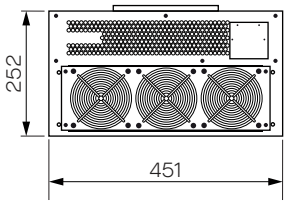
It is safe to operate the ISKRA IAF-Multi Series Active Harmonic Filters at a closed or open loop under the following wiring scheme and load distribution.

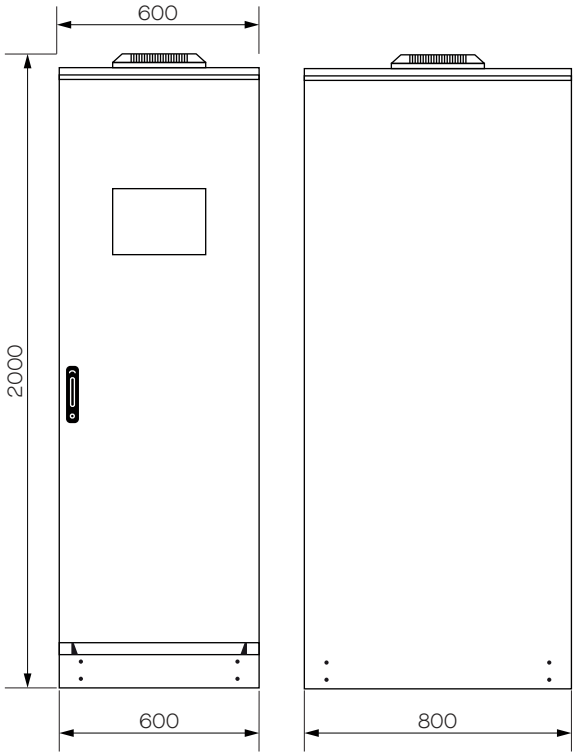


Technical data

Type	IAF-3W-050-400 / IAF-4W-050-400	IAF-3W-100-400 / IAF-4W-100-400
Wiring	3 W or 4 W	
Current rating	Phase: 50 A Neutral: 150 A (3P4W)	Phase: 100 A Neutral: 300 A (3P4W)
Peak current rating	2 × Line Current Capacity	
Voltage	3P3W: 200 V - 480 V (± % 10)	
	3P4W: 200 V - 415 V (± % 10)	
Topology	Three-Level NPC	
Frequency	50 / 60 Hz ± 3 Hz	
Switching frequency	20 kHz	
Reaction time	25 µs	
Harmonic filtering	Up to 51st harmonic, each one individually selectable	
Resonance protection	Yes	
Power factor correction	0 ~ 100 % inductive and capacitive	
Mechanical dimensions	447 × 60 6x 249 mm	600 × 2000 × 800 mm
Current transformer	Open-loop and closed-loop operation supported. Class 1 or better. Primary: 100 A - 2500 A Secondary: 1 A / 5 A	
Typical losses	≤ 3 % (50 A ≤ 1,05 kW – 100 A ≤ 2,1 kW)	
Enclosure	Wall Mount	Panel Type (> 75 A)
Ambient temperature	-10 / +45 °C	
IP class	IP 20	
Relative humidity	95 %	
Standards	EN 50178, EN 55011, EN 61000-6-2, EN 61000-6-4, EN 61000-3-2, EN 61000-3-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11	







50 A and 75 A active filter module
IAF-MULTI-4W-050-400
IAF-MULTI-4W-075-400

100 A active filter module
IAF-MULTI-4W-100-400

Ordering data

Code	Description		Type
IAF-4W-050-400-WT	50 A - 4	Wired active harmonic filter	wall type
IAF-4W-075-400-WT	75 A - 4	Wired active harmonic filter	wall type
IAF-4W-150-400-WT	150 A - 4	Wired active harmonic filter	wall type
IAF-4W-100-400-PT	100 A - 4	Wired active harmonic filter	panel type
IAF-4W-150-400-PT	150 A - 4	Wired active harmonic filter	panel type
IAF-4W-225-400-PT	225 A - 4	Wired active harmonic filter	panel type
IAF-4W-300-400-PT	300 A - 4	Wired active harmonic filter	panel type
IAF-4W-450-400-PT	450 A - 4	Wired active harmonic filter	panel type
IAF-4W-600-400-PT	600 A - 4	Wired active harmonic filter	panel type
IAF-3W-050-400-WT	50 A - 3	Wired active harmonic filter	wall type
IAF-3W-075-400-WT	75 A - 3	Wired active harmonic filter	wall type
IAF-3W-150-400-WT	150 A - 3	Wired active harmonic filter	wall type
IAF-3W-100-400-PT	100 A - 3	Wired active harmonic filter	panel type
IAF-3W-150-400-PT	150 A - 3	Wired active harmonic filter	panel type
IAF-3W-225-400-PT	225 A - 3	Wired active harmonic filter	panel type
IAF-3W-300-400-PT	300 A - 3	Wired active harmonic filter	panel type
IAF-3W-450-400-PT	450 A - 3	Wired active harmonic filter	panel type
IAF-3W-600-400-PT	600 A - 3	Wired active harmonic filter	panel type

Power Factor Correction Equipment
for Low Voltage

Iskra d.o.o.
Stegne 21, 1000 Ljubljana
Slovenia, EU