

AC FILTER CAPACITORS (3-PHASE DELTA CONNECTION)

TYPE KNI4053

APPLICATIONS

- SWITCHING MODE POWER SUPPLIES (SMPS)
- SOLAR POWER PLANT
- WIND PLANTS
- FREQUENCY INVERTERS
- UNINTERRUPTIBLE POWER SUPPLIES (UPS)

FEATURES

- FOR HARSH ENVIRONMENT
- SELF-HEALING PROPERTIES
- ALUMINIUM CASE; FILLED WITH VEGETABLE OIL, NON-PCB
- OVERPRESSURE DISCONNECTOR SUITABLE FOR PFC AND LCL FILTER
- HIGH RIPPLE CURRENT
- HIGH RELIABILITY
- VERY LOW LOSSES

SPECIFICATIONS

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| • RATED CAPACITANCE | 3x8 μ F UP TO 3x200 μ F |
| • CAPACITANCE TOLERANCE | $\pm 5\%$, $\pm 10\%$ |
| • RATED VOLTAGE (U_{rms}) | 450 VAC - 850 VAC |
| • RATED FREQUENCY | 50/60 Hz |
| • DISSIPATION FACTOR ($\tan \delta_0$) | 2×10^{-4} |
| • INSULATION STRENGTH $C \times R_i$ | > 5000 s |
| • OPERATING TEMPERATURE RANGE | -40 °C to +85 °C |
| • MAX. HOT SPOT TEMPERATURE | +85 °C |
| • STORAGE TEMPERATURE | -40 °C to +85 °C |
| • HUMIDITY CLASS | C |
| • PROTECTION | IP20 |
| • CONTACTS | 2x35 mm ² , M6 (5 Nm), $I_{max} = 80$ A
2x25 mm ² , M5 (3 Nm), $I_{max} = 60$ A
2x16 mm ² , M4 (2 Nm), $I_{max} = 36$ A |
| • DISCHARGE RESISTOR | NO |
| • TEST VOLTAGE (BETWEEN TERMINALS) | 1.5 x U_n , 50 Hz, 10 s |
| • TEST VOLTAGE (TERMINALS TO CASE) | 4000 V, 50 Hz, 2 s |
| • SEALING TEST | 75 °C, 6 h |
| • MOUNTING POSITION | UPWARDS |
| • INTERNAL PROTECTION | OVERPRESSURE DISCONNECTOR (ALL PHASES) |
| • ALTITUDE | UP TO 4000 m |
| • EXPECTED LIFETIME | $\geq 100\,000$ HOURS AT U_{rms} , $\theta_{hs} = 70$ °C |
| • FAILURE RATE | 100 FIT |



REFERENCE STANDARD

- IEC 61071
- OPTIONAL IEC 60831, UL 810



AC FILTER CAPACITORS (3-PHASE DELTA CONNECTION)

TYPE KNI4053

GENERAL CHARACTERISTICS

CAPACITANCE RANGE

$U_{rms} = 450 \text{ V AC}$, $U_N = 640 \text{ V AC}$

C_N (μF)	R_s ($\text{m}\Omega$)	L_s (nH)	I_{max} (A)	\hat{I} (kA)	I_s (kA)	R_{th} (K/W)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)
3x25	3x1.4	110	3x35	0.63	1.89	4.8	165	75	0.8	16
3x38	3x1.2	110	3x60	0.9	2.7	4.2	165	90	1.0	16
3x40	3x0.7	110	3x60	2.7	8.2	4.2	165	90	1.0	16
3x46	3x1.2	110	3x60	1.3	3.9	4.2	165	90	1.0	16
3x58	3x1	110	3x60	1.3	3.9	3.6	210	90	1.3	16
3x77	3x0.9	120	3x60	2	6	3.2	245	90	1.5	16
3x100	3x0.9	120	3x60	2.2	6.6	2.6	210	116	2.2	9
3x135	3x0.8	130	3x60	2.3	6.9	2.2	245	116	2.6	9
3x150	3x0.7	130	3x60	3	9	1.9	245	136	4.1	1
3x200	3x0.6	130	3x60	3.5	10.5	1.9	245	136	4.1	1

CAPACITANCE RANGE

$U_{rms} = 530 \text{ V AC}$, $U_N = 750 \text{ V AC}$

C_N (μF)	R_s ($\text{m}\Omega$)	L_s (nH)	I_{max} (A)	\hat{I} (kA)	I_s (kA)	R_{th} (K/W)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)
3x16	3x1.6	110	3x35	0.8	2.4	4.8	165	75	0.8	16
3x30	3x1.5	120	3x60	1.2	3.6	3.6	210	90	1.3	16
3x35	3x1.4	120	3x60	1.4	4.2	3.6	210	90	1.3	16
3x48	3x1.2	120	3x60	1.5	4.5	3.2	245	90	1.5	16
3x50	3x0.6	130	3x60	1.6	4.8	2.6	210	116	2.2	9
3x83	3x0.8	130	3x60	2	6	2.2	245	116	2.6	9
3x100	3x0.8	130	3x60	2.2	6.6	1.9	245	136	4.1	1

CAPACITANCE RANGE

$U_{rms} = 600 \text{ V AC}$, $U_N = 850 \text{ V AC}$

C_N (μF)	R_s ($\text{m}\Omega$)	L_s (nH)	I_{max} (A)	\hat{I} (kA)	I_s (kA)	R_{th} (K/W)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)
3x19	3x1.0	110	3x60	1.6	4.8	4.2	165	90	1.0	16
3x30	3x0.7	120	3x60	2.1	6.3	3.6	210	90	1.3	16
3x50	3x0.7	120	3x60	2.5	7.5	2.6	210	116	2.2	9
3x86	3x0.6	130	3x60	4.2	12.6	1.9	245	136	4.1	1

CAPACITANCE RANGE

$U_{rms} = 760 \text{ V AC}$, $U_N = 1080 \text{ V AC}$

C_N (μF)	R_s ($\text{m}\Omega$)	L_s (nH)	I_{max} (A)	\hat{I} (kA)	I_s (kA)	R_{th} (K/W)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)
3x11	3x1.2	120	3x50	1.3	3.9	4.2	165	90	1.0	16
3x33.4	3x0.8	120	3x60	2.1	6.3	2.6	210	116	2.2	9
3x55.7	3x0.6	130	3x60	4	12	1.9	245	136	4.1	1

CAPACITANCE RANGE

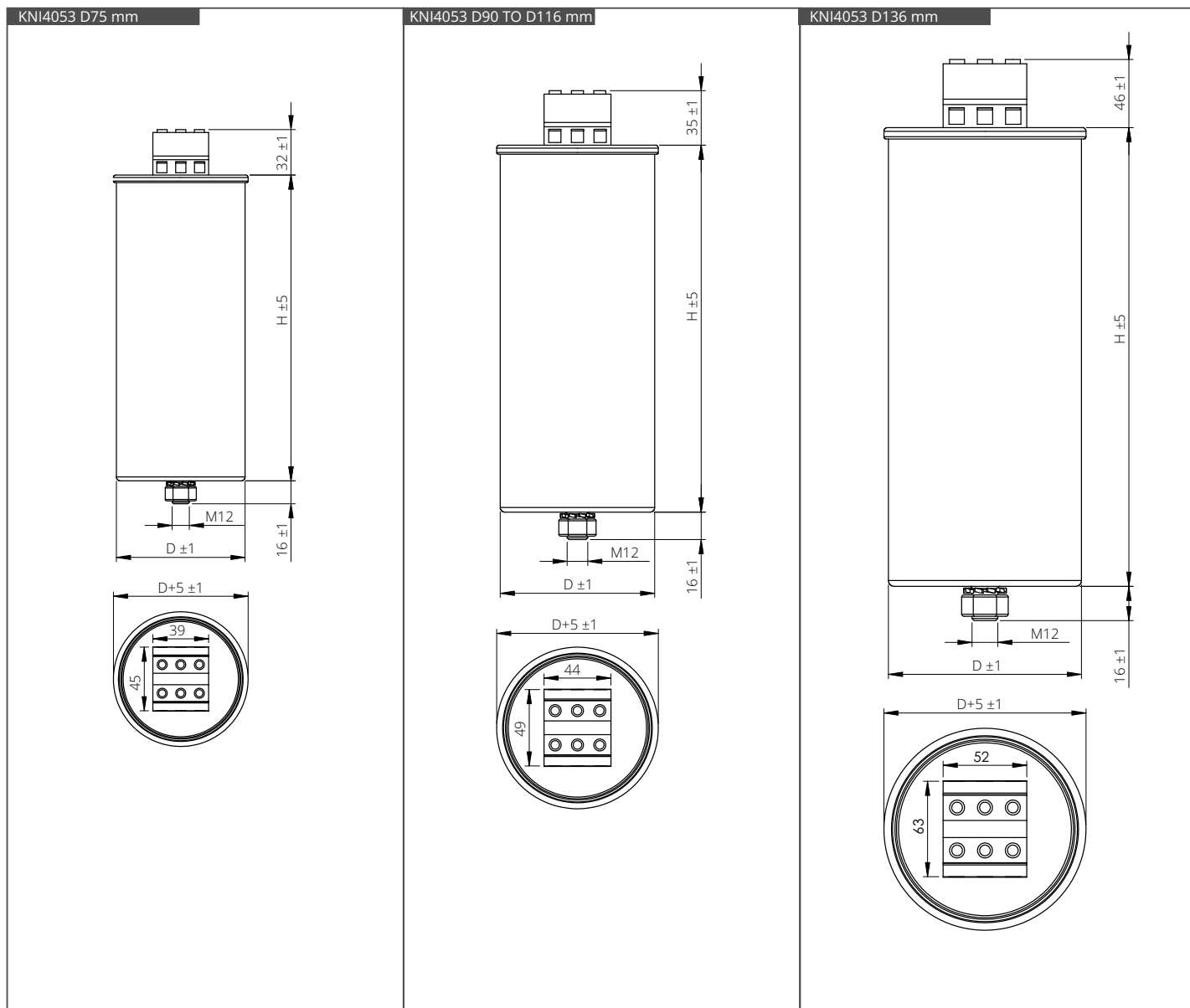
$U_{rms} = 850 \text{ V AC}$, $U_N = 1200 \text{ V AC}$

C_N (μF)	R_s ($\text{m}\Omega$)	L_s (nH)	I_{max} (A)	\hat{I} (kA)	I_s (kA)	R_{th} (K/W)	H (mm)	D (mm)	Weight (kg)	Packing unit (pcs)
3x8	3x1.4	110	3x50	1	3	4.8	165	75	0.8	16
3x12	3x1.2	110	3x60	1.5	4.5	4.2	165	90	1.0	16
3x25	3x0.5	130	3x60	3	9	2.6	210	116	2.2	9
3x50	3x0.6	130	3x60	4.8	14.4	1.9	245	136	4.1	1
3x55.7	3x0.6	130	3x60	4	12	1.9	245	136	4.1	1

AC FILTER CAPACITORS (3-PHASE DELTA CONNECTION)

DIMENSIONS AND CONSTRUCTION

DIMENSIONS



CONSTRUCTION

- **DIELECTRIC:** POLYPROPYLENE FILM
- **CAPACITOR ELECTRODES:** VACUUM-DEPOSITED METAL LAYERS (OVERPRESSURE DISCONNECTOR)
- **CASING:** CYLINDRICAL ALUMINIUM CASE AND COVER
- **FILLING:** BIODEGRADABLE VEGETABLE OIL (NON PCB)
- **TERMINALS:** CONTACT BLOCK (M4, M5, M6)
- **BASE STUD:** M12x16 - MAX: TORQUE 12 Nm

AC FILTER CAPACITORS (3-PHASE DELTA CONNECTION)

CONNECTION AND MOUNTING INSTRUCTIONS

SAFE OPERATION OF THE CAPACITORS CAN BE EXPECTED ONLY IF ALL ELECTRICAL AND THERMAL SPECIFICATIONS AS STATED ON THE LABEL, IN THE DATA SHEETS OR CATALOGUES AND THE FOLLOWING INSTRUCTIONS ARE STRICTLY OBSERVED. THE MANUFACTURER DOES NOT ACCEPT RESPONSIBILITY FOR ANY DAMAGE THAT COULD ARISE DUE TO NON-OBSERVANCE.

CONNECTION

USE THE APPROPRIATE TAB CONNECTORS TO CONNECT THE CABLES OF THE CAPACITORS.

DO NOT SOLDER LEADS TO THE TERMINALS.

DO NOT BEND OR TURN OR MOVE IN ANY OTHER WAY THE CONNECTING TERMINALS AND THE TAB CONNECTORS.

DO NOT USE HEAVY OR SHARP OBJECTS AND TOOLS ON THE BORDERING OR THE CONNECTING TERMINALS.

CONNECTION AT THREADED STUDS SHOULD BE MADE BETWEEN TWO NUTS. DURING THE CONNECTION THE LOWER NUT SHOULD BE BACKED UP TO AVOID ANY TRANSMISSION OF THE TORQUE.

PERMITTED TORQUE FOR SCREW CONNECTIONS:

M4 - 2 Nm

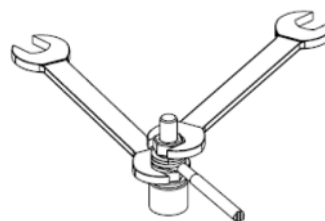
M5 - 3 Nm

M6 - 5 Nm

M8 - 6 Nm

M10 - 10 Nm

WARNING: SAFE CONNECTION



TO PREVENT BREAKING AT TIGHTENING
ALWAYS USE TWO WRENCHES

MOUNTING

CAN BE MOUNTED IN ANY POSITION.

THE CAPACITOR HAS TO BE INSTALLED IN SUCH A WAY AS TO AVOID ANY MECHANICAL DAMAGE AND DENTS IN THE ALUMINIUM.

CAPACITORS WITH OVERPRESSURE SAFETY DEVICE SHOULD BE CONNECTED WITH SUFFICIENTLY FLEXIBLE LEADS IN ORDER TO ENABLE PROPER FUNCTIONING OF THE MECHANISM. ABOVE THE TERMINALS LEAVE ENOUGH SPACE FOR EXPANSION OF THE CAPACITOR CASE.

LEAVE A MINIMUM DISTANCE OF 15 MM OF FREE SPACE ABOVE EACH CAPACITOR.

CONNECT THESE CAPACITORS BY USING ONLY FLEXIBLE CABLES OR ELASTIC COPPER BANDS.

EARTHING

CAPACITORS WITH A METAL CASE MUST BE EARTHED AT THE MOUNTING STUD.

PERMITTED TORQUE FOR STUDS:

M8 - 5 Nm

M12 - 12 Nm

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CAUTIONS AND WARNINGS

CAUTIONS AND WARNINGS



ATTENTION: IN CASE OF DENTS OF MORE THAN 1 MM IN DEPTH OR ANY OTHER MECHANICAL DAMAGE, CAPACITORS MUST NOT BE USED AT ALL. THIS ALSO APPLIES TO CASES OF LEAKAGE. TO ENSURE THE FULL FUNCTIONALITY OF THE OVERPRESSURE DISCONNECTOR, ELASTIC ELEMENTS MUST NOT BE HINDERED AND A MINIMUM SPACE OF 15 MM HAS TO BE KEPT ABOVE EACH CAPACITOR. CHECK TIGHTNESS OF THE CONNECTIONS/TERMINALS PERIODICALLY. THE ENERGY STORED IN CAPACITORS MAY BE LETHAL. TO PREVENT ANY CHANCE OF SHOCK, DISCHARGE AND SHORT CIRCUIT THE CAPACITOR BEFORE HANDLING. FAILURE TO FOLLOW CAUTIONS MAY RESULT, IN THE WORST CASE, IN PREMATURE FAILURES, BURSTING AND FIRE. ISKRA, D.D. IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED TO PEOPLE OR THINGS AND RESULTING FROM AN IMPROPER INSTALLATION OR A MISAPPLICATION OF CAPACITORS.

SAFETY



ATTENTION: ELECTRICAL OR MECHANICAL MISAPPLICATION OF CAPACITORS MAY BE HAZARDOUS. PERSONAL INJURY OR PROPERTY DAMAGE MAY RESULT FROM BURSTING OF THE CAPACITOR OR FROM THE EXPULSION OF OIL OR MELTED MATERIAL DUE TO MECHANICAL DISRUPTION OF THE CAPACITOR. ENSURE GOOD, EFFECTIVE GROUNDING FOR CAPACITOR ENCLOSURES. OBSERVE APPROPRIATE SAFETY PRECAUTIONS DURING OPERATION (SELF-RECHARGING PHENOMENA AND HIGH ENERGY CONTAINED IN THE CAPACITOR). HANDLE CAPACITORS CAREFULLY, BECAUSE EVEN AFTER THE DISCONNECTION THEY MAY STILL BE CHARGED. THE TERMINALS OF CAPACITORS, CONNECTED BUS BARS AND CABLES AS WELL AS OTHER DEVICES MAY ALSO BE ENERGIZED. FOLLOW GOOD ENGINEERING PRACTICE.

THERMAL LOAD



ATTENTION: AFTER INSTALLATION OF THE CAPACITOR IT IS NECESSARY TO VERIFY THAT MAXIMUM HOT SPOT TEMPERATURE DOES NOT EXCEED DURING EXTREME SERVICE CONDITIONS.

MECHANICAL PROTECTION



ATTENTION: THE CAPACITOR HAS TO BE INSTALLED IN SUCH A WAY AS TO AVOID ANY MECHANICAL DAMAGE AND DENTS IN THE ALUMINIUM.

STORAGE AND OPERATING CONDITIONS



ATTENTION: DO NOT USE OR STORE CAPACITORS IN CORROSIVE ATMOSPHERE, ESPECIALLY WHERE CHLORIDE GAS, SULFIDE GAS, ACID, ALKALI, SALT OR THE LIKE ARE PRESENT. IN DUSTY ENVIRONMENTS, IT IS REQUIRED TO PERFORM REGULAR MAINTENANCE AND PROPER CLEANING, ESPECIALLY OF THE TERMINALS, TO AVOID CONDUCTIVE PATH BETWEEN PHASES AND/OR PHASES AND GROUND. THE MAXIMUM STORAGE TEMPERATURE IS 85 °C.

OVERPRESSURE DISCONNECTOR



ATTENTION: TO ENSURE FULL FUNCTIONALITY OF AN OVERPRESSURE DISCONNECTOR, THE FOLLOWING MUST BE OBSERVED: THE ELASTIC ELEMENTS MUST BE HINDERED, I.E.: CONNECTING LINES MUST BE FLEXIBLE LEADS (CABLES); THERE MUST BE ENOUGH SPACE FOR EXPANSION ABOVE THE CONNECTIONS; FOLDING CRIMPS MUST NOT BE RETAINED BY CLAMPS; STRESS PARAMETERS OF THE CAPACITOR MUST FOLLOW IEC 61071 SPECIFICATION.