

AC/DC GENERAL PURPOSE CAPACITORS

Type KNI5048



Applications

Metallized polypropylene ac and dc capacitors are used for power electronic applications with high current and harmonics distortion with long life expectancy.

- Inverter
- Filtering
- Switching

Features

- AC/DC voltage
- Self-healing properties
- High reliability
- Cylindrical aluminium case with plastic self-extinguishing sealing cover
- Overpressure disconnecter
- Tinned brass screw

Standards

IEC 61071

UL-CSA approved (file No. E163120)



Specifications

Rated capacitance	10 µF up to 600 µF
Capacitance tolerance	± 5 %, ± 10 %
Rated voltage (U _{rms})	250 V AC, 330 V AC, 480 V AC, 690 V AC
Operating temperature range	-40 °C to +85 °C
Climatic category	40/070/56 according to IEC 60068-1
Dissipation factors	tgδ ≤ 10 × 10 ⁻⁴ at 100 Hz
Test voltage (between terminals)	1.5 × U _n , 10 s
Test voltage (terminals to case)	3 kV, 50 Hz, 2 s
Life expectancy	≥ 100 000 hours at U _{rms} , θ _{hs} = 70 °C
Failure rate	300 FIT

General characteristics

Capacitance range

U _{rms} = 250 V AC, U _N = 350 V AC, U _{NDC} = 400 V DC												
C _N (μF)	I _{max} (A)	$\hat{i}$ (kA)	dU/dt (V/μs)	R _s (mΩ)	R _{th} (K/W)	D x H (mm)	H1 (mm)	M (mm)	P (mm)	M1 (mm)	L (mm)	 US U_{rms} = 250 V AC
30	22	0.75	25	5.1	11.0	50 × 77	27	6	22	12	12	
40	22	1	25	5.1	11.0	50 × 77	27	6	22	12	12	
50	22	1.25	25	4.9	9.7	50 × 90	27	6	22	12	12	
60	25	1.5	25	4.7	8.7	60 × 77	27	6	22	12	12	•
70	25	1.75	25	4.7	8.7	60 × 77	27	6	22	12	12	•
80	25	2	25	4.2	7.8	60 × 90	27	6	22	12	12	•
100	25	2.5	25	3.6	7.1	60 × 102	27	6	22	12	12	•
130	25	1.95	15	3.9	6.0	60 × 127	27	6	22	12	12	•
150	25	2.25	15	3.9	6.0	60 × 127	27	6	22	12	12	•
150	35	2.25	15	3.6	5.2	75 × 108	33	10	35	12	16	•
175	25	2.62	15	4.0	5.2	60 × 152	27	6	22	12	12	•
200	25	3	15	4.0	5.2	60 × 152	27	6	22	12	12	•
200	35	3	15	3.5	4.4	75 × 133	33	10	35	12	16	•
250	40	3	12	3.8	3.9	75 × 158	33	10	35	12	16	•
300	50	3.6	12	3.8	3.9	75 × 158	33	10	35	12	16	•
400	50	4.8	12	3.0	2.8	85 × 194	33	10	35	12	16	•
500	50	5	10	2.7	2.3	85 × 244	33	10	35	12	16	•
600	50	6	10	2.4	2.3	85 × 244	33	10	35	12	16	•

Capacitance range

U _{rms} = 330 V AC, U _N = 465 V AC, U _{NDC} = 600 V DC												
C _N (μF)	I _{max} (A)	$\hat{I}$ (kA)	dU/dt (V/μs)	R _s (mΩ)	R _{th} (K/W)	D x H (mm)	H1 (mm)	M (mm)	P (mm)	M1 (mm)	L (mm)	 US U _{rms} = 340 V AC
25	22	0.75	30	5.3	11.0	50 × 77	27	6	22	12	12	
30	22	0.9	30	5.3	11.0	50 × 77	27	6	22	12	12	
40	22	1.2	30	5.1	9.7	50 × 90	27	6	22	12	12	
50	22	1.25	25	5.0	8.7	55 × 90	27	6	22	12	12	
60	25	1.5	25	4.8	7.1	60 × 102	27	6	22	12	12	•
70	25	1.4	20	4.8	7.1	60 × 102	27	6	22	12	12	•
75	25	1.5	20	4.6	7.1	60 × 102	27	6	22	12	12	•
80	25	1.6	20	4.6	7.1	60 × 102	27	6	22	12	12	•
100	25	2	20	4.1	6.0	60 × 127	27	6	22	12	12	•
100	30	1.5	15	3.8	5.2	75 × 108	33	10	35	12	16	•
150	30	2.25	15	3.5	4.4	75 × 133	33	10	35	12	16	•
200	40	3	15	2.9	4.0	75 × 153	33	10	35	12	16	•
250	45	3.75	15	3.0	2.8	85 × 194	33	10	35	12	16	•
300	50	4.5	15	3.0	2.8	85 × 194	33	10	35	12	16	•
400	50	4.8	12	2.6	2.3	85 × 244	33	10	35	12	16	•

• Approvals in use

Notes:

Other values and dimensions available on request.

General characteristics

Capacitance range

$U_{rms} = 480 \text{ V AC}$, $U_N = 675 \text{ V AC}$, $U_{NDC} = 850 \text{ V DC}$												
C_N (μF)	I_{max} (A)	$\hat{I}$ (kA)	dU/dt (V/μs)	R_s (mΩ)	R_{th} (K/W)	$D \times H$ (mm)	H1 (mm)	M (mm)	P (mm)	M1 (mm)	L (mm)	 US $U_{rms} = 500 \text{ V AC}$
10	22	0.4	40	5.5	11.0	50 × 77	27	6	22	12	12	
15	22	0.6	40	5.5	9.7	55 × 77	27	6	22	12	12	
20	25	0.8	40	5.3	8.7	60 × 77	27	6	22	12	12	•
25	25	1	40	5.2	7.8	60 × 90	27	6	22	12	12	•
30	25	1.2	40	4.8	7.1	60 × 102	27	6	22	12	12	•
35	25	1.4	40	4.8	7.1	60 × 102	27	6	22	12	12	•
40	25	1.6	40	4.1	6.0	60 × 127	27	6	22	12	12	•
50	25	2	40	4.0	6.0	60 × 127	27	6	22	12	12	•
60	30	2.1	35	3.8	4.4	75 × 133	33	10	35	12	16	•
70	30	2.1	30	3.8	4.4	75 × 133	33	10	35	12	16	•
80	35	2	25	4.9	3.9	75 × 158	33	10	35	12	16	•
90	35	2.25	25	4.7	3.9	75 × 158	33	10	35	12	16	•
100	30	2	20	5.1	3.3	75 × 193	33	10	35	12	16	•
100	35	2.5	25	2.6	3.1	85 × 169	33	10	35	12	16	•
133	35	2.66	20	3.5	2.8	85 × 194	33	10	35	12	16	•
150	50	3	20	3.4	2.8	85 × 194	33	10	35	12	16	•
200	50	4	20	3.0	2.3	85 × 244	33	10	35	12	16	•
250	50	3.75	15	2.6	2.0	85 × 294	33	10	35	12	16	•

Capacitance range

$U_{rms} = 480 \text{ V AC}$, $U_N = 675 \text{ V AC}$, $U_{NDC} = 850 \text{ V DC}$												
C_N (μF)	I_{max} (A)	$\hat{I}$ (kA)	dU/dt (V/μs)	R_s (mΩ)	R_{th} (K/W)	$D \times H$ (mm)	H1 (mm)	M (mm)	P (mm)	M1 (mm)	L (mm)	 US $U_{rms} = 690 \text{ V AC}$
10	25	0.4	40	4.8	8.7	60 × 77	27	6	22	12	12	
15	22	0.45	30	4.5	7.1	60 × 102	27	6	22	12	12	
22	25	0.66	30	4	6.0	60 × 127	27	6	22	12	12	
33	35	0.82	25	4.2	4.2	85 × 114	33	10	35	12	16	
47	50	1.17	25	2.9	3.6	85 × 139	33	10	35	12	16	
68	65	1.7	25	3.2	3.2	85 × 164	33	10	35	12	16	

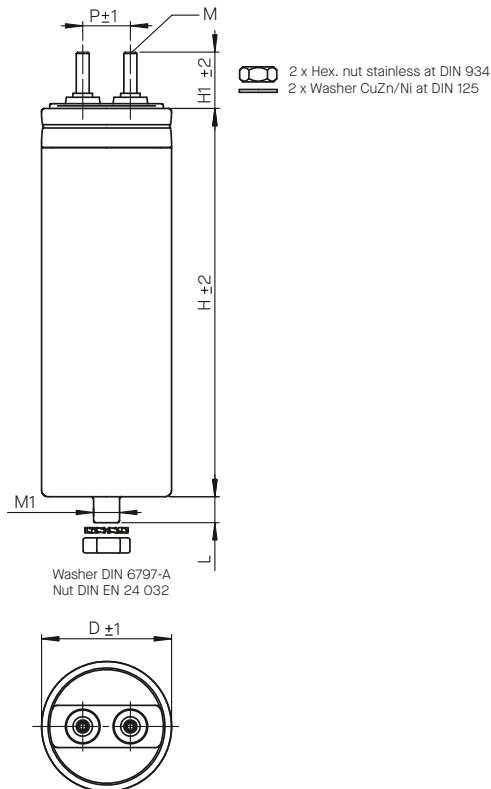
- Approvals in use

Notes:

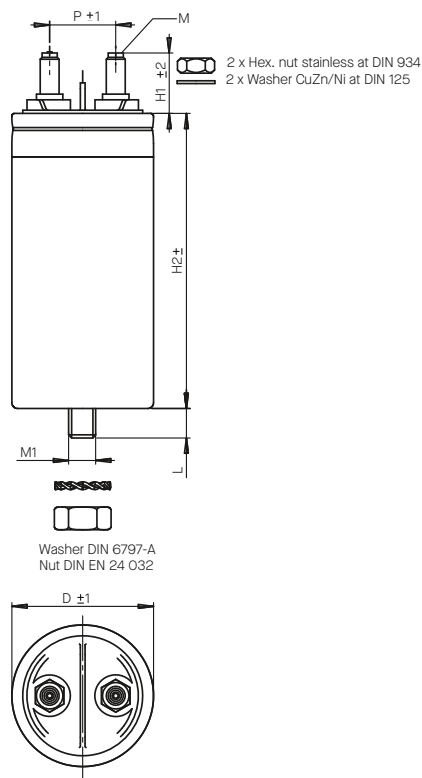
Other values and dimensions available on request.

Dimensions

KNI5048 D50 to D60 mm



KNI5048 D75 to D85 mm



Construction

Dielectric: polypropylene film

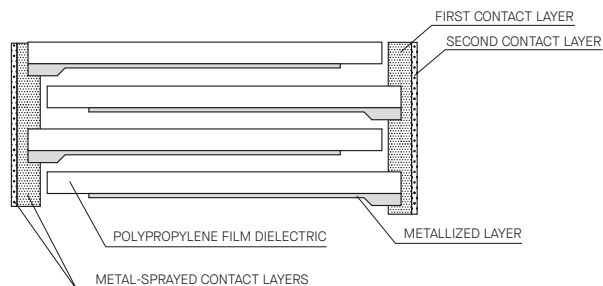
Capacitor electrodes: vacuum-deposited metal layers (overpressure disconnecter)

Casing: cylindrical aluminium case with plastic self-extinguishing sealing cover (UL94 V-0)

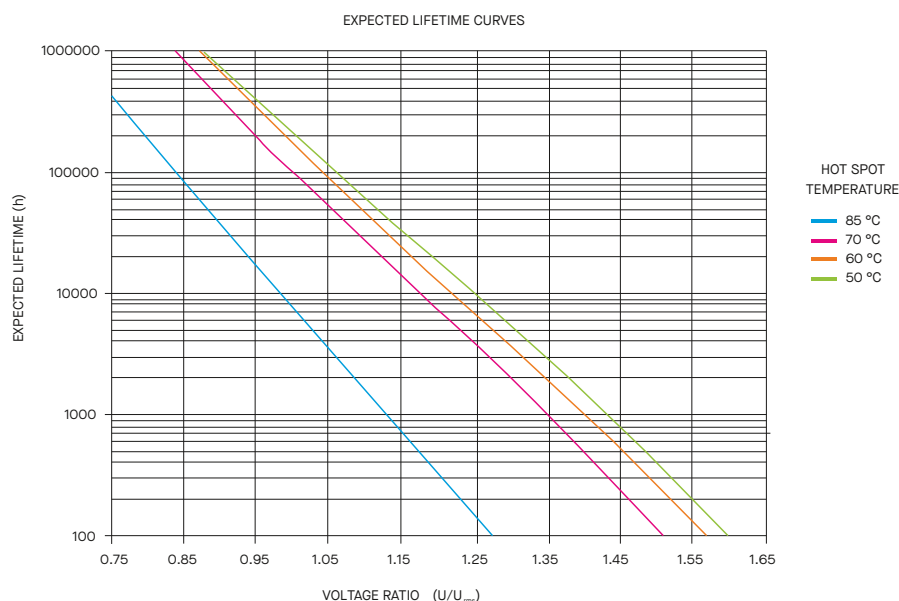
Filling: biodegradable vegetable oil (non PCB)

Terminals: tinned brass screw

Internal construction



Lifetime expectancy



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:

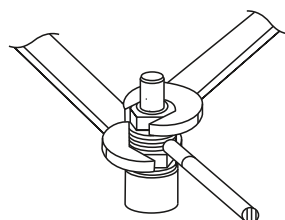
M4 - 2 Nm

M5 - 3 Nm

M6 - 5 Nm

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

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 disconnecter, 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 is 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.o.o. is not responsible for any damage caused to people or things and resulting from an improper installation or a misapplication of capacitors.

⚠ SAFETY: 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, 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: After installation of the capacitor it is necessary to verify that maximum hot spot temperature does not exceed during extreme service conditions.

⚠ MECHANICAL PROTECTION: 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: 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: To ensure full functionality of an overpressure disconnecter, 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.

AC FILTERING CAPACITORS (1-, 3-PHASE DELTA CONNECTION) Type KNI4051, KNI4053



Applications

- ▶ Switching mode power supplies (SMPS)
- ▶ Solar power plants
- ▶ 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

Standards

IEC 61071

Optional IEC 60831, UL810

Specifications

Rated capacitance	3×8 µF up to 3×200 µF
Capacitance tolerance	±5 %, ±10 %
Rated voltage (U _{rms})	450 V
Rated frequency	50/60 Hz
Dissipation factor (tan δ ₀)	2 × 10 ⁻⁴
Insulation strength C x Ri	> 5 000 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	2×35 mm ² , M6 (5 Nm), I _{max} = 80 A 2×25 mm ² , M5 (3 Nm), I _{max} = 60 A 2×16 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	≥ 100 000 hours at U _{rms} , θ _{hs} = 70 °C
Failure rate	100 FIT

General characteristics

KNI4051

Capacitance range

$U_{rms} = 530 \text{ V AC}$, $U_N = 750 \text{ V AC}$										
C_N (μF)	R_s (mΩ)	L_s (nH)	I_{max} (A)	$\hat{I}$ (kA)	I_s (kA)	R_{th} (K/W)	H (mm)	D (mm)	Weight (kg)	Packing units (pcs)
20	1,5	45	30	0,3	0,9	5,2	110	75	0,55	9
30	1,6	70	30	0,3	0,9	4,4	135	75	0,65	9
50	1,5	45	60	2,4	7,3	3,3	165	85	0,9	4
100	2,4	70	60	3,1	9,2	2,5	210	90	2	4
150	2,4	70	60	4,6	13,8	2	210	116	2,5	2
200	2,4	70	60	6,1	18,4	2	210	116	2,5	2
300	2,4	70	60	9,2	27,6	1,6	210	136	3,5	1
400	3	110	60	8,9	26,8	1,4	260	136	4	1

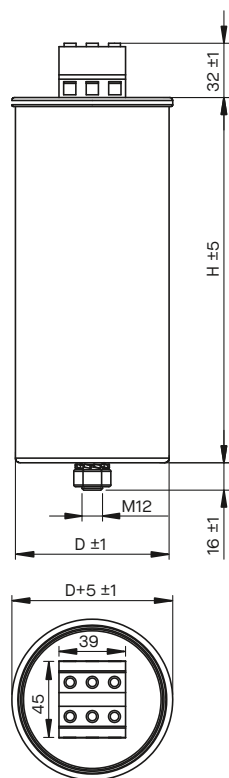
KNI4053

Capacitance range

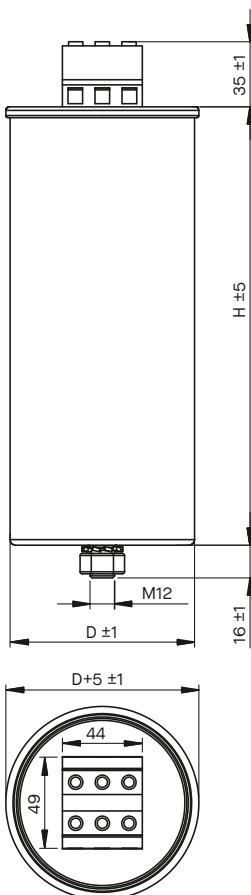
$U_{rms} = 450 \text{ V AC}$, $U_N = 640 \text{ V AC}$										
C_N (μF)	R_s (mΩ)	L_s (nH)	I_{max} (A)	$\hat{I}$ (kA)	I_s (kA)	R_{th} (K/W)	H (mm)	D (mm)	Weight (kg)	Packing units (pcs)
3x25	3x1.4	110	3x35	0.63	1.89	4.8	165	75	0.8	9
3x38	3x1.2	110	3x60	0.9	2.7	4.2	165	90	1.0	4
3x40	3x0.7	110	3x60	2.7	8.2	4.2	165	90	1.0	4
3x46	3x1.2	110	3x60	1.3	3.9	4.2	165	90	1.0	4
3x58	3x1	110	3x60	1.3	3.9	3.6	210	90	1.3	4
3x77	3x0.9	120	3x60	2	6	3.2	245	90	1.5	4
3x100	3x0.9	120	3x60	2.2	6.6	2.6	210	116	2.2	2
3x135	3x0.8	130	3x60	2.3	6.9	2.2	245	116	2.6	2
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
$U_{rms} = 530 \text{ V AC}$, $U_N = 750 \text{ V AC}$										
3x16	3x1.6	110	3x35	0.8	2.4	4.8	165	75	0.8	9
3x30	3x1.5	120	3x60	1.2	3.6	3.6	210	90	1.3	4
3x35	3x1.4	120	3x60	1.4	4.2	3.6	210	90	1.3	4
3x48	3x1.2	120	3x60	1.5	4.5	3.2	245	90	1.5	4
3x50	3x0.6	130	3x60	1.6	4.8	2.6	210	116	2.2	2
3x83	3x0.8	130	3x60	2	6	2.2	245	116	2.6	2
3x100	3x0.8	130	3x60	2.2	6.6	1.9	245	136	4.1	1
$U_{rms} = 600 \text{ V AC}$, $U_N = 850 \text{ V AC}$										
3x19	3x1.0	110	3x60	1.6	2.4	4.8	165	90	1.0	4
3x30	3x0.7	120	3x60	2.1	3.6	6.3	210	90	1.3	4
3x50	3x0.7	120	3x60	2.5	4.2	2.6	210	116	2.2	2
3x86	3x0.6	130	3x60	4.2	4.5	1.9	245	136	4.1	1
$U_{rms} = 760 \text{ V AC}$, $U_N = 1080 \text{ V AC}$										
3x11	3x1.2	120	3x50	1.3	3.9	4.2	165	90	1.0	4
3x33.4	3x0.8	120	3x60	2.1	6.3	2.6	210	116	2.2	2
3x55.7	3x0.6	130	3x60	4	12	1.9	245	136	4.1	1
$U_{rms} = 850 \text{ V AC}$, $U_N = 1200 \text{ V AC}$										
3x8	3x1.4	110	3x50	1	3	4.8	165	75	0.8	9
3x12	3x1.2	110	3x60	1.5	4.5	4.2	165	90	1.0	4
3x25	3x0.5	130	3x60	3	9	2.6	210	116	2.2	2
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

Dimensions

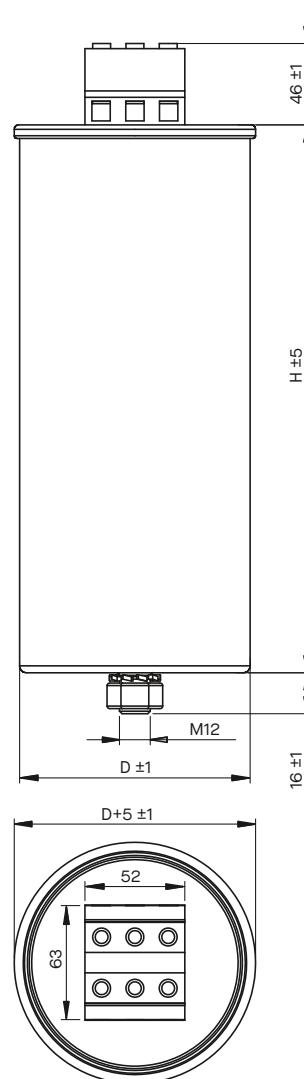
KNI405x D75 mm



KNI405x D90 to D116 mm



KNI405x D136 mm



Construction

- **Dielectric:** polypropylene film
- **Capacitor electrodes:** vacuum-deposited metal layers (overpressure disconnecter)
- **Casing:** cylindrical aluminium case and cover
- **Filling:** biodegradable vegetable oil (non PCB)
- **Terminals:** contact block (M4, M5, M6)
- **Base stud:** M12×16 - max: torque 12 Nm

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:

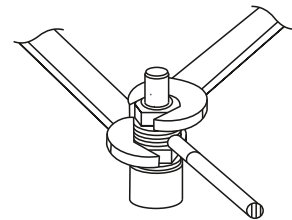
M4 - 2 Nm

M5 - 3 Nm

M6 - 5 Nm

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

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 is 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.o.o. is not responsible for any damage caused to people or things and resulting from an improper installation or a misapplication of capacitors.

⚠ SAFETY: 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, 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: After installation of the capacitor it is necessary to verify that maximum hot spot temperature does not exceed during extreme service conditions.

⚠ MECHANICAL PROTECTION: 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: 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: 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.