



Live-line Capacitors

12kV–36kV System Voltages

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The CeramTec Group is a world leader in the design and manufacture of complex electronic ceramic components and assemblies used in a wide range of applications and cutting edge technologies. CeramTec UK specialises in the development and production of dielectric and ferroelectric materials and components. These rod assemblies are used in Medium Power Transmission Systems as live-line indication capacitors on 12kV, 24kV & 36kV system voltage lines. Requests for custom capacitor designs are invited.



APPLICATIONS INCLUDE

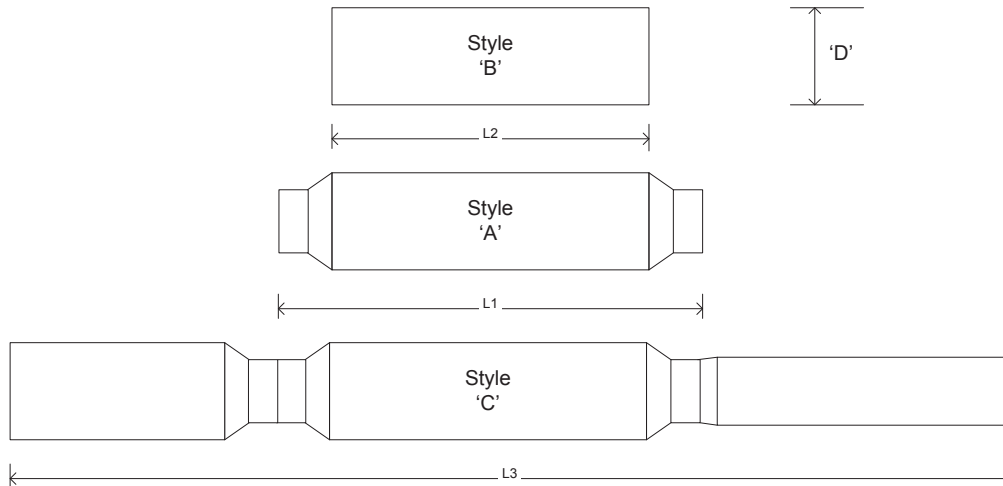
- Medium Voltage live–line indication
- Re-routing of systems in the event of inadvertent disconnection
- Capacitive voltage dividers for MV voltage measurement

FEATURES

- Wide capacitance range
- 12-36kV system voltage operation
- Variety of custom metal end fittings available
- Lead (Pb) free & RoHS compliant

Electrical Specification			
Capacitance Range	See Table	See Table	See Table
Capacitance Tolerance	See Table	See Table	See Table
System Voltage	12	24	36
Rated Voltage	Up to 7kVrms	Up to 15kVrms	Up to 21kVrms
Test Voltage (50 Hz)	38kVrms/1min	55kVrms/1min	77kVrms/1min
Partial Discharge	<5pC @ 13.2kVrms	<5pC @ 26.4kVrms	<5pC @ 40kVrms
Impulse Test Voltage	75kVpk	125kVpk	170kVpk
Capacitance Temperature / Voltage Characteristics	See typical curves	See typical curves	See typical curves

Outline Drawing:



Note: Style 'C' drawing shows a typical live-line assembly incorporating custom metalwork- many other types are available- please consult the factory.

Electrical Characteristics

Part Number	HV Capacitance pF @ 50HZ /20° C	Capacitance Tolerance	Diel Ref	Rated Voltage kVrms	System Voltage kVrms	With-stand Voltage kVrms /1min	Impulse Voltage kVpk	Dis-charge Free Test kV,<5pC	Style	D (mm)	L1 (mm)	L2 (mm)	L2 (mm)	Thread Size (mm)
07898	15	±10%	K200	15	24	50	125	26.4	A	26	82	62	-	M4
08080	15	±10%	K450	15	24	50	125	26.4	A	17	82	62	-	M4
08099	15	±10%	K450	21	36	77	170	26.4 ⁽¹⁾	A	17	82	62	-	M4
07897	20	±10%	K200	7	12	38	75	13.2	A	25	56	40	-	M4
07959	20	±10%	K400	7	12	38	75	13.2	A	17	55	39	-	M4
55916	38	±10%	K1150	14	24	55	140	26.4	B	17	-	61	-	-
08037	38	±10%	K1150	14	24	55	140	26.4	A	17	81	61	-	M4
08038	38	±10%	K1150	14	24	55	140	26.4	C	17	-	61	177.5	M10
08040	38	±10pF	K1150	14	24	55	140	26.4	C	17	-	61	183,5	M12
07720	40	±10%	K800	7	12	38	75	13.2	A	17	53	40	-	M4
55701/3	50	±5pF	K1500L	14	24	55	125	26.4	B	17	-	61	-	-
07723	50	±8pF	K1500L	15	24	55	125	26.4	A	17	81	61	-	M4
07853	50	±10pF	K2100	15	24	55	125	26.4	A	12.25	81	61	-	M4
08098	55	±10%	K1700	21	36	77	170	26.4 ⁽¹⁾	A	17	82	62	-	M4
08101	138	±20%	K2500	21	36	77	170	26.4 ⁽¹⁾	A	26	82	62	-	M4
07728	200	+20% -10%	K3500	7	12	38	95	13.2	A	17	64	44	-	M4
07718	220	+20% -10%	K3500	7	12	38	75	13.2	A	17	56	40	-	M4
07727	220	+20% -10%	K3500	7	12	38	75	13.2	A	17	60	40	-	M4
07849	260	±20%	K3500	7		30	60	8	A	17	50.5	30.5	-	M4
08027	400	±20%	K3500	14	24	55	125	26.4	A	27	81	61	-	M4
07724/001	125-175		K3500	10	24	55	145	26.4	A	17	81	61	-	M4
55530/000	135-180		K3500	15	24	55	145	26.4	B	17	-	61	-	-
07724/000	135-180		K3500	15	24	55	145	26.4	A	17	81	61	-	M4
07855	135-190		K3500	14	24	55	140	26.4	C	17	-	61	196	M10

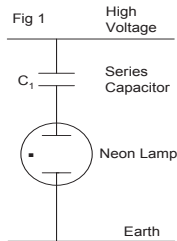
(1) Consult factory for full 36kV system Partial Discharge Specification <5pC @ 40kVrms.

(2) Style C part shown is an example of the assembly types available, obtain drawing for full dimensional specification.

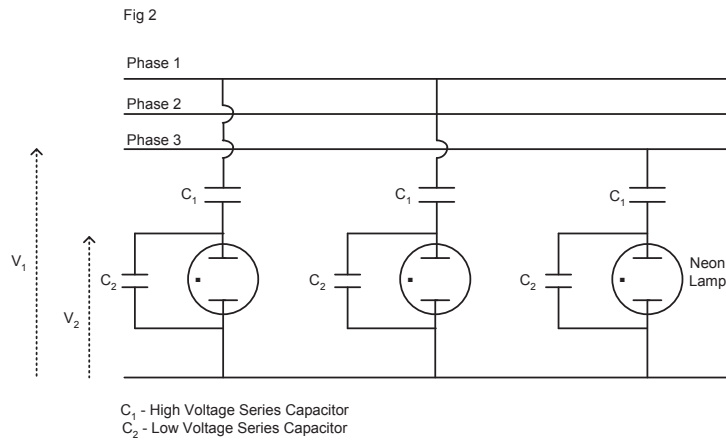
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Theory:



$$V_1 = V_2 \cdot \left(\frac{C_1}{C_1 + C_2} \right)$$



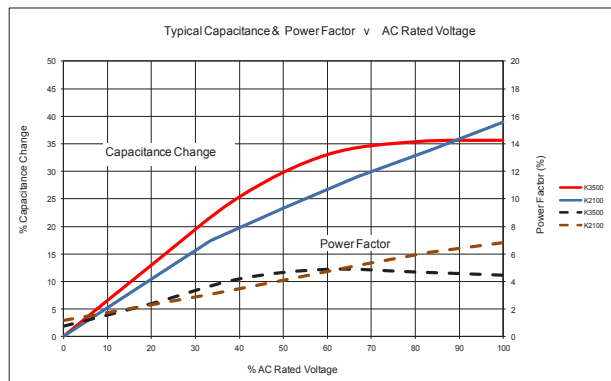
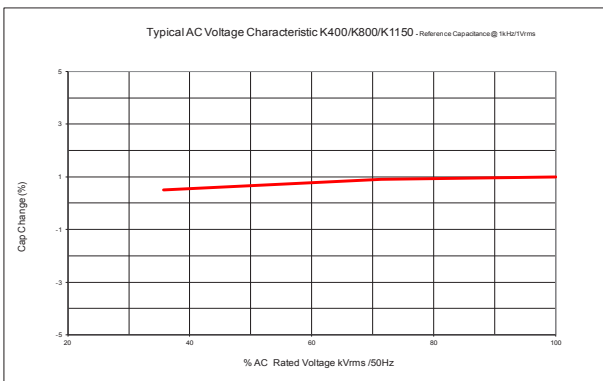
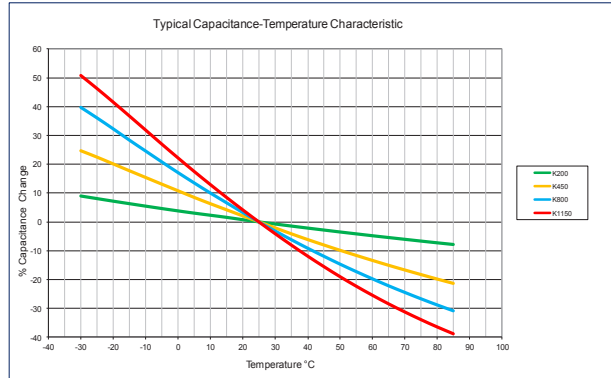
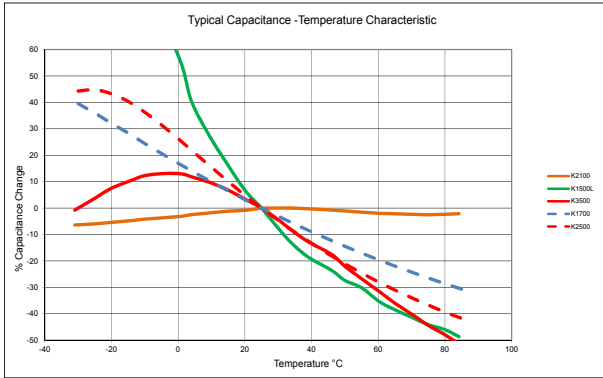
In its simplest form the Live-Line Indicator consists of a high voltage ac rated capacitor which is connected in series with the neon indicator between the phase and earth lines. (Fig1).

The addition of higher value, low voltage rated capacitors in parallel with the neon is sometimes preferred. (Fig2).

The objective is two-fold – firstly to advise the operator that the connections are live and secondly for operation of re-routing systems in the event of inadvertent disconnection.

Dielectric Material

Dielectric Reference	K200	K450	K800	K1150	K1500L	K1700	K2100	K2500	K3500
Dielectric Constant(ϵ_r) @ 1V/1kHz/20°C	200	450	800	1150	1500	1650	2100	2700	3750
Dissipation Factor @ 1V/1kHz/20°C	$\leq 10 \times 10^{-4}$	$\leq 20 \times 10^{-4}$	$\leq 20 \times 10^{-4}$	$\leq 25 \times 10^{-4}$	$\leq 20 \times 10^{-4}$	$\leq 15 \times 10^{-4}$	$\leq 170 \times 10^{-4}$	$\leq 20 \times 10^{-4}$	$\leq 100 \times 10^{-4}$
Insulation Resistance (Ω) @ 1000V 20°C	$\geq 1 \times 10^{11}$	$\geq 1 \times 10^{10}$	$\geq 1 \times 10^{11}$	$\geq 1 \times 10^{11}$	$\geq 1 \times 10^{10}$	$\geq 1 \times 10^{11}$	$\geq 1 \times 10^{10}$	$\geq 1 \times 10^{11}$	$\geq 1 \times 10^{10}$
Ageing Rate (%) / Decade Hr (@1V)	None	-1	-1	-1	Negligible	Negligible	-3	Negligible	-3
Temperature Coefficient of Capacitance (EIA Category)	See Curve	See Curve	See Curve	See Curve	Z5U	Z5T	X7R	Z5U	Y5U
Capacitance - AC kVrms /50Hz Voltage Characteristic	See Curves								
Operating Temperature Range	Typical -25°C to + 85°C								



NOTES

- Terminals are soldered to the ceramic parts with 221°C melting point solder.
- Components are lead (Pb) free and RoHS compliant.
- Handling of uncoated units must be carried out under strict cleanliness conditions.
- Requests for custom capacitor designs are invited i.e. different capacitance/voltage specifications, custom metalwork.

- Capacitors of this type have been used in transformer oil and in SF6 gas. In these cases we would recommend a paint coating on the otherwise bare ceramic surface.
- The usual end product is a resin cast capacitor stand-off for busbar or link support of appropriate height for the achievement of the system requirements for flashover and creepage distance etc.
- Withstand voltage testing is carried out in a dielectric fluid.



The measured values mentioned before were determined for test samples and are applicable as standard values. The values were determined on the basis of DIN-/DIN-VDE standards and if these were not available, on the basis of CeramTec standards. The values indicated must not be transferred to arbitrary formats, components or parts featuring different surface qualities. They do not constitute a guarantee for certain properties. We expressly reserve the right to make technical changes.

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