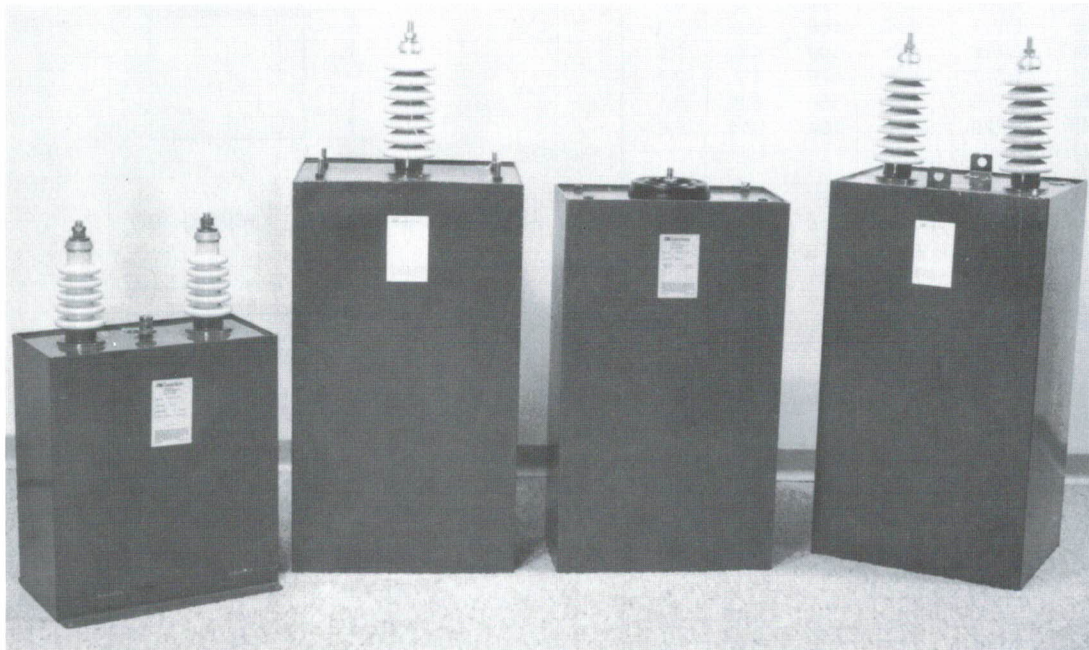


The ES Series of Energy Storage capacitors is designed for applications where large amounts of energy are required. Uses include very high power lasers, atomic fusion research, particle accelerators, Marx generators and other scientific and commercial installations. Two sets of standard ratings are provided, one for applications where the voltage reversal does not exceed 20% and one for more severe reversals of up to 80%.



Capacitance:
See Ratings Table

Capacitance Tolerance:
 $\pm 10\%$

Rated Voltage:
3 to 125 KVDC

Rated Energy:
2 to 9 KJ

Operating Temperature:
 -35°C to $+70^{\circ}\text{C}$

Case Construction:
Welded steel case finished with CSI blue paint.

Terminals:
4 different options are available. See ratings tables and the bushing information section.

Mounting:
Brackets and/or mounting lugs are available as options. Please specify mounting requirements when ordering.

BUSHING INFORMATION

In order to have a complete part number, the appropriate bushing code must be added to the model number of the chosen capacitor. For example: 50N9324TLNP. The letters A to D under the Available Bushings headings in the rating tables refer to the diagrams on the right of this page.

Bushing types NP and TNP are glazed porcelain, and are welded or soldered into the covers for a hermetic seal. Types LNP, TLNP, are a high impact-resistance cast epoxy, sealed with silicone O-rings to absorb the shock of high impulse currents.

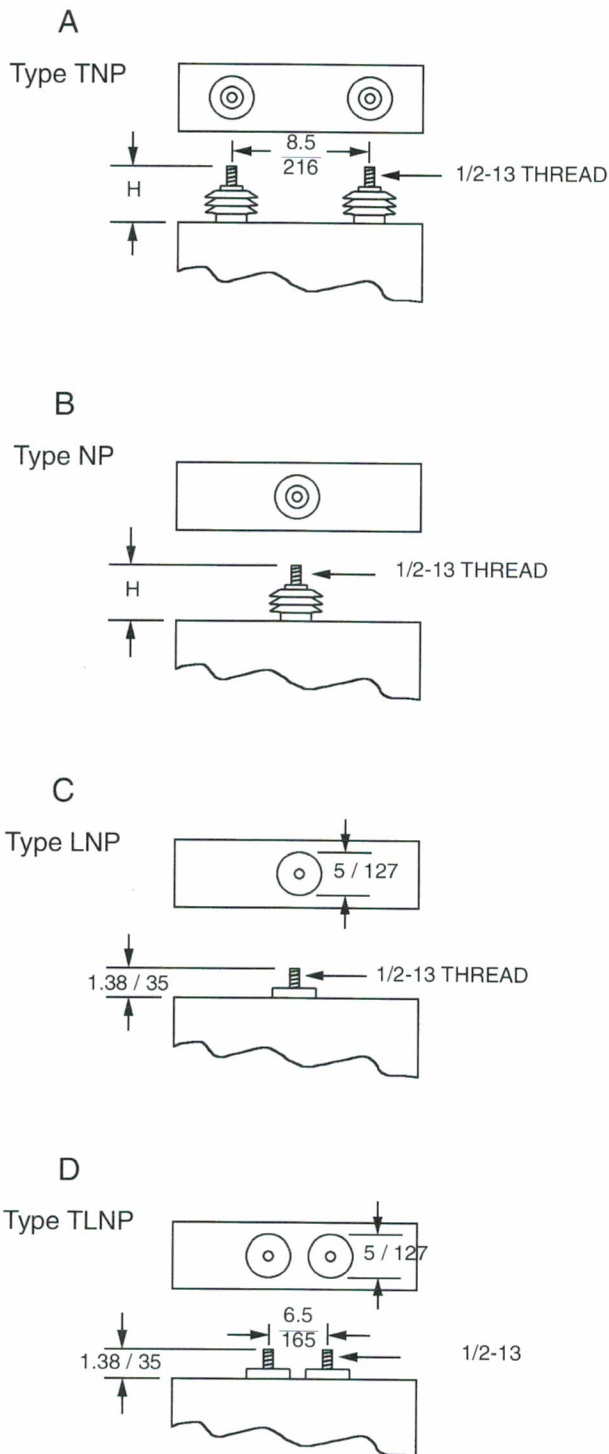
The inductance of these capacitors is principally determined by the choice of bushing. Typical values are shown in the table below and assume an optimum coaxial return current path. The peak current shown in the table is for a guideline only, as actual values may vary with energy level, connection method, and the discharge period. Be sure you choose a bushing for your capacitor that has an adequate current rating.

Inductance & Peak Current Ratings

Style	Inductance	Peak Current
TNP	75-250nH	50KA
NP	50-150nH	50KA
LNP	40nH	100KA
TLNP	70nH	100KA

TNP and NP Bushing Dimensions

Voltage KV	Height (H)		Diameter		No. of Skirts
	in.	mm	in.	mm	
1-5	3.1	79	1.75	45	0
6-35	4.0	102	2.75	70	2
36-85	7.7	196	3.31	84	5
86-125	9.6	244	3.31	84	7



STANDARD RATINGS : 20% REVERSAL MODELS

VOLTAGE (KV)	μF	PART NUMBER	JOULES	AVAILABLE BUSHINGS
CASE SIZE: 7.25 x 14 x 15.25 Inches (184 x 356 x 388 mm)				
3	500	3N7300	2475	A, B, C, D
4	380	4N7301	3040	A, B, C, D
4.5	330	4N7302	3340	A, B, C, D
5	275	5N7303	3440	A, B, C, D
5.5	205	5N7304	3100	A, B, C, D
6	160	6N7305	2880	A, B, C, D
6.5	145	6N7306	3060	A, B, C, D
7	130	7N7307	3180	A, B, C, D
8	95	8N7308	3040	A, B, C, D
9	82	9N7309	3340	A, B, C, D
10	65	10N7310	3250	A, B, C, D
11	50	11N7311	3025	A, B, C, D
12	40	12N7312	2880	A, B, C, D
13	36	13N7313	3040	A, B, C, D
14	32	14N7314	3140	A, B, C, D
15	30	15N7315	3375	A, B, C, D
16	24	16N7316	3070	A, B, C, D
18	20	18N7317	3240	A, B, C, D
20	16	20N7318	3200	A, B, C, D
25	10	25N7319	3125	A, B, C, D
30	7.0	30N7320	3150	A, B, C, D
35	5.0	35N7321	3060	A, B
40	3.75	40N7322	3000	A, B
50	2.40	50N7324	3000	A, B
CASE SIZE: 7.25 x 14 x 24 Inches (184 x 356 x 616 mm)				
4	650	4N7401	5200	A, B, C, D
4.5	560	4N7402	5670	A, B, C, D
5	465	5N7403	5810	A, B, C, D
5.5	350	5N7404	5300	A, B, C, D
6	275	6N7405	4950	A, B, C, D
6.5	245	6N7406	5175	A, B, C, D
7	220	7N7407	5390	A, B, C, D
8	160	8N7408	5120	A, B, C, D
9	130	9N7409	5265	A, B, C, D
10	100	10N7410	5000	A, B, C, D
11	85	11N7411	5140	A, B, C, D
12	69	12N7412	4970	A, B, C, D
13	60	13N7413	5070	A, B, C, D
14	54	14N7414	5290	A, B, C, D
15	50	15N7415	5620	A, B, C, D
16	40	16N7416	5120	A, B, C, D
18	32	18N7417	5180	A, B, C, D
20	25	20N7418	5000	A, B, C, D
25	17	25N7419	5310	A, B, C, D
30	11	30N7420	4950	A, B, C, D
35	8	35N7421	4900	A, B
40	6	40N7422	4800	A, B
45	4.8	45N7423	4860	A, B
50	3.8	50N7424	4750	A, B

VOLTAGE (KV)	μF	PART NUMBER	JOULES	AVAILABLE BUSHINGS
CASE SIZE: 7.25 x 14 x 25 Inches (184 x 356 x 636 mm)				
60	2.6	60N7526	4680	A, B
70	1.8	70N7528	4410	A, B
80	1.4	80N7530	4480	A, B
100	0.9	100N7534	4500	A, B
125	0.5	125N7539	3910	A, B
CASE SIZE: 11 x 14 x 25 Inches (280 x 356 x 636 mm)				
5	700	5N9303	8750	A, B, C, D
5.5	525	5N9304	7940	A, B, C, D
6	410	6N9305	7380	A, B, C, D
6.5	360	6N9306	7600	A, B, C, D
7	330	7N9307	8080	A, B, C, D
8	240	8N9308	7680	A, B, C, D
9	190	9N9309	7700	A, B, C, D
10	150	10N9310	7500	A, B, C, D
11	125	11N9311	7560	A, B, C, D
12	100	12N9312	7200	A, B, C, D
13	90	13N9313	7600	A, B, C, D
14	80	14N9314	7840	A, B, C, D
15	75	15N9315	8440	A, B, C, D
16	60	16N9316	7680	A, B, C, D
18	48	18N9317	7780	A, B, C, D
20	37	20N9318	7400	A, B, C, D
25	25	25N9319	7810	A, B, C, D
30	16	30N9320	7200	A, B, C, D
35	12	35N9321	7350	A, B, C, D
40	9	40N9322	7200	A, B, C, D
45	7	45N9323	7090	A, B
50	5.7	50N9324	7125	A, B
60	3.9	60N9326	7020	A, B
70	2.7	70N9328	6615	A, B
80	1.9	80N9330	6720	A, B
100	1.3	100N9334	6500	A, B
125	0.8	125N9339	6250	A, B

Approximate Unit Weights

Case Size (Inches)	Lbs.	Kg
7.25 x 14 x 15.25	92	42
7.25 x 14 x 24	125	57
7.25 x 14 x 25	130	59
11 x 14 x 25	183	83

STANDARD RATINGS 80% REVERSAL MODELS

VOLTAGE (KV)	μF	PART NUMBER	JOULES	AVAILABLE BUSHINGS
CASE SIZE: 7.25 x 14 x 24 Inches (184 x 356 x 616 mm)				
4	500	4N7451	4000	A, B, C, D
4.5	425	4N7452	4300	A, B, C, D
5	350	5N7453	4370	A, B, C, D
5.5	265	5N7454	4000	A, B, C, D
6	200	6N7455	3600	A, B, C, D
6.5	180	6N7456	3800	A, B, C, D
7	165	7N7457	4040	A, B, C, D
8	120	8N7458	3840	A, B, C, D
9	95	9N7459	3850	A, B, C, D
10	75	10N7460	3750	A, B, C, D
11	65	11N7461	3930	A, B, C, D
12	50	12N7462	3600	A, B, C, D
13	45	13N7463	3800	A, B, C, D
14	40	14N7464	3920	A, B, C, D
15	38	15N7465	4270	A, B, C, D
16	30	16N7466	3840	A, B, C, D
18	24	18N7467	3880	A, B, C, D
20	18	20N7468	3600	A, B, C, D
25	12	25N7469	3750	A, B, C, D
30	8	30N7460	3600	A, B, C, D
CASE SIZE: 11 x 14 x 25 Inches (184 x 356 x 636 mm)				
5	500	5N9353	6250	A, B, C, D
5.5	400	5N7404	6050	A, B, C, D
6	300	6N7405	5400	A, B, C, D
6.5	275	6N7406	5800	A, B, C, D
7	250	7N7407	6120	A, B, C, D
8	180	8N7408	5760	A, B, C, D
9	140	9N7409	5760	A, B, C, D
10	110	10N7410	5500	A, B, C, D
11	95	11N7411	5740	A, B, C, D
12	75	12N7412	5400	A, B, C, D
13	68	13N7413	5740	A, B, C, D
14	60	14N7414	5880	A, B, C, D
15	52	15N7415	5850	A, B, C, D
16	45	16N7416	5760	A, B, C, D
18	35	18N7417	5670	A, B, C, D
20	27	20N7418	5400	A, B, C, D
25	18	25N7419	5620	A, B, C, D
30	12	30N7420	5400	A, B, C, D
35	9	35N7421	5510	A, B, C, D
40	6.5	40N7422	5200	A, B, C, D
45	5.3	45N7423	5360	A, B
50	4.0	50N7424	5000	A, B
60	2.8	60N9376	5040	A, B
70	2.0	70N9378	4900	A, B
80	1.5	80N9380	4800	A, B
100	1.0	100N9384	5000	A, B
125	0.6	125N9389	4680	A, B

APPLICATION OF ES CAPACITORS

CSI has a number of practical Application Notes written by the late founder of CSI, Bruce R. Hayworth, that describe many of the factors involved in the specification and application of high voltage and high energy capacitors. These include:-

- #104 Specification Guide For Energy Storage Capacitors
- #112 Effect Of DC Life On The Discharge Life Of Pulse Capacitors
- #113 The Non-Inductive Myth
- #114 How To Tell A Nanohenry From A Microfarad
- #115 Specifying A Flashlamp Capacitor

Call or Fax CSI to receive copies of these notes. As with the application of any high energy device, care should be taken to select the right capacitor. Please take advantage of CSI's application assistance through the use of the Application Data Sheet on page 25. Our engineering group will be pleased to evaluate the application and recommend the most suitable and cost effective approach.