Westinghouse Electric Corporation
Distribution Apparatus Division
Bloomington, Indiana 47401

December, 1975
New Information
E, D, C/1981/PL

Indoor-Outdoor
Altitude 0-10000 feet
3-120 KV

Intermediate Arrester Type IVL

IVL Intermediate Arresters

IVL Arresters assure low discharge voltages, and low impulse and switching surge sparkover voltages which permit selection of transformers with reduced BIL's saving users thousands of dollars.

The performance characteristics of the IVL arrester are demonstrated by tests conducted in accordance with ANSI C62.1.

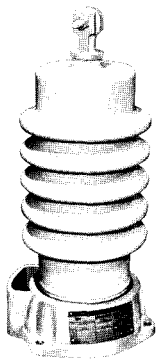

Figure 1 Porcelain Top 3-30KV

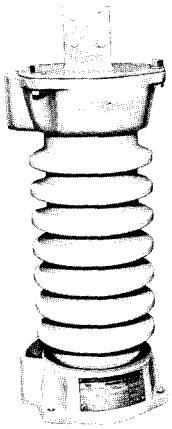

Figure 2 Metal Top 3-120 KV

Table I—Electrical Protective Characteristics

Arrester Rating KV Rms Maximum Valve-Off or Maximum Reseal Rating ①	Maximum Circuit Voltage Phase to Phase KV RMS		Figure Ref.	Maximum Front-of-Wave Impulse Sparkover	Maximum 100% Impulse Sparkover 1.2 x 50 Wave	Minimum 60 Hz Sparkover	Maximum Discharge Voltage With Discharge Current, 8 x 20 wave				
	Ungrounded Neutral 100% Arrester ②	Effectively Grounded Neutral 80% Arrester ②					1.5KA	3KA	5KA	10KA	20KA
				KV Crest	KV Crest ③	KV RMS ④	KV Crest				
3	3	3.75	1,2	11	11	4.5	5.2	6	6.6	7.5	8.7
4.5	4.5	5.63	1,2	16	15	6.8	7.8	9	9.9	11.3	13.1
6	6	7.50	1,2	21	19	9	10.4	11.9	13.2	15	17.4
7.5	7.5	9.38	1,2	26	23.5	11.3	13	14.9	16.5	18.8	21.8
9	9	11.25	1,2	31	27.5	13.5	15.6	17.9	19.8	22.5	26.1
10	10	12.50	1,2	35	31	15	17.5	20.0	22.0	25.0	29.0
12	12	15.00	1,2	40	35.5	18	20.8	23.8	26.4	30	34.8
15	15	18.75	1,2	50	43.5	22.5	25.9	29.7	32.9	37.5	43.5
18	18	22.50	1,2	59	51.5	27	31.1	35.7	39.5	45	52.2
21	21	26.25	1,2	68	59	31.5	36.3	41.6	46.1	52.5	60.9
24	24	30.00	1,2	78	67	36	41.5	47.6	52.7	60.0	69.6
27	27	33.75	1,2	88	75	40.5	46.7	53.5	59.2	67.5	78.3
30	30	37.50	1,2	97	81	45	51.8	59.4	65.8	75	87
36	36	45.00	2	116	95	54	62.2	71.3	79	90	104.4
39	39	48.75	2	126	102	58.5	67.4	77.3	85.5	97.5	113.1
45	45	56.25	2	144	116	67.5	77.7	89.1	98.7	112.5	130.5
48	48	60.00	2	154	123	72	82.9	95.1	105.3	120	139.2
60	60	75.00	2	190	153	90	103.6	119	131.2	150	174
72	72	90.00	2	228	180	108	124.3	142.6	158	180	208.8
78	78	97.50	2	245	195	117	134.7	154.5	171	195	226.2
84	84	105.00	2	262	209	126	145	166.4	184.2	210	243.6
90	90	112.50	2	282	223	135	155.4	178.2	197.3	225	261
96	96	120.00	2	300	236	144	165.7	190.1	210.5	240	278.4
108	108	135.00	2	335	263	162	186.5	213.9	237	270	313.1
120	120	150.00	2	370	290	180	207.2	238	263	300	347.9

Notes:
① Maximum permissible continuous power frequency voltage across the arrester, line to ground, at which the arrester will perform its duty cycle, 50 or 60 Hz. Reference for selection of arrester ratings. ANSI C 62.2 "Guide for Application"
② Grounded and ungrounded neutral systems are defined by EEI Pub. No. R-6 (NEMA Pub. No. 117). Appendix B and ASA Standards C84.1, "Preferred Voltage Rating".
For reference the same information is included in NEMA Pub. No. LA1.
③ Highest 1.2 x 50 wave impulse voltage that apparatus insulation is subjected to since this voltage consistently produces arrester sparkover (IEC standard 99-1).
④ Power-frequency sparkover voltage will not be less than 1.50 times rated voltage.

Arrester Insulation Withstand Test Voltages ANSI C62.1.

The assembled insulating members of the IVL arrester or single unit will withstand impulse and power frequency voltages between line and ground terminals in accordance with Table II.

Table II—Intermediate Arresters

Voltage Rating of Arrester KV Rms	Impulse Test 1.2 x 50 Microsecond Full Wave KV Crest① (BIL)	Alternating-Current 60 Hz, Test Voltage KV Rms	
		1-Minute Dry	10-Second Wet
3	60	21	20
4.5	75	27	24
6	75	27	24
7.5	95	35	30
9	95	35	30
10	110	50	45
12	110	50	45
15	110	50	45
18	150	70	60
21	150	70	60
24	150	70	60
27	200	95	80
30	200	95	80
36	200	95	80
39	250	120	100
45	250	120	100
48	250	120	100
60	350	175	145
72	350	175	145
78	450	225	190
84	450	225	190
90	450	225	190
96	450	225	190
108	550	280	230
120	550	280	230

① The values given apply for either positive or negative waves.

Pressure Relief Protective Characteristics②

The fundamental technique of pressure relief is a Westinghouse "first" that was developed and patented in 1949. The "safe fault current" pressure relief ratings of IVL arresters meet and exceed ANSI C62.1 as shown in Table III.

Table III—Current Test

Arrester Rating (KV)	ANSI C62.1 Class III Standard	IVL Rating
	High Current	
3-120	16,100 Amperes RMS Sym	25,000 Amperes RMS Sym
	Low Current	
3-120	400-600 Amperes RMS Sym	465 Amperes RMS Sym

IVL arresters have exhaust parts providing directional venting of the gasses in the unlikely event of an arrester failure. Directing the ionized gases is extremely important to prevent loss of adjacent apparatus from flashover.

② Pressure relief ratings for porcelain top arresters are not standardized. Ratings apply to metal top arresters only.

Centilever Strength:

The lateral force such as line lead pull that may be applied to the top of the arrester is determined by dividing the centilever strength by the height of the arrester.

Arrester Rating (KV)	Cantilever Strength	
	Inch-Pounds	Foot-Pounds
3-120	60,000	5,000

Further Information

38-210 P WE A
38-211 D WE A
38-212 F WE A

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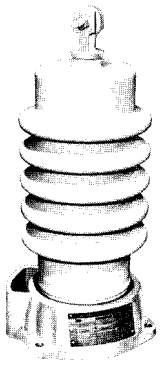

Figure 1 Porcelain Top 3-30KV

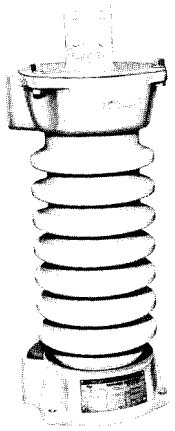

Figure 2 Metal Top 3-120 KV

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