Instructions for Type IVS Autovalve Lightning Arresters for Indoor or Outdoor Service With Pressure Relief for use at 0 to 10,000 feet altitude

I.L. 38-221-1

GENERAL

Type IVS Autovalve Lightning Arresters described in this leaflet are intermediate arresters for the economical protection of power apparatus in small and medium size substations. They should be used where the higher cost and better protective characteristics of the type SV Autovalve arrester are not justified. The type IVS arrester affords low discharge characteristics as well as low and consistent impulse sparkover to provide, maximum protection to electrical apparatus.

This arrester incorporates the best features of its predecessor, the type IVS; meets all AIEE, ASA, and NEMA Standards for intermediate type arresters; and offers other improvements such as low and high current pressure relief.

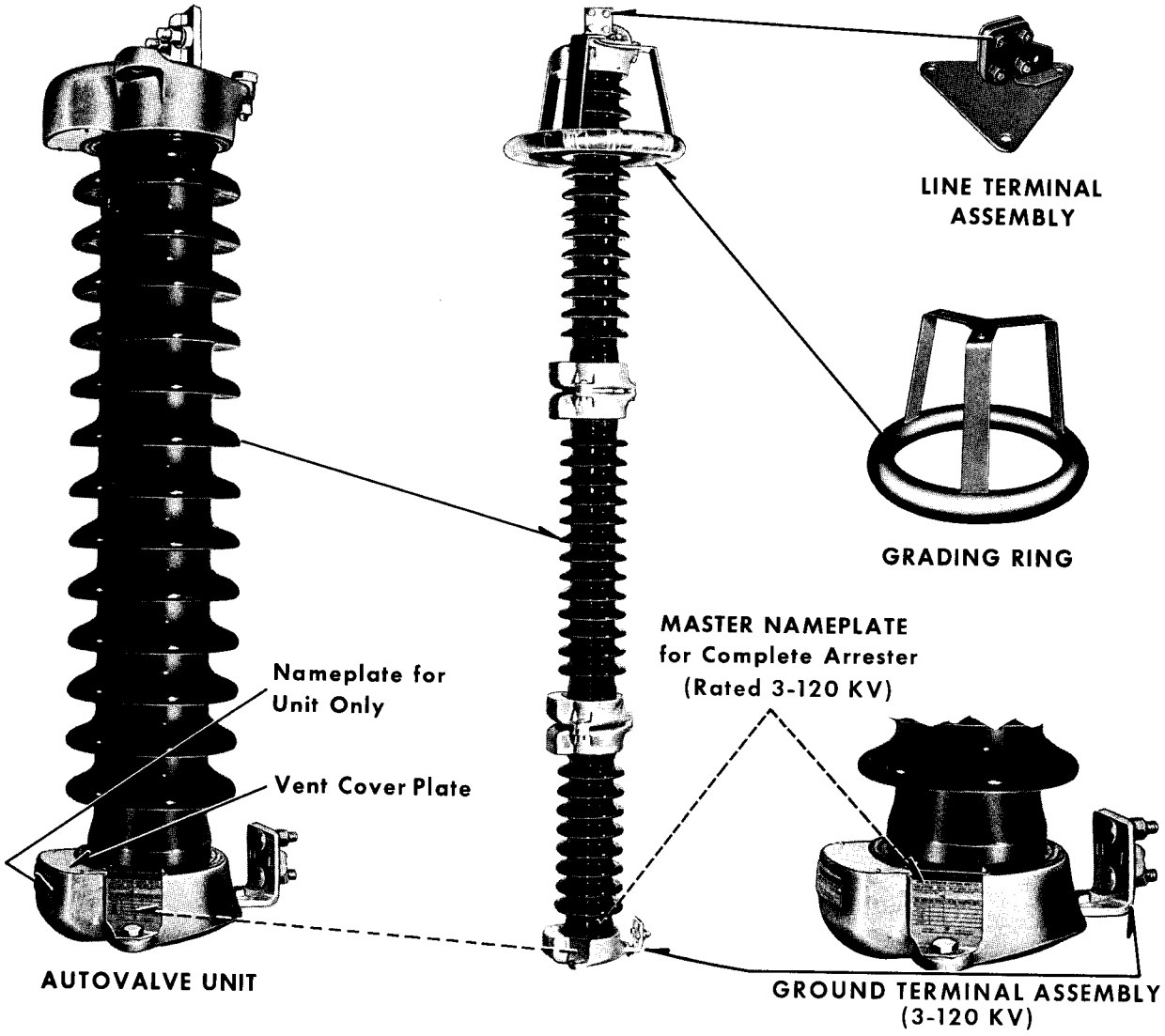

Fig. 1. Type IVS Autovalve Lightning Arrester and Component Parts

Effective November, 1969. Supersedes I.L. 38-130-1, dated June, 1964

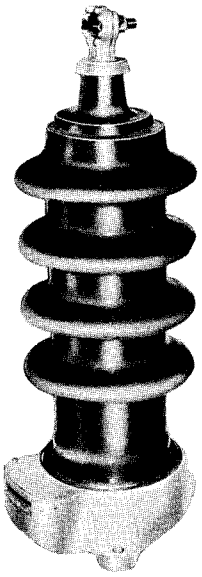

Fig. 2. Porcelain Top Unit 3-15 Kv

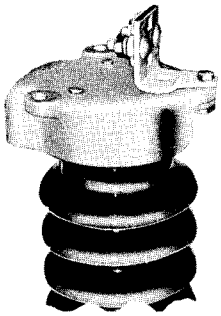

Fig. 3. Line Terminal for 3-72 Kv

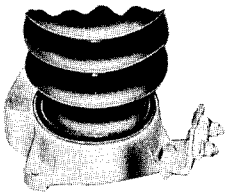

Fig. 4. Ground Terminal 3 - 120 Kv

A special feature of the arrester is an auxiliary low current venting device--located at the bottom of the unit--which functions during low-fault currents to preclude the danger of trapped pressure caused by venting failure.

RECEIVING

Each single pole arrester consists of one or more porcelain clad arrester units and its required attachments. When the arrester is installed, the various parts must be assembled to form the complete arrester pole. The parts, as packaged, consist of the following:

1. Arrester Units. These are the porcelain housings, containing the operating parts. Each unit is an arrester in itself. Units rated 3-15 KV have porcelain tops (Fig. 2) with integral line terminal and should not be used in arrester poles of more than one unit. Units rated 3-40 KV with metal castings at each end (Fig. 1) may be used alone or in multiples until a maximum arrester rating of 120 KV is obtained.

a. For arresters rated 3-120 KV, each standard unit incorporates the pressure relief device. Each unit has a nameplate attached to its base casting (Fig. 1). This nameplate identifies and gives the rating of that arrester unit only and not the complete arrester. Necessary mounting hardware is in a sack tied to one end casting.

2. Line Terminal Assembly (Fig. 1). For use with arresters 90 KV and above.

3. Grading Ring Assembly (Fig. 1). Not used with arresters rated 72 KV and below.

4. Ground Terminal Assembly (Fig. 4). For 3-120 KV ratings, it is supplied with each arrester complete with hardware.

5. All Terminals are suitable for copper or aluminum.

6. Master Nameplate. An L shaped nameplate is supplied with arresters rated 3-120 KV (Fig. 1). This nameplate identifies by style number the arrester pole, its rating and the position of the individual units in the pole. This nameplate is not supplied with the porcelain top arresters 3-15 KV.

7. Non-Standard Arrester Parts (Furnished if Requested). Brackets for cross-arm and wall mounting; cover adapter plates for suspension mounting; base adapting plates for 4 bolt hold mounting of IVS

Shortages should be checked with the carrier, or if not the fault of the carrier, with our nearest Sales Office. If parts do not agree with the packing list, contact the nearest Westinghouse representative, giving him the order reading and other identification.

Table I indicates the number of parts to look for when unpacking any one arrester of a given rating.

For operation above 6000 ft., increase the clearances shown by 3% for each 1000 ft. increase in altitude.

MAX. VOLTAGE RATE KV(RMS)	ARRESTER STYLE NO.	PAGE 3 FIG. REF.	NO. OF SKI-RTS	DIMENSIONS IN INCHES (APPROXIMATE) UP TO 6000 FT. H*	T	S	R	P	N	M	D	L	FOR PORCELAIN TOP UNITS 3-15 KV A	B	C	E
TYPE IVS PORCELAIN TOP																
3	632A158A01	1	1	13.75	9								5.5	5.5	7	8.5
6	632A159A01	1	2	17.87	9								5.5	5.5	7	8.5
9	632A160A01	1	2	17.87	9								7	7	7	8.5
12	632A161A01	1	4	24.25	11								8.5	8.5	8.5	10.5
15	632A162A01	1	4	24.25	11								8.5	8.5	8.5	10.5

MAX. VOLTAGE RATE KV(RMS)	ARRESTER STYLE NO.	PAGE 3 FIG. REF.	NO. OF SKI-RTS	DIMENSIONS IN INCHES (APPROXIMATE) UP TO 6000 FT. H*	T	S	R	P	N	M	D	L	STACK ASSEMBLIES FOR 48-120 KV UNIT POSITION	UNIT KV	UNIT STYLE NUMBER
TYPE IVS METAL TOP															
3	632A571A01	2	2	17.06	14.75	10	6	8					BOTTOM	24	506D419G02
6	632A572A01	2	3	19.31	15	11	6	8.5					SECOND	24	506D419G02
9	632A573A01	2	3	19.31	16	11	6	8.5					BOTTOM	30	506D419G03
12	632A574A01	2	4	21.06	17.75	12	7	9					SECOND	30	506D419G03
15	632A575A01	2	4	21.06	19.25	13	8	10					BOTTOM	36	506D419G04
20	632A175A01	2	6	26.06	20	15	8	10.5					SECOND	36	506D419G04
24	632A176A01	2	8	29.44	21	17.5	10	10.5							
30	632A177A01	2	10	34.69	23	18.5	12	10.5					BOTTOM	30	506D419G03
36	632A178A01	2	13	40.75	25	21	16	10.5					SECOND	30	506D419G03
40	632A179A01	2	14	43.50	26	22	18	10.5					THIRD	30	506D419G03
48	632A180A01	3	16	56.69	33	26	37	16	10	10			BOTTOM	24	506D419G02
60	632A181A01	3	20	67.19	37	30	45	18.5	12	10			SECOND	36	506D419G04
72	632A182A01	3	26	79.31	42	36	54	20.5	16	10			THIRD	36	506D419G04
90	632A665A01	4	30	105.76	55	45	42	35	10	22	20	13	BOTTOM	36	506D419G04
96	632A183A01	4	34	107.62	59.5	49	42	35	10	22	34	13	SECOND	36	506D419G04
108	632A184A01	4	39	118.94	74	59	42	35	18	22	34	24	THIRD	36	506D419G04
120	632A185A01	4	42	127.18	79	67	42	35	18	22	34	19.5	BOTTOM	40	506D419G05
													SECOND	40	506D419G05
													THIRD	40	506D419G05

*OVERALL HEIGHT FROM FOUNDATION TO CENTER OF LINE TERMINAL CLAMP.

Fig. 5. Outline Dimensions of Type IVS Lightning Arresters

TABLE I

RATINGS	PARTS REQUIRED
3 to 15 Kv inclusive	One porcelain top unit with integral line terminal, mounted ground terminal and attached master nameplate.
3 to 40 Kv inclusive	One arrester unit, line terminal assembly, ground terminal assembly and master nameplate.
48 to 72 Kv inclusive	Two arrester units, line terminal assembly, ground terminal assembly, and master nameplate.
90-120 Kv	Three arrester units, line terminal assembly, ground terminal assembly, grading ring, and master nameplate.

INSTALLATION

To afford the highest degree of protection, the arresters should be located near the apparatus to be protected, using leads as short as possible. Each arrester pole should be solidly connected to a low resistance ground, preferably the same one as the apparatus.

CAUTION: Arrester exhaust ports should be directed away from the transformer and other arrester poles.

Installation is begun by laying out a suitable foundation in accordance with the outline drawing for the arrester. See Fig. 5 for clearance and arrester dimensions.

Bolt the bottom arrester unit directly to the foundation. For arresters rated 48 through 120 KV, attach the master nameplate at one of the mounting feet by means of the mounting bolt.

Once the bottom unit and its associated parts are firmly anchored, install the remaining units as indicated on the master nameplate and in the outline drawing.

When all units are bolted in place, and if no grading ring is required, attach the line terminal assembly to the top unit. For arresters requiring a grading ring, add the ring first and then the line terminal assembly.

CAUTION: The line terminal assembly must **NOT** be used to lift the arrester.

RATINGS

The voltage rating given on the nameplate is a maximum rating. It designates the maximum sixty-cycle rms voltage applied across the arrester line and ground terminals against which the arrester is able to return itself to an insulator after having discharged the surge. If the system voltage applied to the arrester terminals under either normal or abnormal conditions (Such as faults) exceeds this rating, the arrester is likely to remain conducting after discharging the surge and will be damaged.

To Change Rating. The arrester voltage rating may be altered in the field by adding, subtracting, or changing arrester units. However, because of a difference in voltage distribution over the arrester unit and a difference in the mounting dimensions, IVS units described in this leaflet are not interchangeable with LVS or any other type of arrester units now in service. In all cases before altering an arrester's rating, consult our nearest District Office.

CAUTION: The arrester pole units should **NOT** be climbed for maintenance or any other purpose.

TESTING

All arrester units are tested at the factory. Each valve element is surge tested, the complete arrester unit is tested for its sixty cycle sparkover, and for radio interference. In addition, each unit is pressure tested to insure that it is tightly sealed against entrance of moisture. Units should not be opened in the field, as to do so would break the seal; leading to the possibility of moisture entrance and consequent deterioration of the arrester.

arresters; insulating base unit for use with discharge counter.

These arresters are for operation at altitudes up to 10,000 feet.

UNPACKING

Unpack carefully and examine for breakage or other damage, especially to the porcelain. If damage exists, save the container and packing and notify the carrier.

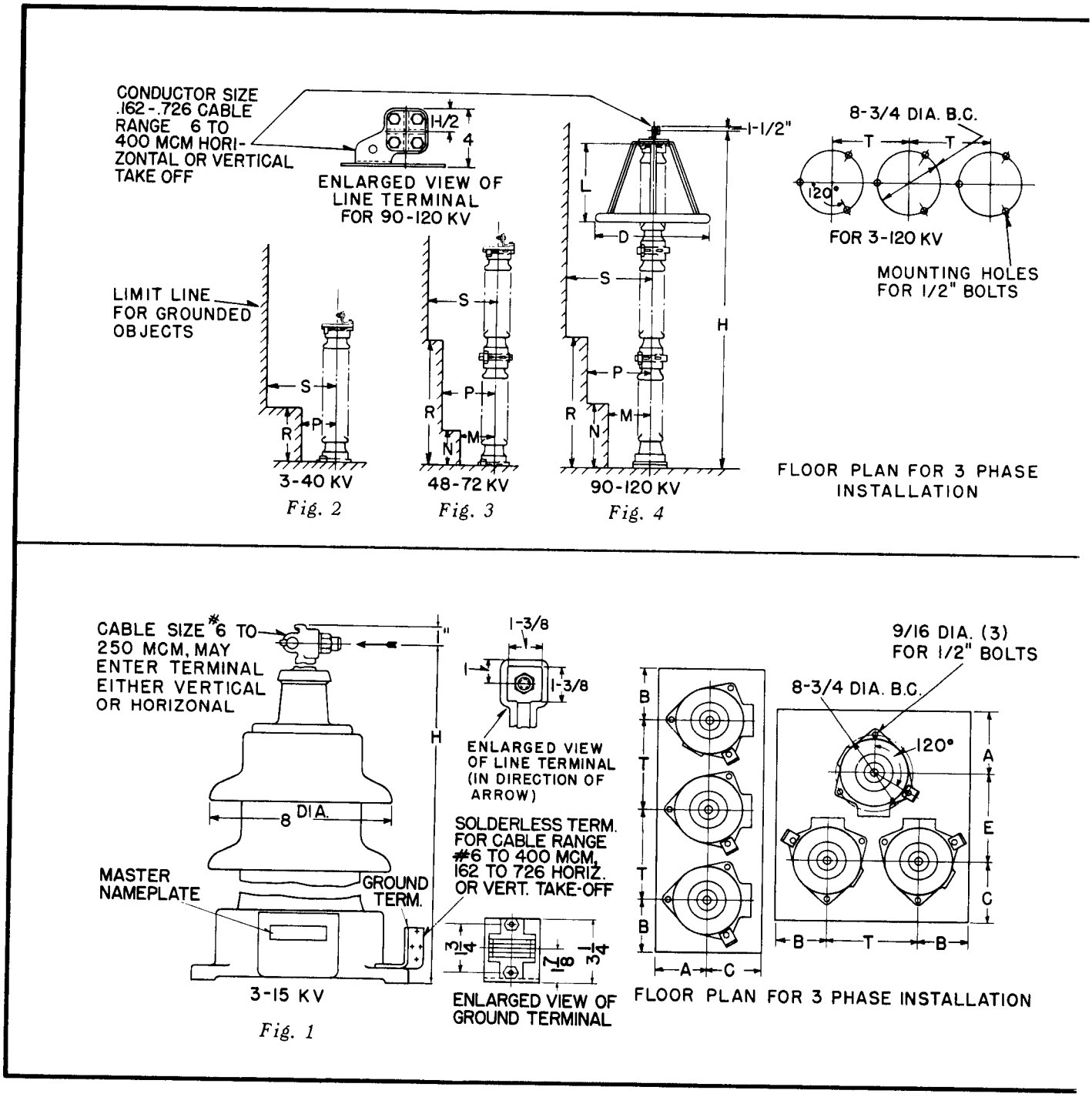

Fig. 5. Outline Dimensions of Type IVS Lightning Arresters

No simple field tests will check the complete characteristics of an arrester unit, since this requires considerable laboratory equipment.

If an arrester is suspected of having been damaged in service, the only field tests that should be attempted are sixty cycle sparkover, Doble, or "Megger", then only on clean, dry arresters. It must be understood, however, that such tests will not determine the condition of the valve elements.

If 60 cycle sparkover tests are made, the circuit should provide a means for limiting the maximum possible current through the arrester to 30 milliamperes or less and such current should not flow for more than 5 seconds. The voltage should be run up to sparkover quickly so as not to overheat the gap shunting resistors.

It may be found that Doble or Megger tests on units of the same rating will give different readings. However, if one unit shows considerable deviation from the rest, its condition may be open to question. It is more significant to make periodic readings and note the trends of the readings.

MAINTENANCE

The Autovalve arrester requires no regular maintenance other than an occasional inspection. In locations where the porcelain becomes contaminated by dirt, soot, salt, etc., it is recommended that the arresters be cleaned periodically.

Caution: It is not recommended that arresters consisting of more than two units be washed while they are energized.

Correspondence. Direct any inquires pertaining to the lightning arrester to the nearest Westinghouse Sales Office giving all information stated on the master nameplate.

Westinghouse Electric Corporation

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Printed in U.S.A.