



## INSTALLATION INSTRUCTIONS

INSTRUCTION SHEET NO. 17-5144 (10/06)

### DYNAVAR® UNDER-OIL DISTRIBUTION SURGE ARRESTERS

#### ⚠CAUTION

The equipment covered by these instructions should be installed and serviced only by competent personnel familiar with good safety practices. This instruction is written for such personnel and is not intended as a substitute for adequate training and experience in safe procedures.

#### ⚠WARNING

Prior to installing this product, check the nameplate information to verify that it is the correct product for the application. Verify that the nameplate information corresponds to the information provided on the outline drawing.

### INTRODUCTION

The DynaVar® under-oil distribution arrester is designed to limit surge voltage by discharging the surge current to ground. The arrester is for application under oil. It will meet or exceed the application requirements of IEEE C62.11 and IEC 60099-4 standards for metal oxide surge arresters for AC Power Circuits.

The arrester, shown in Figure 1, contains a number of metal-oxide valve elements mounted securely inside a phenolic housing. The arrester is shipped fully assembled.

The DynaVar® under-oil arrester is designed to be used inside a distribution transformer, immersed in insulating liquid. The arrester can be used where the maximum temperature does not exceed 125 °C, and where the weighted average temperature does not exceed 90 °C.

The catalog number, rating, and maximum continuous voltage capability are identified on the nameplate, which is imprinted on the phenolic housing near the line end.

#### ⚠WARNING

**DynaVar arresters must be applied where the continuous phase-to-ground voltage at the arrester location does not exceed the arrester continuous voltage capability as indicated on the nameplate. Arrester physical size may not determine the voltage rating. Do not install arrester if type, rated voltage/ $U_r$  and maximum continuous operating voltage/ $U_c$  data are not exactly the same on the nameplate and packaging labels.**

If at any time it is necessary to correspond with Hubbell Power Systems, complete nameplate data should be furnished in order to expedite replies.

### INITIAL INSPECTION

#### ⚠CAUTION

**Unusually rough handling during shipment can result in damage to the housing, which may ultimately lead to an arrester failure. Inspect each arrester carefully for evidence of damage. If damage is apparent, do not install the arrester.**

### INSTALLATION

The arrester may be mounted vertically or horizontally. The arrester can be mounted to a grounded surface, provided that the creepage distance along the bracket from ground to the nearest surface of the arrester housing is not less than 1.75 inches (45mm). When so installed, the creepage distance from the line electrode to ground is sufficient to withstand BIL levels shown in Table 1.

The line and ground leads must be restrained. Holes are provided in the mounting bracket, as shown in Figure 1, for securing the leads. This is necessary to prevent a ground lead from contacting an energized surface in the event of an arrester failure. When securing the leads to the bracket, apply normal practices with respect to clearances between insulated leads and energized or grounded surfaces.

The arrester lead connections must not place excessive mechanical stress on the arrester terminals. Lateral force to the terminals should be limited to less than 15 lbf (67 N).

## FUSING

The DynaVar® under-oil arrester qualifies for fail “OPEN” per IEEE C62.11 and IEC 60099-4 when the short circuit current exceeds the values tabulated in Table 1. An arrester fails “OPEN” if, after the fault current is interrupted by an over-current protective device, the resultant arrester circuit is an open circuit. Tests have indicated that the force of fragmentation will be damped by the surrounding insulating liquid, thereby preventing damage to adjacent components such as core and coils.

In a vertical-mount position, alongside the transformer coils, the ejected internal parts will fall to the bottom of the tank. If the arrester is mounted above the core and coils, a pressboard (or similar) shield should be used to prevent ejected parts from falling into the windings of the transformer.

The transformer should not be tested (impulse or hipot) with the arrester connected. If the arrester is connected to the transformer during impulse test, the arrester will clamp the voltage; thus the transformer will not be subjected to full test voltage. If the arrester is connected to the transformer during hipot test, it is highly probable that the arrester will be damaged by this overvoltage.

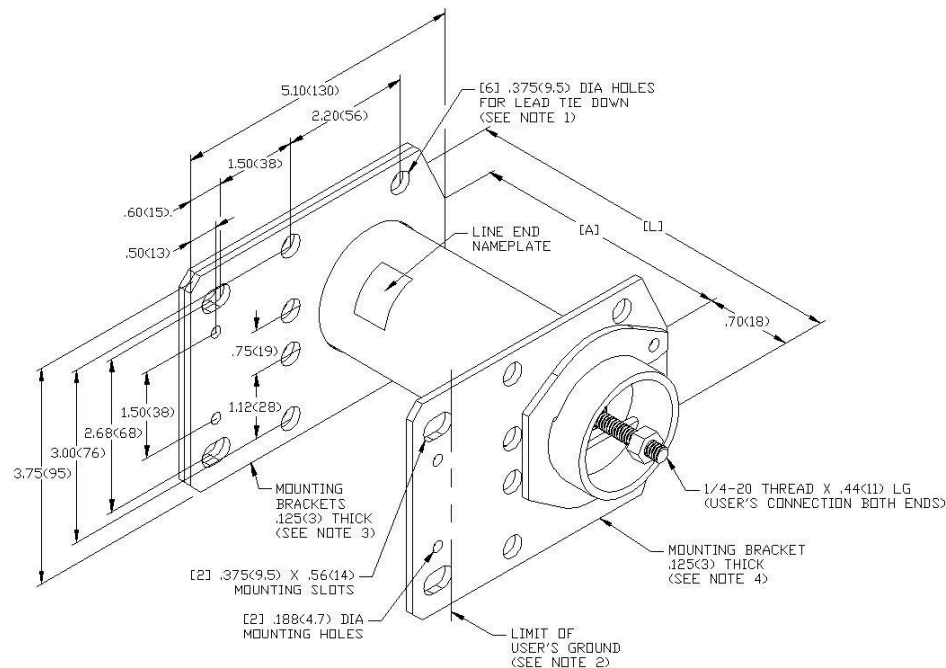
Generally the use of under-oil arresters should not affect fusing practice. In the case of internal fusing, it is the energy released by the fuse which limits transformer cover retention capability.

## ARRESTER CARE

Normal care taken in handling the arrester will prevent the possibility of damage to the metal-oxide valve elements. For example, do not allow the arrester to be impacted by, or on, other objects and be shocked mechanically.

The arrester is constructed of materials that have little or no moisture absorbing capacity. Special precautions are not necessary to prevent the arrester from being exposed to moisture laden air prior to installation. A normal transformer treat or bake out should be sufficient to remove any moisture which may have been introduced into the transformer and absorbed by the arrester surfaces.

The arrester does not require testing. No test which applies power-frequency voltage in excess of arrester voltage rating should be made without consulting the Hubbell Power Systems. There is no single field test which will indicate the complete operating characteristics of the arrester.



**Figure 1**

**NOTES:**

1. Line and ground lead connections are 1/4-20 UNC-2A threads with 0.44 inches (11 mm) of threads exposed.
2. To maintain the BIL, the mounting bracket must not overlap the grounded structure by more than 0.95 inches (24 mm).
3. Three mounting brackets supplied for 27 kV and 30 kV ratings only; two mounting brackets supplied for all other ratings. For vertical mounting, all brackets may be moved to the upper end or one bracket may be positioned at another location; for vertical mounting of 27 kV and 30 kV rated units, at least two of the three brackets must be used at the upper end. For horizontal mounting, the brackets should be located such that their separation is not be less than 0.75 times dimension "A".

**Table 1**

<b>Rated Voltage</b>  kV rms	<b>Maximum Continuous Operating Voltage</b>  kV rms	<b>BIL (see note 2)</b>  kV crest	<b>Fail Open Current Rating</b>  A rms	<b>L</b>  in (mm)	<b>Mass</b>  lb (kg)	<b>A</b>  in (mm)	<b>B</b>  in (mm)
3	2.55	75	*	2.94 (74.7)	0.80 (1.76)	1.74 (44.2)	1.54 (39.1)
6	5.1	75	2000	4.00 (101.6)	1.50 (3.30)	2.80 (71.1)	2.60 (66.0)
9	7.65	95	1000	4.96 (126.0)	1.90 (4.18)	3.76 (95.5)	3.56 (90.4)
10	8.4	95	1000	5.24 (133.1)	2.00 (4.40)	4.04 (102.6)	3.84 (97.5)
12	10.2	95	500	6.00 (152.4)	2.30 (5.06)	4.80 (121.9)	4.60 (116.8)
15	12.7	125	500	6.90 (175.3)	2.70 (5.94)	5.70 (144.8)	5.50 (139.7)
18	15.3	125	500	8.02 (203.7)	3.20 (7.04)	6.82 (173.2)	6.62 (168.1)
21	17	125	500	8.68 (220.5)	3.50 (7.70)	7.48 (190.0)	7.28 (184.9)
27	22	150	500	10.90 (276.9)	4.40 (9.68)	9.70 (246.4)	9.50 (241.3)
30	24.4	150	500	11.86 (301.2)	4.90 (10.78)	10.66 (270.8)	10.46 (265.7)

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*These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to Hubbell Power Systems.*