SUBJECT: Technical Specifications for VariSTAR® MUS MOV Arrester Modules – **IEEE**® Station/IEC Class 2

Technical Data

TD-245

APPLICATION

These epoxy-fiberglass reinforced modules containing Metal Oxide Varistors (MOV) are for use as active elements in IEC Class 2 and **IEEE**® station class gapless surge arresters when applied in appropriately designed housing.

Individual modules are sealed within a plastic bag and display the module number, see Figure 3 and Figure 4.

Table 1
Suggested Usage & Class Ratings

U_r (Rating)	I_N	U_c (MCOV)	IEC Line Dicharge Class	IEC High Current IEEE® HCSD	Energy Absorption Level kJ/kV of U_c (1 impulse)	Energy Absorption Level kJ/kV of U_c (2 impulse)*	I_{ref}	V_{ref} Min	Cantilever Strength 12 mm Stud (Nm)	Cantilever Strength 1 inch Stud (Nm)
3-60 kV	10 kA	2.55-48 kV	2	100 kA	3.4	5.5	6.0 mA	U_c x 1.24	1,130	1,695

* Rating based on two impulses with 1 minute between impulses.
** The dimensions refers to the thread size in the electrodes and to achieve the cantilever strength shown, the corresponding stud size must be used.

Table 2
Maximum Residual Voltages – Protective Characteristics – VariSTAR MUS MOV Arrester Modules

U_r Arrester Rating (kV rms)	U_c /COV (kV rms)	IEC Steep Current Residual Voltage (kV crest)	IEEE® Front-of-Wave Protective Level (kV crest)	Lightning Impulse Residual Voltage (kV crest) 8/20 µs Current Wave						Switching Impulse Residual Voltage (kV crest) 30/60 µs Current Wave			
				1.5 kA	3 kA	5 kA	10 kA	20 kA	40 kA	125 A	250 A	500 A	1000 A
3	2.55	9.2	9.3	7.0	7.4	7.7	8.4	9.4	11	6.1	6.3	6.5	6.7
6	5.10	17.9	18.2	13.9	14.7	15.4	16.7	18.6	21.4	12.2	12.6	13.0	13.5
9	7.65	26.8	27.2	20.9	22.0	23.1	25.0	27.7	31.7	18.3	18.9	19.5	20.2
10	8.40	29.3	29.7	23.0	24.2	25.4	27.4	30.4	34.8	20.1	20.7	21.4	22.2
12	10.2	35.6	36.0	27.9	29.4	30.8	33.1	36.9	42.1	24.4	25.2	26.0	26.9
15	12.7	44.2	44.7	34.7	36.6	38.3	41.4	45.9	52.2	30.4	31.3	32.4	33.5
18	15.3	53.0	53.7	41.8	44.0	46.2	49.8	55.2	62.8	36.6	37.7	39.0	40.4
21	17.0	58.9	59.7	46.4	48.9	51.3	55.4	61.3	69.7	40.7	41.9	43.4	44.9
24	19.5	67.5	68.4	53.3	56.1	58.8	63.5	70.3	79.9	46.7	48.1	49.8	51.5
27	22.0	76.1	77.0	60.1	63.3	66.3	71.6	79.3	90.0	52.7	54.3	56.1	58.1
30	24.4	84.4	85.4	66.6	70.2	73.6	79.4	87.9	100	58.4	60.2	62.3	64.4
33	27.5	95.0	96.2	75.1	79.1	82.9	89.5	99.1	112	65.9	67.8	70.2	72.6
36	29.0	100	101	79.2	83.4	87.4	94.4	105	119	69.5	71.5	74.0	76.6
39	31.5	109	111	86.0	90.6	95.0	103	113	129	75.4	77.7	80.4	83.1
42	34.0	118	119	92.8	97.8	103	111	122	139	81.4	83.9	86.8	89.7
45	36.5	126	128	100	105	110	119	131	149	87.4	90.0	93.1	96.3
48	39.0	135	136	107	112	118	127	140	159	93.4	96.2	100	103
54	42.0	145	147	115	121	127	137	151	171	101	104	107	111
60	48.0	165	167	131	138	145	156	173	196	115	118	123	127

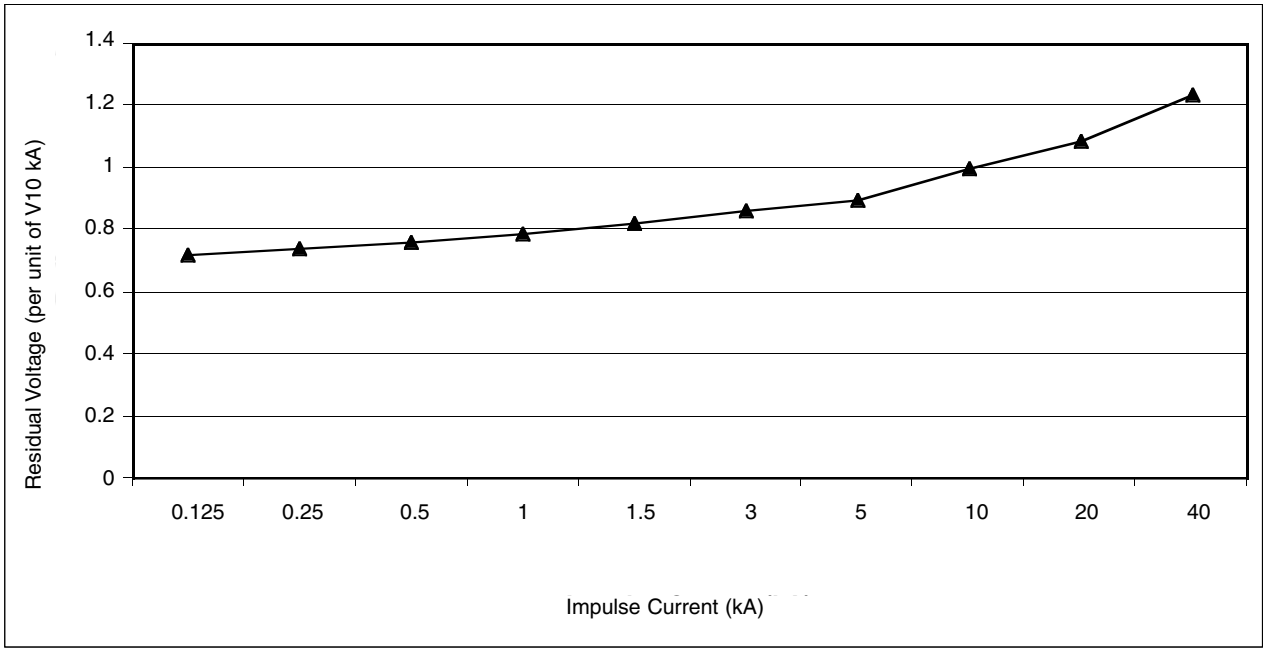

Figure 1
Residual Voltage vs Impulse Current

TEMPORARY OVERVOLTAGE CAPABILITY

Typical data, actual results dependent on arrester design.

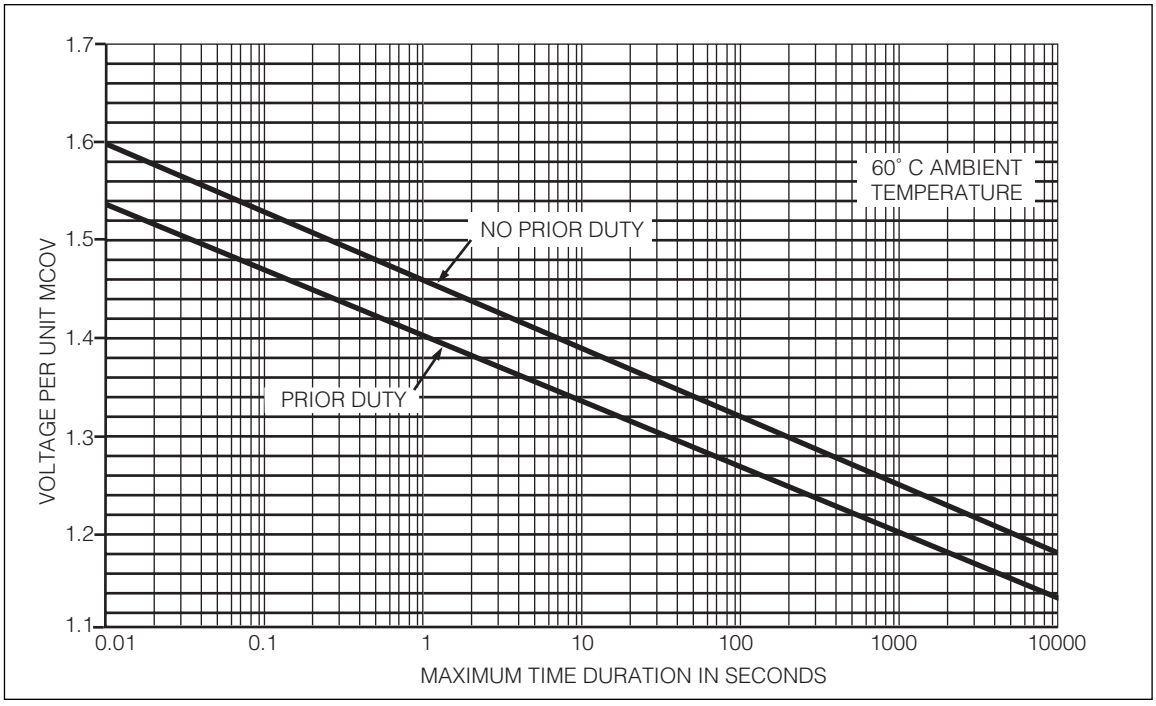

Figure 2
Temporary Overvoltage Capability, 60°C

Module Cat. No.	Arrester Rating kV	Housing Code	Dimension (A)		Weight (kg)
			Inches	mm	
MUS2A00206	3	6	4.61	117	0.7
MUS2A00208	3	8	6.15	156	0.8
MUS2A00506	6	6	4.61	117	1.1
MUS2A00508	6	8	6.15	156	1.2
MUS2A00708	9	8	6.15	156	1.5
MUS2A00710	9	10	7.68	195	1.6
MUS2A00808	10	8	6.15	156	1.5
MUS2A00810	10	10	7.68	195	1.6
MUS2A01010	12	10	7.68	195	1.9
MUS2A01012	12	12	9.22	234	2.0
MUS2A01014	12	14	10.75	273	2.1
MUS2A01212	15	12	9.22	234	2.4
MUS2A01214	15	14	10.75	273	2.4
MUS2A01216	15	16	12.29	312	2.5
MUS2A01512	18	12	9.22	234	2.7
MUS2A01514	18	14	10.75	273	2.8
MUS2A01516	18	16	12.29	312	2.9
MUS2A01518	18	18	13.83	351	2.9
MUS2A01712	21	12	9.22	234	2.7
MUS2A01714	21	14	10.75	273	2.8
MUS2A01716	21	16	12.29	312	2.9
MUS2A01718	21	18	13.83	351	2.9
MUS2A01914	24	14	10.75	273	3.1
MUS2A01916	24	16	12.29	312	3.2
MUS2A01918	24	18	13.83	351	3.3
MUS2A01920	24	20	15.36	390	3.3
MUS2A01922	24	22	16.90	429	3.5
MUS2A02216	27	16	12.29	312	3.6
MUS2A02218	27	18	13.83	351	3.7
MUS2A02220	27	20	15.36	390	3.7
MUS2A02222	27	22	16.90	429	3.8
MUS2A02224	27	24	18.44	468	3.9
MUS2A02418	30	18	13.83	351	4.0
MUS2A02420	30	20	15.36	390	4.1
MUS2A02422	30	22	16.90	429	4.1
MUS2A02424	30	24	18.44	468	4.2
MUS2A02426	30	26	19.97	507	4.3
MUS2A02718	33	18	13.83	351	4.3
MUS2A02720	33	20	15.36	390	4.4
MUS2A02722	33	22	16.90	429	4.5
MUS2A02724	33	24	18.44	468	4.5
MUS2A02726	33	26	19.97	507	4.6
MUS2A02728	33	28	21.51	546	4.7
MUS2A02730	33	30	23.05	585	4.8
MUS2A02918	36	18	13.83	351	4.7
MUS2A02920	36	20	15.36	390	4.8
MUS2A02922	36	22	16.90	429	4.9
MUS2A02924	36	24	18.44	468	4.9
MUS2A02926	36	26	19.97	507	5.0
MUS2A02928	36	28	21.51	546	5.1
MUS2A02930	36	30	23.05	585	5.2
MUS2A03120	39	20	15.36	390	5.1
MUS2A03122	39	22	16.90	429	5.2
MUS2A03124	39	24	18.44	468	5.3
MUS2A03126	39	26	19.97	507	5.3

Module Cat. No.	Arrester Rating kV	Housing Code	Dimension (A)		Weight (kg)
			Inches	mm	
MUS2A03128	39	28	21.51	546	5.4
MUS2A03130	39	30	23.05	585	5.5
MUS2A03422	42	22	16.90	429	5.5
MUS2A03424	42	24	18.44	468	5.6
MUS2A03426	42	26	19.97	507	5.7
MUS2A03428	42	28	21.51	546	5.7
MUS2A03430	42	30	23.05	585	5.8
MUS2A03622	45	22	16.90	429	5.9
MUS2A03624	45	24	18.44	468	6.0
MUS2A03626	45	26	19.97	507	6.1
MUS2A03628	45	28	21.51	546	6.1
MUS2A03630	45	30	23.05	585	6.2
MUS2A03926	48	26	19.97	507	6.4
MUS2A03928	48	28	21.51	546	6.5
MUS2A03930	48	30	23.05	585	6.5
MUS2A04226	54	26	19.97	507	6.7
MUS2A04228	54	28	21.51	546	6.8
MUS2A04230	54	30	23.05	585	6.9
MUS2A04830	60	30	23.05	585	7.3

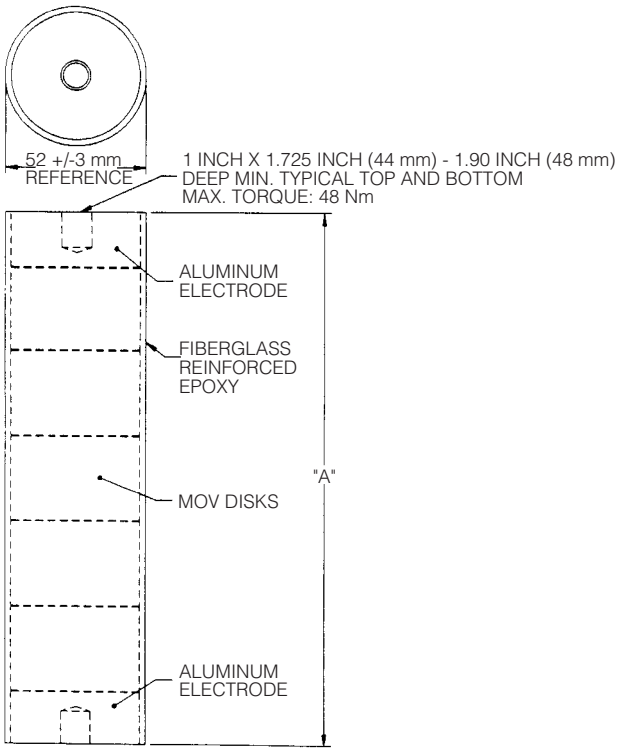

Figure 3
IEEE® Station/IEC Class 2 VariSTAR MOV Module Catalog Numbers and Dimensions for modules with a 1 inch threaded hole in the electrodes

Module Cat. No.	Arrester Rating kV	Housing Code	Dimension (A)		Weight (kg)
			Inches	mm	
MUS2B00208	3	8	6.15	156	0.9
MUS2B00510	6	10	7.68	196	1.3
MUS2B00512	6	12	9.22	234	1.4
MUS2B00710	9	10	7.68	195	1.7
MUS2B00712	9	12	9.22	234	1.8
MUS2B00714	9	14	10.75	273	1.9
MUS2B00810	10	10	7.68	195	1.7
MUS2B00812	10	12	9.22	234	1.8
MUS2B00814	10	14	10.75	273	1.9
MUS2B01012	12	12	9.22	234	2.1
MUS2B01014	12	14	10.75	273	2.2
MUS2B01016	12	16	12.29	312	2.3
MUS2B01214	15	14	10.75	273	2.5
MUS2B01216	15	16	12.29	312	2.6
MUS2B01218	15	18	13.83	351	2.7
MUS2B01220	15	20	15.36	390	2.8
MUS2B01514	18	14	10.75	273	2.9
MUS2B01516	18	16	12.29	312	3.0
MUS2B01518	18	18	13.83	351	3.1
MUS2B01520	18	20	15.36	390	3.2
MUS2B01522	18	22	16.90	429	3.3
MUS2B01716	21	16	12.29	312	3.3
MUS2B01718	21	18	13.83	351	3.4
MUS2B01720	21	20	15.36	390	3.5
MUS2B01722	21	22	16.90	429	3.6
MUS2B01724	21	24	18.44	468	3.7
MUS2B01918	24	18	13.83	351	3.7
MUS2B01920	24	20	15.36	390	3.8
MUS2B01922	24	22	16.90	429	3.9
MUS2B01924	24	24	18.44	468	4.0
MUS2B01926	24	26	19.97	507	4.1
MUS2B02218	27	18	13.83	351	4.1
MUS2B02220	27	20	15.36	390	4.1
MUS2B02222	27	22	16.90	429	4.3
MUS2B02224	27	24	18.44	468	4.4
MUS2B02226	27	26	19.97	507	4.5
MUS2B02228	27	28	21.51	546	4.7
MUS2B02230	27	30	23.05	585	4.8
MUS2B02420	30	20	15.36	390	4.5
MUS2B02422	30	22	16.90	429	4.6
MUS2B02424	30	24	18.44	468	4.7
MUS2B02426	30	26	19.97	507	4.8
MUS2B02428	30	28	21.51	546	4.9
MUS2B02430	30	30	23.05	585	5.1
MUS2B02722	33	22	16.90	429	4.9
MUS2B02724	33	24	18.44	468	5.0
MUS2B02726	33	26	19.97	507	5.1
MUS2B02728	33	28	21.51	546	5.2
MUS2B02730	33	30	23.05	585	5.4
MUS2B02922	36	22	16.90	429	5.3
MUS2B02924	36	24	18.44	468	5.4
MUS2B02926	36	26	19.97	507	5.5
MUS2B02928	36	28	21.51	546	5.6
MUS2B02930	36	30	23.05	585	5.8
MUS2B03124	39	24	18.44	468	5.7
MUS2B03126	39	26	19.97	507	5.8
MUS2B03128	39	28	21.51	546	5.9
MUS2B03130	39	30	23.05	585	6.0
MUS2B03426	42	26	19.97	507	6.1
MUS2B03428	42	28	21.51	546	6.2
MUS2B03430	42	30	23.05	585	6.3
MUS2B03626	45	26	19.97	507	6.5
MUS2B03628	45	28	21.51	546	6.6
MUS2B03630	45	30	23.05	585	6.7
MUS2B03928	48	28	21.51	546	6.9
MUS2B03930	48	30	23.05	585	7.0
MUS2B04230	54	30	23.05	585	7.3
MUS2B04830	60	30	23.05	585	7.7

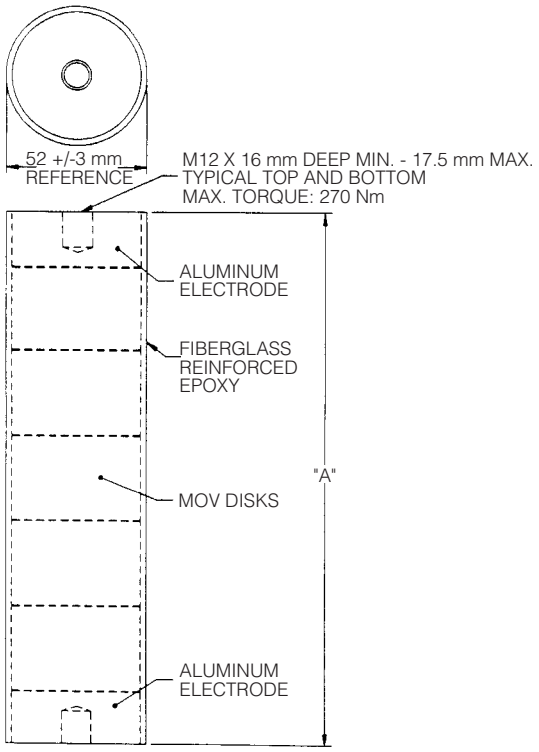

Figure 4
IEEE® Station/IEC Class 2 VariSTAR MOV Module Catalog Numbers and Dimensions for modules with a 12 mm threaded hole in the electrodes

FACTORY ROUTINE TESTS

- Visual Inspection
- Reference Voltage Test
- Partial Discharge Test
- Watts Loss Test
- Residual Voltage Test

Cooper Power Systems, Inc. reserves the right to make changes to its product specifications, performance data or characteristics, at any time, without prior notice, and without creating any obligations on its part. Accordingly, the use of the information contained herein creates no liability on the part of Cooper Power Systems, Inc.

COOPER Power Systems

1045 Hickory Street
Pewaukee, WI 53072 USA
www.cooperpower.com