SYSTEM PROTECTION

I. FUSE COORDINATION

I.1. GENERAL

I.1.1. The purpose of protective coordination is to provide isolation of a fault as close to the fault as possible so that a minimum of customers will be affected. The workhorse of the JEA protection scheme is the fuse. By following the fuse tables given in this section, the fuse closest to a fault will melt first providing proper coordination and fault isolation.

I.1.2. The fuse tables are divided into three major groups:

I.1.2.1. GROUP A Lateral Fusing

This shows the required fuses for the fusing of laterals and sub-laterals. Tables for overhead and underground laterals behind substation breakers and reclosers are given for each system voltage.

I.1.2.2. GROUP B: Equipment Protection Fusing

This provides the fuse sizes for the protection of transformers and capacitors.

I.1.2.3. GROUP C: Fuse Coordination

This has various tables for coordinating one type of fuse link behind another type of fuse link.

I.1.3. In order to maintain a properly functioning fuse coordination system, the fuse tables presented in this section must be followed in both system design and maintenance.

I.1.4. If an installed fuse will not hold the connected load and a larger fuse is installed, the party installing the larger size fuse shall notify the USC System Analysis Process of (1) the location, (2) the old fuse size, and (3) the new fuse size.

I.1.5. If a fuse is replaced with a different size fuse because the required size was not available, the party installing the different size fuse shall notify the Systems Operation Control Center so the proper size fuse can be reinstalled.

II. GROUP A: LATERAL FUSING

II.1. GENERAL COMMENTS

II.1.1. Underground Laterals:

Fuse the lateral at the tap with the correct size lateral fuse if the lateral meets ANY of the following conditions:

II.1.1.1. The tap occurs in an underground fusing cabinet.

II.1.1.2. The transformer served is equipped with bay-o-net fuses.

II.1.1.3. More than one transformer is served.

II.1.1.4. There are provisions for extending the lateral.

II.2. FUSING BEHIND SECTIONALIZERS:

Sectionalizers do not have time-current characteristics and therefore do not affect coordination between a fuse and an upstream breaker or recloser. When selecting fuses behind a sectionalizer, the presence of the sectionalizer should be ignored.

III. GROUP A: LATERAL FUSING -- 15.2/26.4KV DISTRIBUTION SYSTEM

III.1. NOTES:

III.1.1. In the event that the tap off the main line fuse or sublateral fuse does not provide adequate current carrying capacity, notify the USC System Analysis Process.

III.1.2. A "*" denotes single phase hydraulic reclosers taken over as part of "Okefenokee" takeover and are being temporarily used on JEA's system. For coordination purposes, ignore the existence of these reclosers.

TABLE 1: OVERHEAD LATERAL & CABLE POLE FUSING (T-LINK)
26.4 kV System Behind Station Breaker

CONDUCTOR SIZE	TAP OFF MAIN LINE
1/0 AL. or 2 CU. or 2 AL.	100T
4 CU.	80T
4 AL. OR 6 CU. or Smaller	65T
CABLE POLE 1/0 AL. CABLE or Smaller	100T

TABLE 2: UNDERGROUND LATERAL FUSING (E-LINK)
26.4 kV System Behind Station Breaker

CABLE SIZE	TAP OFF MAIN LINE	1ST SUB-LATERAL FUSE	2ND SUB-LATERAL FUSE
1/0 AL. OR SMALLER	150E	100E	50E

IV. GROUP B: EQUIPMENT PROTECTION FUSING

TABLE 1: LINE CAPACITOR BANK FUSING

3-PHASE BANK KVAR	SYSTEM VOLTAGE 2.4/4.16 kV	SYSTEM VOLTAGE 15.2/26.4 kV
150	25T	–
300	50T	–
600	100T	15T
1200	–	25T

TABLE 2: TRANSFORMER FUSING -- 15.2/26.4 K

TRANSFORMER			FUSE LINKS – OVERHEAD (1)				BAY-O-NET FUSES UNDERGROUND	
KVA 1-PHASE OH/UG	KVA 3 PHASE PADS	FULL LOAD AMPS	JEA ITEM ID	CHANCE TYPE	KEARNEY TYPE	COOPER TYPE	JEA ITEM ID	RTE TYPE
5	–	.33	FUS OH 019	0.4 SF	1/2 X	–	–	–
10	–	.66	FUS OH 020	0.7 SF	1 X	–	–	–
15	–	.99	FUS OH 021	1.0 SF	1-1/2 X	–	–	–
25	–	1.65	FUS OH 022	1.6 SF	2-1/2 X	–	FUS UG 021	C3
37.5	–	2.47	FUS OH 023	2.1 SF	3-1/2 X	–	–	–
50	–	3.29	FUS OH 024	3.1 SF	4 X	–	FUS UG 022	C5
75	–	4.93	FUS OH 026	5.2 SF	7 X	–	FUS UG 022	C5
100	–	6.58	FUS OH 027	7.0 SF	10 X	–	FUS UG 023	C8
167	–	10.98	FUS OH 028	10.4 SF	15 X	–	FUS UG 023	C8
250	–	16.45	FUS OH 029	14 SF	25 KS	25 S	FUS UG 024	C10
–	75	1.64	–	–	–	–	FUS UG 021	C3
–	150	3.28	–	–	–	–	FUS UG 022	C5
–	225	4.92	–	–	–	–	FUS UG 022	C5
–	300	6.56	–	–	–	–	FUS UG 023	C8
–	500	10.94	–	–	–	–	FUS UG 024	C10
–	750	16.40	–	–	–	–	FUS UG 024	C10
–	1000	21.87	–	–	–	–	FUS UG 024	C10
–	1500	32.80	–	–	–	–	FUS UG 025	C12
–	2500	54.67	–	–	–	–	FUS UG 026	C14
–	3750	82.00	–	–	–	–	FUS UG 048	C17

(1) FUSE LINKS – Overhead applies to pole mounted transformers as well as padmounted transformers not equipped with BAY-O-NET fuses that are fused at the cable pole. See Group A General Comments on underground laterals.

TABLE 3: TRANSFORMER FUSING -- 7.6/13.2 kV

TRANSFORMER			FUSE LINKS - OVERHEAD (1)				BAY-O-NET FUSES	
KVA 1 PHASE	KVA 3 PHASE PADS	FULL LOAD AMPS	JEA ITEM ID	CHANCE TYPE	KEARNEY TYPE	COOPER TYPE	JEA ITEM ID	RTE TYPE
5	–	.66	FUS OH 020	0.7 SF	1 X	–	–	–
10	–	1.31	FUS OH 022	1.6 SF	2-1/2 X	–	–	–
15	–	1.97	FUS OH 023	2.1 SF	3-1/2 X	–	–	–
25	–	3.28	FUS OH 024	3.1 SF	4 X	–	–	–
37.5	–	4.92	FUS OH 026	5.2 SF	7 X	–	–	–
50	150	6.56	FUS OH 027	7.0 SF	10 X	–	FUS UG 023	C8
75	225	9.84	FUS OH 028	10.4 SF	15 X	–	FUS UG 023	C8
100	300	13.12	FUS OH 029	14 SF	25 KS	25 S	FUS UG 024	C10
167	500	21.92	FUS OH 030	21 SF	30 KS	30 S	FUS UG 024	C10
250	750	32.80	FUS OH 031	32 SF	50 KS	50 S	FUS UG 025	C12
333	1000	43.70	FUS OH 032	46 SF	65 KS	65 S	FUS UG 025	C12
500	1500	65.60	FUS OH 033	100 MS	100 KS	100 S	FUS UG 026	C14

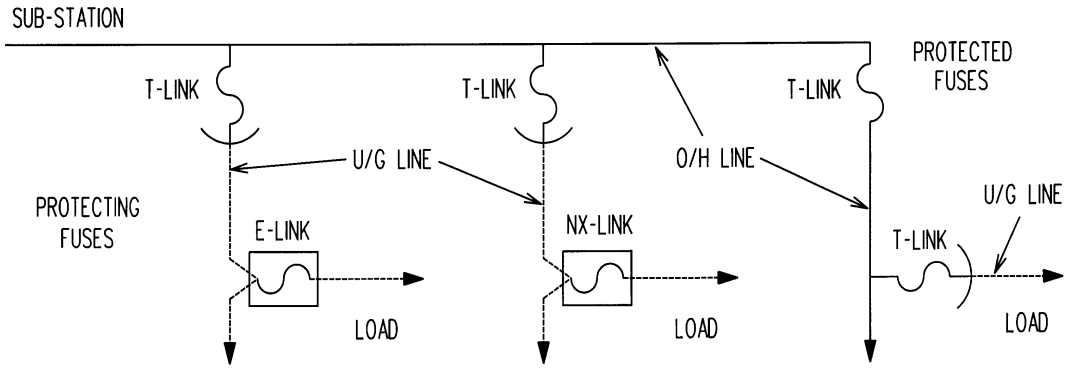
(1) FUSE LINKS – Overhead applies to pole mounted transformers as well as padmounted transformers not equipped with BAY-O-NET fuses that are fused at the cable pole. See Group A general comments on underground laterals.

TABLE 4: TRANSFORMER FUSING -- 2.4/4.16kV

TRANSFORMER		FUSE LINKS - OVERHEAD			
KVA 1 PHASE	FULL LOAD AMPS	JEA ITEM ID	CHANCE TYPE	KEARNEY TYPE	COOPER TYPE
3	1.25	FUS OH 022	1.6 SF	2-1/2 X	--
5	2.08	FUS OH 023	2.1 SF	3-1/2 X	--
7.5	3.13	FUS OH 024	3.1 SF	4 X	--
10	4.17	FUS OH 025	4.2 SF	5-1/2 X	
15	6.25	FUS OH 027	7.0 SF	10 X	--
25	10.42	FUS OH 028	10.4 SF	15 X	--
37.5	15.60	FUS OH 029	14 SF	25 KS	25 S
50	20.80	FUS OH 030	21 SF	30 KS	30 S
75	31.30	FUS OH 031	32 SF	50 KS	50 S
100	41.70	FUS OH 032	46 SF	65 KS	65 S
167	69.60	FUS OH 033	100 MS	100 KS	100 S
250	104.00	FUS OH 034	125 MS	125 KS	125 S
333	139.00	FUS OH 035	150 MS	150 KS	150 S
500	208.00	FUS OH 036	200 MS	200 KS	200 S

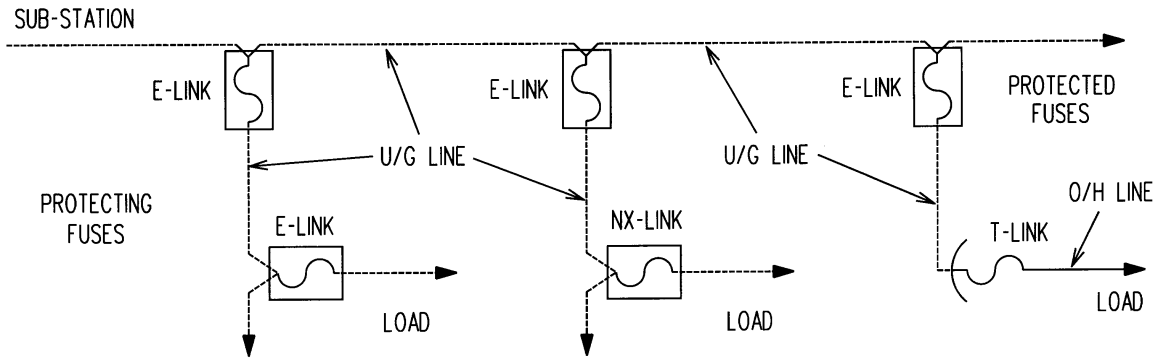
V. GROUP C: FUSE COORDINATION

TABLE 1: LATERAL FUSING OFF OF FUSED OVERHEAD LATERALS



PROTECTING FUSE	PROTECTED FUSE (T-LINK)							
	100T	80T	65T	50T	40T	30T	25T	20T
E-LINK (3-PHASE)	80	65	50	40	30	25	20	15
NX-LINK (1-PHASE)	50	40	30	25	20	12	12	10
T-LINK	50	40	30	25	20	12	12	10

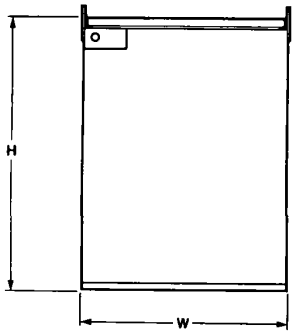
TABLE 2: LATERAL FUSING OFF OF FUSED UNDERGROUND LATERALS



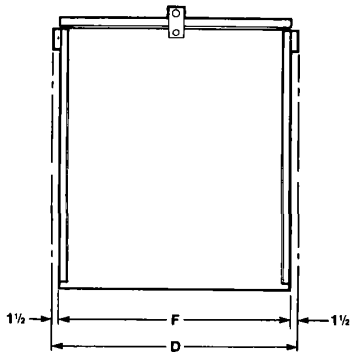
PROTECTING FUSE	PROTECTED FUSE (E-LINK)								
	150E	100E	80E	65E	50E	40E	30E	25E	20E
E-LINK (3-PHASE)	100	50	50	40	25	20	20	15	15
NX-LINK (1-PHASE)	65	30	25	25	20	12	12	10	10
T-LINK	80	40	30	25	20	15	12	10	8

UVF4

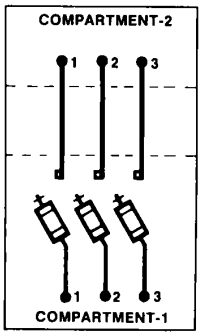
THREE PHASE FUSING ASSEMBLY
LIVE FRONT



FRONT VIEW



SIDE VIEW



CONNECTION DIAGRAM

DIMENSIONS:

h – 55”
W – 43”
F – 56-3/4”
D – 59-3/4”

ITEM	QTY	DESCRIPTION
FUSAS001	1	FUSE ASSEMBLY, PADMOUNT THREE PHASE IN / OUT
LOCPA001	2	PADLOCK, BRASS 1-3/4 IN. SHANK OPENING

NOTE: Plate CBLX to install cable support unistruts.

UVF5 * _

CABLE FAULT INDICATOR

Elbow Mount

Remote Fiber Optic

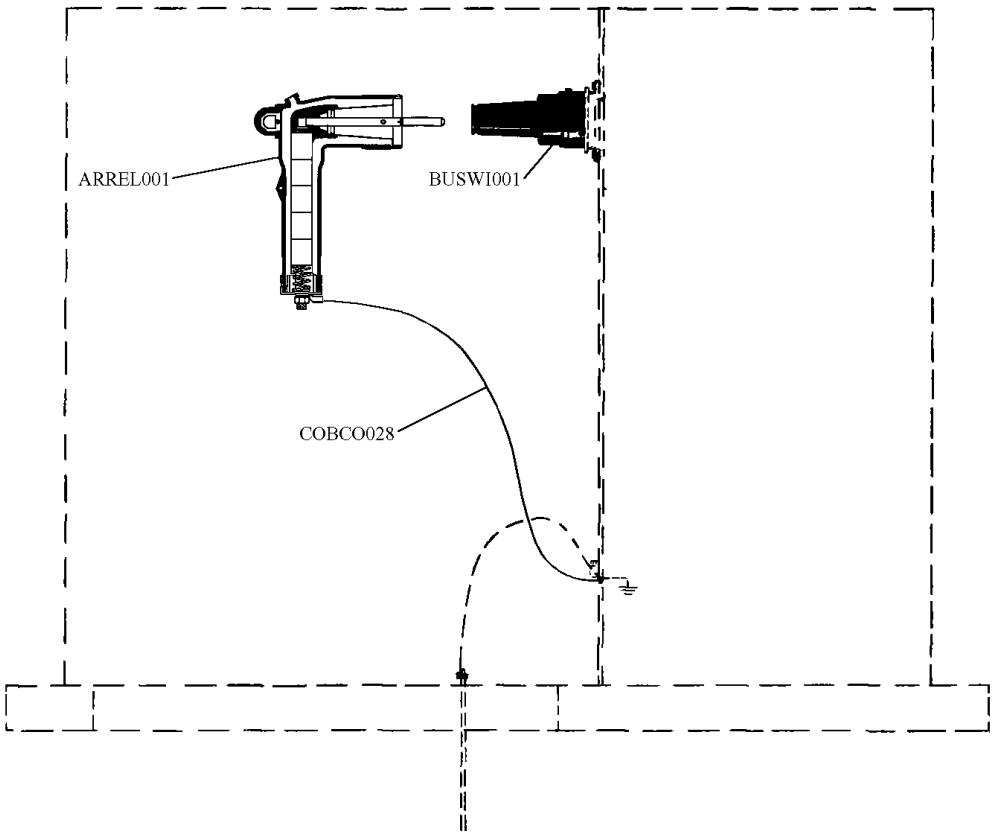
Large Core

PLATE	ITEM ID	QTY	TRIP	RESET	MAXIMUM CABLE DIAMETER	APPLICATION
UVF5*1/0-1	INDCF004	1	280AMP	1.0AMP	2.0”	1 PHASE 1/0AWG
UVF5-1000	INDCF012	1	840AMP	3.0AMP	2.2”	1 PHASE 1000/350KCM
UVF5*1000/3	INDCF012	1	840AMP	3.0AMP	2.0”	3 PHASE 1000KCM

NOTES:

1. All automatic reset fault indicators have a 32 second inrush restraint time delay and a 7.5 min. reset time delay.
2. Fault indicators are to be installed as follows:
   a. Preferred: Install fault indicator below the terminator stress cone and above the concentric neutral basket. Fault indicator core must be under the drain wire.
   b. Alternate: Install fault indicator over the concentric neutral basket where the neutrals are bent back and bound.

UVF6
UWF6
URF6
ELBOW ARRESTOR

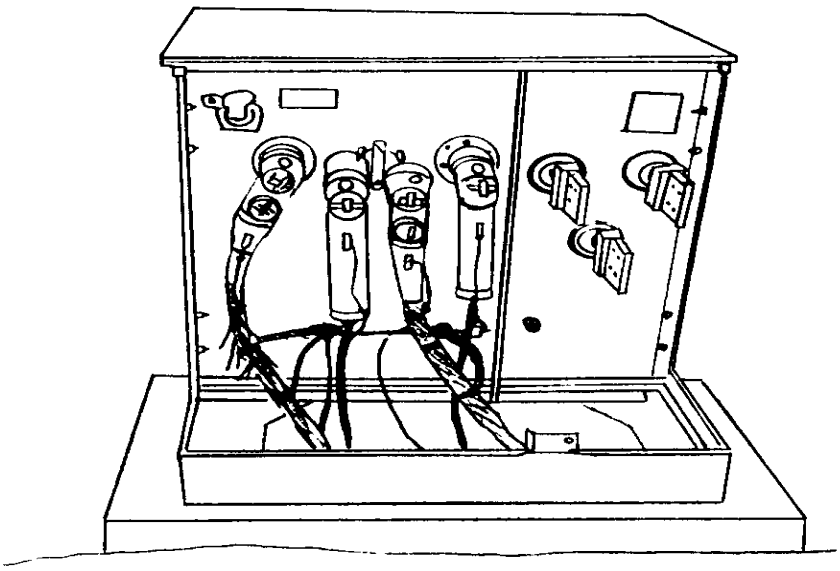


NOTE:
Plate UVF6 for 26.4 kV, UWF6 for 13.2 kV, and URF6 for 4.16 kV

ITEM	QTY	DESCRIPTION
ARREL---	1	ARRESTOR, ELBOW, METAL OXIDE VARRISTER
BUSWI001	1	BUSHING, PLUG INSERT 25KV LOADBREAKER 200 AMP
COBCO028	5	CONDUCTOR, BARE CU, #4AWG SOL SOFT DRAW

UVF7

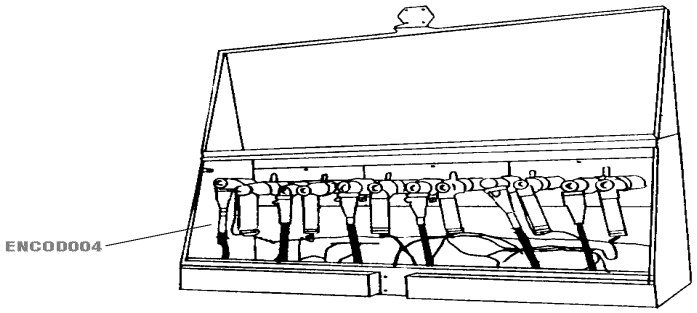
SECTIONALIZER – ARRESTER TRANSFORMER



ITEM	QTY	DESCRIPTION
ARREL001	2	ARRESTER, ELBOW METAL OXIDE VARRISTER
COBCO028	3	CONDUCTOR, BARE CU, #4AWG SOL SOFT DRAW
CNNVG003	2	CONNECTOR, SPLIT BOLT 2 - 1/0 CU
RECPA004	1	RECEPTACLE, FEED THRU 25KV LOADBREAK

UVF8

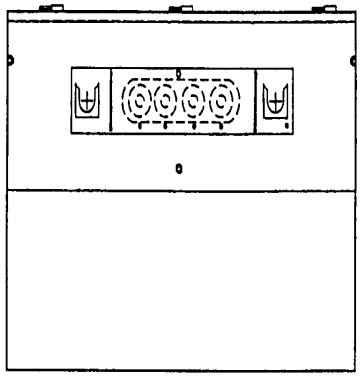
THREE PHASE LIGHTNING ARRESTER CABINET

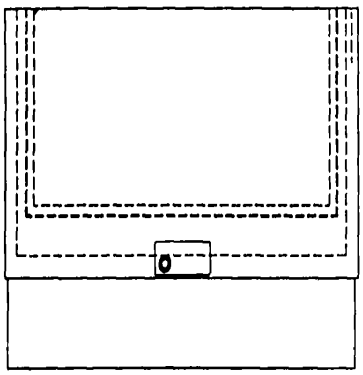


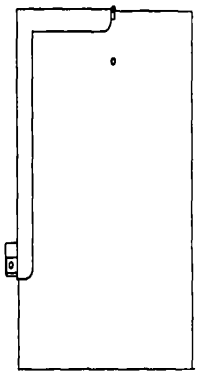
ITEM	QTY	DESCRIPTION
ARREL001	6	ARRESTER, ELBOW METAL OXIDE VARRISTER
BOLMS017	4	BOLT, MACHINE SQ. HEAD 5/8 X 8 IN.
CLATG001	5	CONNECTOR, TRANSFORMER TANK GROUND
CLAHL001	6	CLAMP, HOTLINE #6 SOL. - 1/0 STR.
COBCO029	20	CONDUCTOR, BARE CU, #2AWG SOL HARD DRAW
ENCOD004	1	ENCLOSURE, THREE PHASE JUNCTION/ ARRESTER
LOCPA001	1	PADLOCK, ALL BRASS 1 - 3/4 IN SHANK OPENING
RECPA004	6	RECEPTACLE, FEED THRU 25KV LOADBREAKER
WASSF003	4	WASHER, SQ. FLAT FOR 5/8 OR 3/4 IN. BOLT

UVF9

SINGLE PHASE JUNCTION ENCLOSURE







NOTES:

1. Enclosure comes equipped with two (2) parking stand mounting plates and one (1) universal junction module mounting plate.
2. Itemize the accessories you wish to mount in the enclosure.
   EXAMPLES:
   FEED-THRU BUSHING I.RECPA004
   3 POINT JUNCTION MODULE I.JUNL0XXX
   4 POINT JUNCTION MODULE I.JUNL0XXX
3. Use pad plate – UPD1 *

ITEM	QTY	DESCRIPTION
ANCSD001	4	ANCHOR, CONCRETE
ENCOD007	1	ENCLOSURE, SINGLE PHASE JUNCTION
LOCPA001	1	PADLOCK, ALL BRASS 1 - 3/4 IN SHANK OPENING
RECPA004	1	BUSHING, FEED-THRU

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