

Eaton Corporation
Pressure Sensors Division
15 Durant Avenue
P.O. Box 504
Bethel, CT 06801
203 / 796-6000

EATON

LTR2773

September 24, 1996

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington DC 20555-0001

Reference: USNRC Letter of August 29, 1996

Subject: Request for Information Regarding 10 CFR Part 50, Appendix B
Controls on Supplied Equipment

Dear Sir,

Eaton Corporation's engineering staff has reviewed USNRC letter of August 29, 1996, concerning fuse ratings in the Main Steam and Feedwater Isolation System. A careful review of all pertinent documents shows that the fuse rating of 3.2A at 250V is correct for this application.

The following are copies of documents that support this finding as attachments:

ATTACHMENT A is a copy of Bechtel specification 10466, figure 1 and a typical sheet from the Signal Flow Block Diagram KF8909. The highest voltage available on the relay circuit is 140VDC. The block diagram KF8909 is unique to the Main Steam and Feedwater Isolation System as supplied only to Callaway and Wolf Creek.

ATTACHMENT B is a copy of the parts list for the Main Steam and Feedwater Isolation System. The EATON designation is 9N53. The document is PL9N53. Please see item 28. The fuse part number is KAB350V rated at 3.2A.

ATTACHMENT C is a copy of the fuse drawing KAB350. Note 4 identifies fuses on this drawing as being rated at 250V. The fuse in question (per PL9N53) is KAB350V, and the Bussman fuse part number is FNM3 2/10 rated at 250V. A copy of the manufacturer specification sheet is also included.

Eaton Corporation feels that this response is adequate to address the immediate concerns of the United States Nuclear Regulatory Commission.

9610010213 960924
PDR ADOCK 05000482
P PDR

FAX 203 / 796-6313
TWX 310 / 681-9305
Telex 681-9305

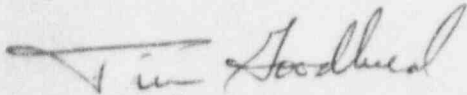
F474A

Page 2 of 2
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September 24, 1996
USNRC

If you have any further questions regarding this issue, please contact the assigned Cognizant Engineer, Mr. Al Emanuele at (203) 798-3088, or myself at (203)798-3126.

Best regards,

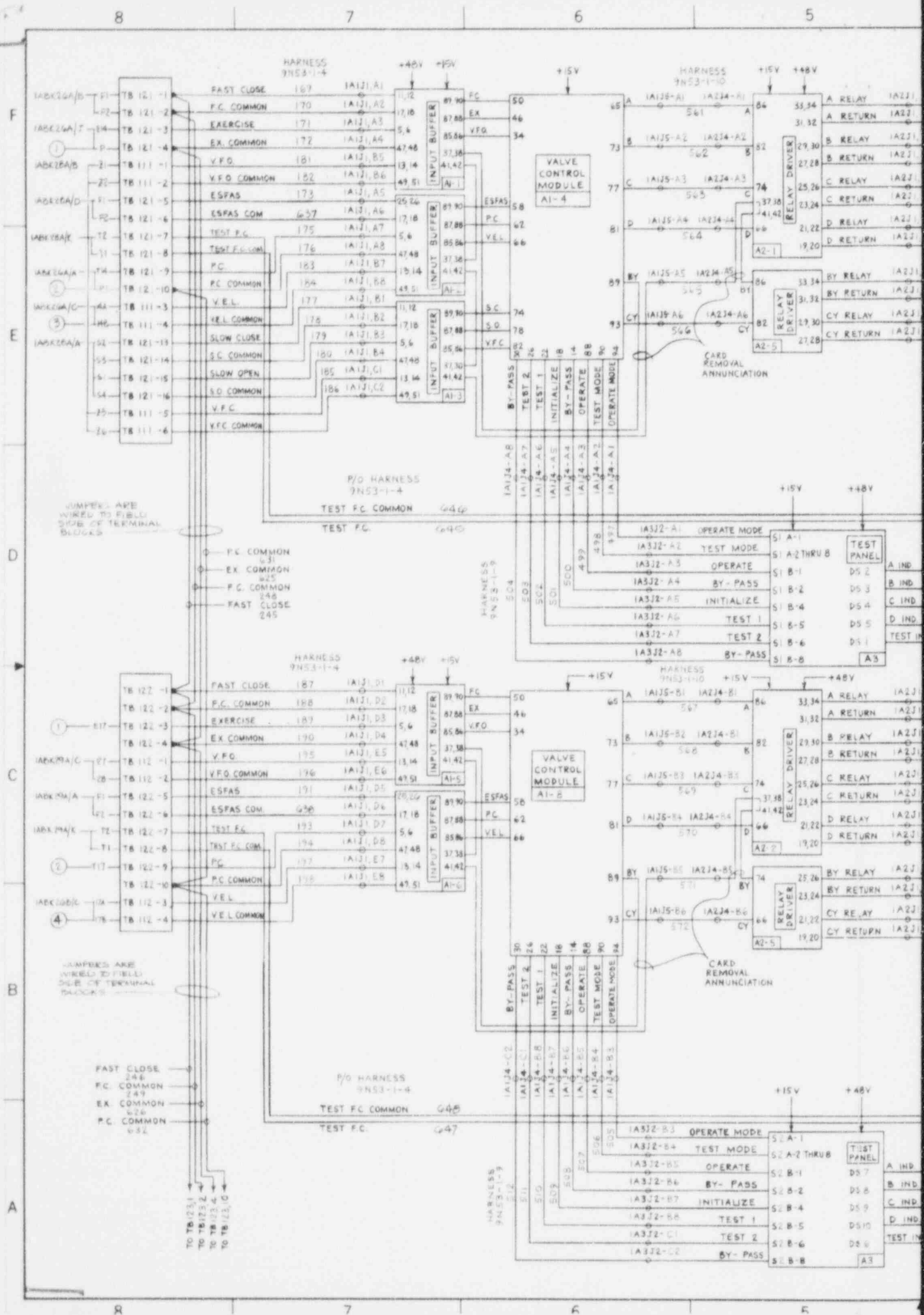
EATON CORPORATION
Power Plant Controls Business Unit

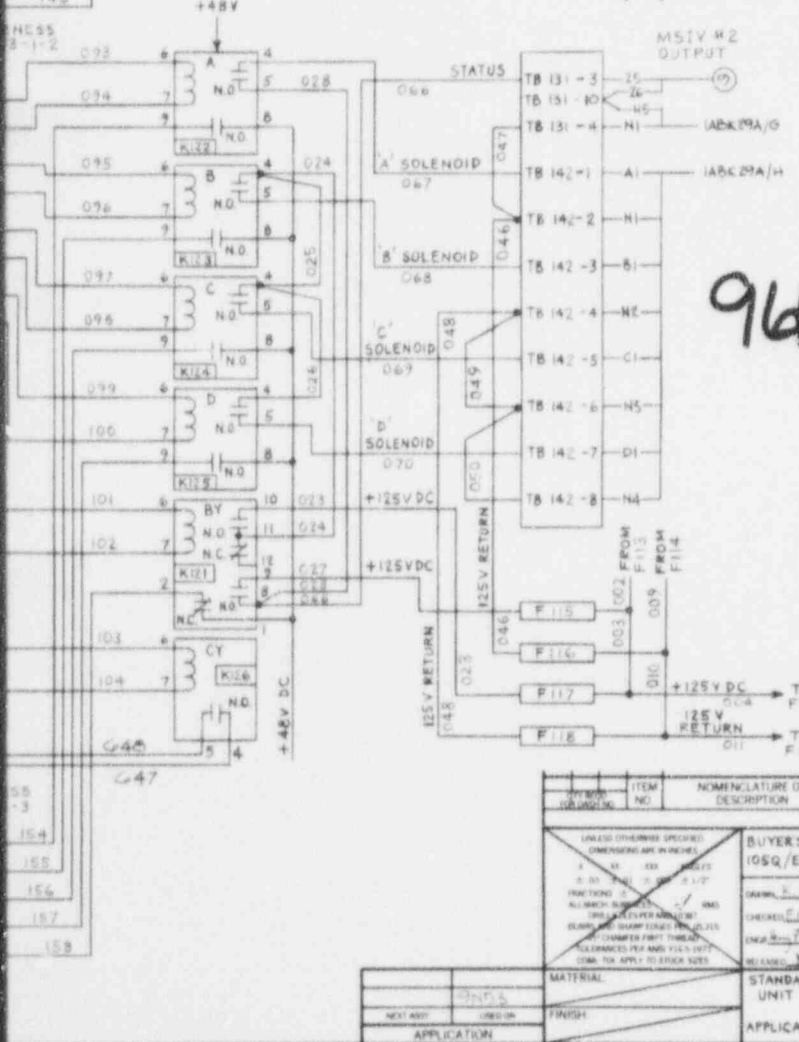
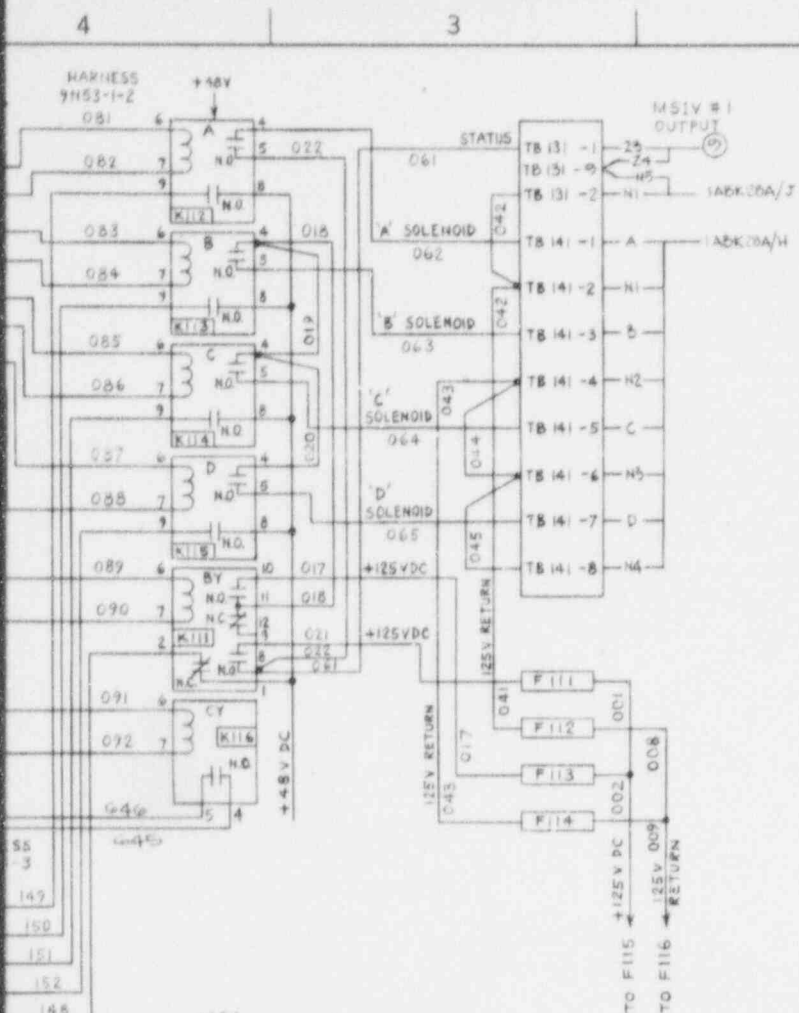
A handwritten signature in dark ink, appearing to read "Tim Goodbred". The signature is fluid and cursive, with a large initial "T" and "G".

Tim Goodbred
Power Controls Business Unit Manager

ATTACHMENT A

FOR LTR2773





REVISIONS			
NO.	DATE	DESCRIPTION	APPROVED
-	4/10/60	RELEASED ON C/N 51878	FJM
B	4/10/60	REVISIONS TO C/N 51878. SEE 9/4 FOR DETAILS.	FJM
-	4/10/60	REVISIONS TO C/N 51878. SEE 9/4 FOR DETAILS.	FJM
C	4/10/60	REVISIONS TO C/N 51878. SEE 9/4 FOR DETAILS.	FJM
D	4/10/60	REVISIONS TO C/N 51878. SEE 9/4 FOR DETAILS.	FJM
E	4/10/60	REVISIONS TO C/N 51878. SEE 9/4 FOR DETAILS.	FJM
F	4/10/60	REVISIONS TO C/N 51878. SEE 9/4 FOR DETAILS.	FJM
G	4/10/60	REVISIONS TO C/N 51878. SEE 9/4 FOR DETAILS.	FJM

ANSTEC
APERTURE
CARD

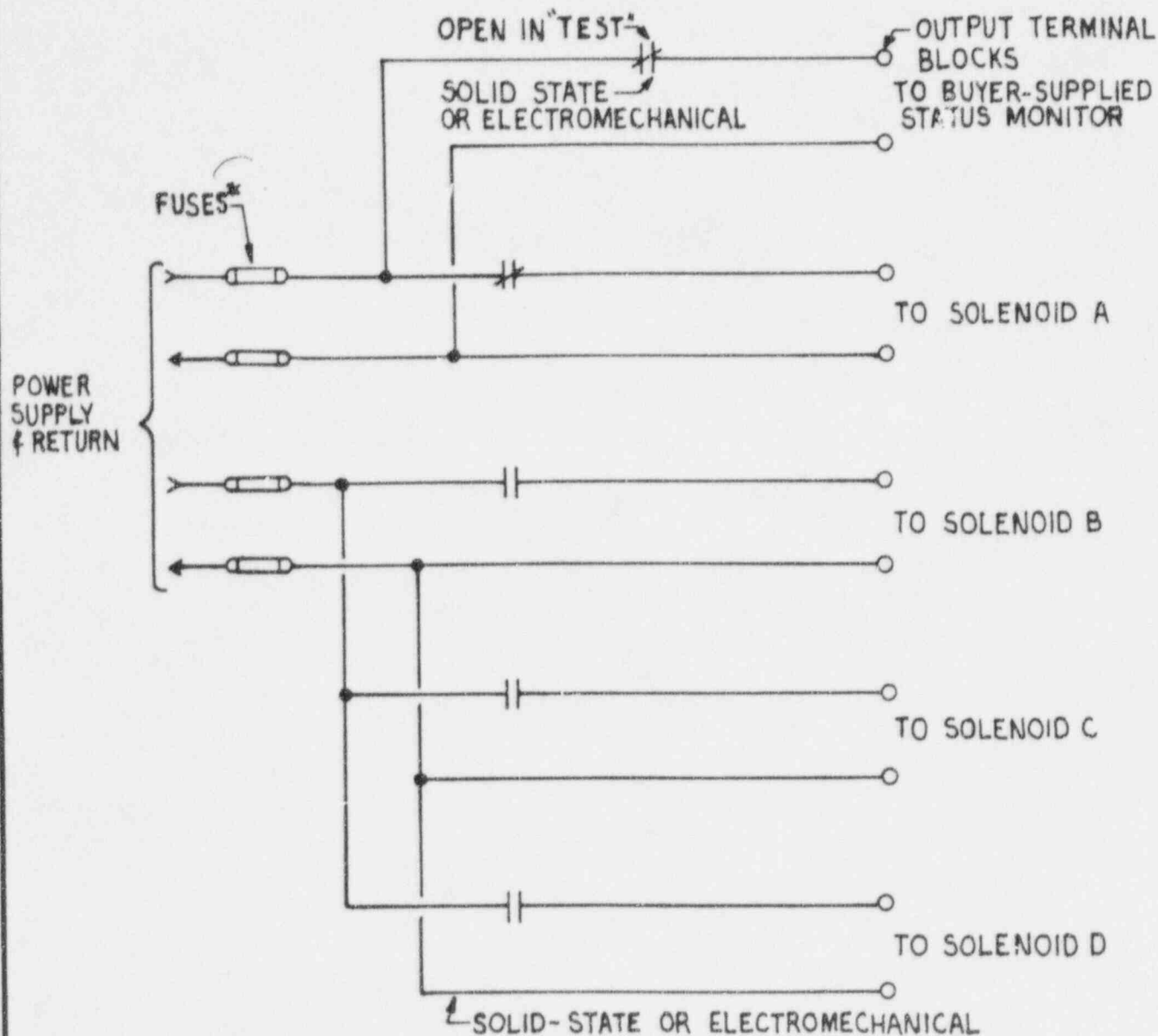
Also Available on
Aperture Card

- NOTES:
1. 1A121-A4 REFER TO PIN A4 ON CONNECTOR J1 ON CARD CAGE A1 REAR PANEL - (TYPICAL EXAMPLE).
 2. 056 THREE DIGIT NUMBER EITHER ABOVE OR BELOW A WIRE LINE SIGNIFIES C.C. WIRE NUMBER (TYPICAL EXAMPLE)

REVISION	STATUS
SHEET NO.	REV.
1	G
2	G
3	E
4	E
5	F
6	G
7	G
8	F


ITEM NO.	QUANTITY	NOMENCLATURE OR DESCRIPTION	ENGINE SIZE	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE	REMARKS
LIST OF MATERIAL							
BUYER'S P.O. # 10466- 105Q/E092-1-2-3-4-5 CHECKED BY: [Signature] ENGINEER: [Signature] DATE: 4/10/60							
STANDARDIZED NUCLEAR UNIT POWER PLANT SYSTEM APPLICABLE TO ALL UNITS							
CONSOLIDATED CONTROLS CORPORATION SIGNAL FLOW BLOCK DIAGRAM MSFIS - SEPARATION GROUP I MSIV#1 AND MSIV#2							
SIZE: 15CM NO. 02750 DATE: 4/10/60 SCALE: 1" = 1"							

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NOTE
 THE ARRANGEMENT SHOWN IS TO BE DUPLICATED FOR EACH ACTUATION TRAIN FOR EACH MSIV AND FIV; THE OUTPUT CONTACT ARRANGEMENT FOR AN FIV HAS BEEN SHOWN AS AN EXAMPLE.

* 3 AMPERE NOMINAL RATING

SNUPPS		OUTPUT FUSING & OUTPUT TO THE BUYER-SUPPLIED STATUS MONITOR	SPECIFICATION 10466	
			FIGURE 1	REV. 2

ATTACHMENT B

FOR LTR2773

PARTS LIST		CONSOLIDATED CONTROLS CORPORATION <small>BETHEL, CONN. EL SEGUNDO, CALIF.</small>										FSCM NO. 02750		PL 9N53		REVISION LTR B											
		CONTRACT NO		TYPE-MOD-SERIES		DRAWN <u>dg 11-1-79</u>		CHECKED <u>FM. 11-6-79</u>		ENGR <u>FM. 11-13-79</u>		RELEASED <u>11-1-79</u>		TITLE MSFIS, LOGIC/TERMINATION CABINET ASSEMBLY CHANNEL I & IV		SHEET 1 OF 6 SHEETS											
GOV'T																											
CUST		10466-J105Q-E092-1,-2,-3,-4,-5																									
C.C.C.		35-5733		9N53																							
LTR		REVISION DESCRIPTION												DATE		APPD											
-		RELEASE ON C/N S 1615												11-13-79		FJM											
A		C/N S 2255 CHANGED QTY. OF ITEM 11, WAS 14 & ITEM 28, WAS 42, ITEM 47 WAS 28												6-9-81		FJM											
B		C/N S 9976 ADDED ITEM 27 TO SHT.												1-30-91		KRT											
RECORD OF REVISION STATUS OF EACH SHEET																											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
-	-	-	-	-	-																						
A	A	A	A	-	-																						
B	A	A	A	-	-																						

PARTS LIST				CONTRACT NO 10466-J105Q/E092-1, -2, -3, -4, -5		FSCM NO. 02750	PL 9N53	REVISION LTR A	
TITLE MSFIS LOGIC/TERMINATION CABINET ASSEMBLY								SHEET 2	
ITEM NO	QTY REQD		CODE IDENT NO.	DWG & SERVICE PART NO. SIZE	DESCRIPTION	REMARKS			
	-1	-2							
1	1	1		F	KB7202-2	Cabinet Assembly	Seismic NEMA 12		
2	1	1		F	8N29-1	Power Supply Assy., +15V & +48V			
3	1	1		D	7N226	Double Rack Assembly			
4	1	1		D	7N227	Single Rack Assembly			
5	1	1		F	7N228	Manual Test Panel Assembly			
6	1	1		C	KM7237	Blank Panel			
7	48	48		C	KK251A	Relay Socket			
8	48	48		C	KJR431A	Relay	48VDC		
9	18	18		C	KHW3300C	Terminal Board	12 Pos. REF: T.B. Strip Marked per KAB1366E		
10	12	12		C	KHW3300B	Terminal Board	6 Pos. REF: T.B. Strip Marked per KAB1366D & KAB1366S		
11	12	12		C	KY351F	Fuse Holder			
12	2	2		C	KNR3300	Block, Power Stud			
13	2	2		F	KW7272	Plate, Relay Mounting			
14	2	2		C	KN7287	Bracket, Term Block	Single Row		
15	1	1		D	KP7287	Bracket, Term Block	Double Row (Rear)		
16	2	2		C	KW7226	Angle Raceway			

PARTS LIST				CONTRACT NO 10466-J105Q/E092-1, -2, -3, -4, -5		FSCM NO. 02750	PL 9N53	REVISION LTR A
TITLE MSFIS LOGIC/TERMINATION CABINET ASSEMBLY								SHEET 3
ITEM NO	QTY REQD -1 -2	CODE IDENT NO.	DWG & SERVICE PART NO. SIZE	DESCRIPTION		REMARKS		
17	2 2		C	KAB7229-1	Channel, Support			
18	2 2		C	KAA7229	Channel, Relay Mtg. Plate			
19	1 1		D	KT7226A	Angle, Lower Vertical	Left Side		
20	1 1		D	KT7226B	Angle, Lower Vertical	Right Side		
21	1 1		C	KU7226A	Angle, Ctr Vertical Support	Left Side		
22	1 1		C	KU7226B	Angle, Ctr Vertical Support	Right Side		
23	1 1		C	KV7226A	Angle, Upper Vertical Support	Left Side		
24	1 1		C	KV7226B	Angle, Upper Vertical Support	Right Side		
25	2 2		B	KFM226-1	Angle, Card Rack	8 3/4" Rack		
26	2 2		B	KFN226-1	Angle, Card Rack	14" Rack		
27	2 2		C	KEK226-1	Angle, P.S.			
28	32 32		C	KAB350V	Fuse	3.2 AMP		
29	1 1		A	KKF307	Terminal			
30	1 1		C	KFW226	Angle, Mtg., Ground			
31	2 -		C	KDV2236K	Nameplate	Customer Red/White Core		
32	- 2		C	KDV2236L	Nameplate	Customer Yellow/Black Core		

PARTS LIST			CONTRACT NO 10466-J105Q/E092-1, -2, -3, -4, -5		FSCM NO. 02750	PL 9N53	REVISION LTR A
TITLE MSFIS LOGIC/TERMINATION CABINET ASSEMBLY							SHEET 4
ITEM NO	QTY REQD		CODE IDENT NO.	DWG & SERVICE PART NO.		DESCRIPTION	REMARKS
	-1	-2		SIZE			
33	2	-		C	KAD7236A	Nameplate	CCC
34	-	2		C	KAD7236B	Nameplate	CCC
35	A/R	A/R		B	KK294E	Tie Mount	#8 Screw Mtg.
36	A/R	A/R		B	KD1302 <input type="checkbox"/>	Spiral Wrap	Size Select At Assembly
37	A/R	A/R		-	MAW57 <input type="checkbox"/>	Shrink Tubing	Size Select At Assembly
38	6	6		-	MS51957-79	Screw, Pan Hd.	#8-32 X 1/2 LG. (Used with Item 35)
39	76	76		-	MS15795-842	Flat Washer	#10 CRES
40	44	44		-	MS35338-138	Lock Washer	#10 CRES
41	96	96		-	MS51957-33	Screw, P.H.	#6-32 X 7/8 LG. CRES
42	96	96		-	MS15795-805	Washer, Flat	#6 CRES
43	68	68		-	MS15795-807	Washer, Flat	#8 CRES
44	8	8		-	MS51957-46	Screw, P.H.	#8-32 X 5/8 LG. CRES
45	4	4		-	MS35649-2385	Nut, Hex	#3/8-16 Brass
46	4	4		-	MS35649-2255	Nut, Hex	#1/4-20 Brass
47	24	24		-	MS51957-31	Screw, P.H.	#6-32 X 5/8 LG. CRES
48	76	76		-	MS51958-63	Screw, P.H.	#10-32 X 1/2 LG. CRES

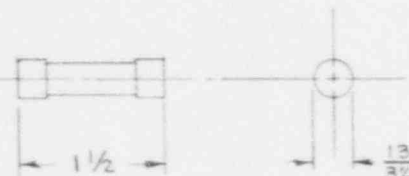
PARTS LIST				CONTRACT NO 10466-J105Q/E092-1. -2, -3, -4, -5		FSCM NO. 02750	PL 9N53	REVISION LTR —
TITLE MSFIS LOGIC/TERMINATION CABINET ASSEMBLY								SHEET 5
ITEM NO	QTY REQD		CODE IDENT NO.	DWG & SERVICE PART NO. SIZE	DESCRIPTION	REMARKS		
	-1	-2						
4	A/R	A/R		B	KK294G	Tie Mount	# $\frac{1}{4}$ Screw Mtg.	
50	60	60		-	MS51957-50	Screw, Pan Hd.	#8-32 X $1\frac{1}{2}$ LG. CRES	
51	14	14		-	MS35307-305	Screw, Cap, Hex. Hd.	# $\frac{1}{4}$ -20 X $\frac{5}{8}$ LG. CRES	
52	109	109		-	MS15795-810	Washer, Flat	# $\frac{1}{4}$	
53	109	109		-	MS35338-139	Washer, Lock	# $\frac{1}{4}$	
54	94	94		-	MS35307-307	Screw, Cap, Hex Hd.	# $\frac{1}{4}$ -20 X $\frac{7}{8}$ LG. CRES	
55	1	1		C	KY7226	Angle, Horizontal		
56	2	2		-	MS35037-306	Screw, Mach. Hex Hd.	# $\frac{1}{4}$ -20 X $\frac{3}{4}$ CRES	
57	2	2		-	MS35649-2254	Nut, Hex	# $\frac{1}{4}$ -20	
58	20	20		-	MS51958-64	Screw, P.H.	#10-32 X $\frac{5}{8}$ LG. CRES	
59	20	20		-	MS35650-304	Nut, Hex	#10-32 CRES	
60	A/R	A/R		-	MS51957-79	Screw, P.H.	$\frac{1}{4}$ -20 X $\frac{1}{2}$ LG. CRES	
61	1	1		-	MS35307-407	Screw, Cap, Hex Hd.	$\frac{1}{2}$ -13 X $\frac{3}{4}$ LG. CRES	
62	1	1		-	MS15795-818	Washer, Flat	$\frac{1}{2}$	
63	1	1		-	MS35338-143	Washer, Lock	$\frac{1}{2}$	
64	1	1		-	MS35308-355	Screw, Cap, Hex Hd.	$\frac{3}{8}$ -24 X $\frac{1}{2}$ LG. CRES	

ATTACHMENT C

FOR LTR2773

SEE NOTE 7

CCC P/N	AMP RATING	CHASE-SHAWMUT CATALOG NO.	BUSSMANN CATALOG NO.
KAB350A	1/10	TRM 1/10	FNM 1/10
KAB350B	15/100	TRM 15/100	FNM 15/100
KAB350C	2/10	TRM 2/10	FNM 2/10
KAB350D	3/10	TRM 3/10	FNM 3/10
KAB350E	4/10	TRM 4/10	FNM 4/10
KAB350F	1/2	TRM 1/2	FNM 1/2
KAB350G	6/10	TRM 6/10	FNM 6/10
KAB350H	8/10	TRM 8/10	FNM 8/10
KAB350J	1	TRM 1	FNM 1
KAB350K	1.125	TRM 1-1/8	FNM 1 1/8
KAB350L	1.25	TRM 1-1/4	FNM 1 1/4
KAB350M	1.4	TRM 1-4/10	FNM 1 4/10
KAB350N	1.6	TRM 1-6/10	FNM 1 6/10
KAB350P	1.8	TRM 1-8/10	FNM 1 8/10
KAB350R	2	TRM 2	FNM 2
KAB350S	2.25	TRM 2-1/4	FNM 2 1/4
KAB350T	2.5	TRM 2-1/2	FNM 2 1/2
KAB350U	2.8	TRM 2-8/10	FNM 2 8/10
KAB350V	3.2	TRM 3-2/10	FNM 3 2/10
KAB350W	3.5	TRM 3-1/2	FNM 3 1/2
KAB350Y	4	TRM 4	FNM 4
KAB350AA	4.5	TRM 4-1/2	FNM 4 1/2
KAB350AB	5	TRM 5	FNM 5
KAB350AC	5.6	TRM 5-6/10	FNM 5 6/10
KAB350AD	6.25	TRM 6-1/4	FNM 6 1/4
KAB350AE	7	TRM 7	FNM 7
KAB350AF	8	TRM 8	FNM 8
KAB350AG	9	TRM 9	FNM 9
KAB350AH	10	TRM 10	FNM 10
KAB350AJ	15	TRM 15	—
KAB350AK	20	TRM 20	—
KAB350AL	25	TRM 25	—
KAB350AM	30	TRM 30	—



REVISIONS			
ZONE	LTR	DESCRIPTION	DATE APPROVED
—	—	REL ON C/N 5319	9-18-77 KRT
A	—	P/N 6703 KAB350V WAS KAB350V	9-17-78 KRT
B	—	P/N 6703 ADDED BUSSMANN PART NOS. & NOTES 9-8-77	10-8-78 FJM
C	—	P/N 5705 ADDED NOTE 7	1-13-79 FJM
D	—	CAN5806 BUSSMAN FNM10 10/05 FNM10	1-28-85 KRT

NOTES:

- APPROVED SOURCE OF SUPPLY:
CHASE-SHAWMUT CO. BUSSMANN MFG DIVISION
374 MERRIMAC STREET MERRIMAN, MA. 01850
NEWBURYPORT, MA. 01950 UNIVERSITY AT JEFFERSON ST. LOUIS MO. 63107
- ALL DIMENSIONS ARE FOR REFERENCE ONLY
- SEE C.C.C. DRAWING KY351 ("C" SIZE) FOR FUSE HOLDER
- MIDGET SIZE - 250 VOLT
- ONLY THE ITEM DESCRIBED ON THIS DRAWING WHEN PROCURED FROM THE VENDOR LISTED HEREON IS APPROVED BY C.C.C. FOR USE IN THE APPLICATIONS LISTED HEREON. A SUBSTITUTE ITEM SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY C.C.C.
- IDENTIFICATION OF THE APPROVED SOURCE HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEM DESCRIBED ON THIS DRAWING.
- WHEN REQUIRED, VENDOR SHALL SUBMIT A CERTIFICATE STATING THAT THE FUSES FURNISHED ARE QUALIFIED AS CLASS 1E IN ACCORDANCE WITH GOULD SPECIFICATION NO GEFD-001

SOURCE CONTROL DRAWING

QTY REQ'D FOR DASH NO.	ITEM NO.	NOMENCLATURE OR DESCRIPTION	DWG SIZE	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTE	REMARKS
LIST OF MATERIAL							
Q34	Q34	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES 3/16 1/8 1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/4 1 1/2 1 3/4 2 2 1/4 2 1/2 2 3/4 3 3 1/4 3 1/2 4 4 1/4 4 1/2 4 3/4 5 5 1/4 5 1/2 5 3/4 6 6 1/4 6 1/2 6 3/4 7 7 1/4 7 1/2 7 3/4 8 8 1/4 8 1/2 8 3/4 9 9 1/4 9 1/2 9 3/4 10 10 1/4 10 1/2 10 3/4 11 11 1/4 11 1/2 11 3/4 12 12 1/4 12 1/2 12 3/4 13 13 1/4 13 1/2 13 3/4 14 14 1/4 14 1/2 14 3/4 15 15 1/4 15 1/2 15 3/4 16 16 1/4 16 1/2 16 3/4 17 17 1/4 17 1/2 17 3/4 18 18 1/4 18 1/2 18 3/4 19 19 1/4 19 1/2 19 3/4 20 20 1/4 20 1/2 20 3/4 21 21 1/4 21 1/2 21 3/4 22 22 1/4 22 1/2 22 3/4 23 23 1/4 23 1/2 23 3/4 24 24 1/4 24 1/2 24 3/4 25 25 1/4 25 1/2 25 3/4 26 26 1/4 26 1/2 26 3/4 27 27 1/4 27 1/2 27 3/4 28 28 1/4 28 1/2 28 3/4 29 29 1/4 29 1/2 29 3/4 30 30 1/4 30 1/2 30 3/4 31 31 1/4 31 1/2 31 3/4 32 32 1/4 32 1/2 32 3/4 33 33 1/4 33 1/2 33 3/4 34 34 1/4 34 1/2 34 3/4 35 35 1/4 35 1/2 35 3/4 36 36 1/4 36 1/2 36 3/4 37 37 1/4 37 1/2 37 3/4 38 38 1/4 38 1/2 38 3/4 39 39 1/4 39 1/2 39 3/4 40 40 1/4 40 1/2 40 3/4 41 41 1/4 41 1/2 41 3/4 42 42 1/4 42 1/2 42 3/4 43 43 1/4 43 1/2 43 3/4 44 44 1/4 44 1/2 44 3/4 45 45 1/4 45 1/2 45 3/4 46 46 1/4 46 1/2 46 3/4 47 47 1/4 47 1/2 47 3/4 48 48 1/4 48 1/2 48 3/4 49 49 1/4 49 1/2 49 3/4 50 50 1/4 50 1/2 50 3/4 51 51 1/4 51 1/2 51 3/4 52 52 1/4 52 1/2 52 3/4 53 53 1/4 53 1/2 53 3/4 54 54 1/4 54 1/2 54 3/4 55 55 1/4 55 1/2 55 3/4 56 56 1/4 56 1/2 56 3/4 57 57 1/4 57 1/2 57 3/4 58 58 1/4 58 1/2 58 3/4 59 59 1/4 59 1/2 59 3/4 60 60 1/4 60 1/2 60 3/4 61 61 1/4 61 1/2 61 3/4 62 62 1/4 62 1/2 62 3/4 63 63 1/4 63 1/2 63 3/4 64 64 1/4 64 1/2 64 3/4 65 65 1/4 65 1/2 65 3/4 66 66 1/4 66 1/2 66 3/4 67 67 1/4 67 1/2 67 3/4 68 68 1/4 68 1/2 68 3/4 69 69 1/4 69 1/2 69 3/4 70 70 1/4 70 1/2 70 3/4 71 71 1/4 71 1/2 71 3/4 72 72 1/4 72 1/2 72 3/4 73 73 1/4 73 1/2 73 3/4 74 74 1/4 74 1/2 74 3/4 75 75 1/4 75 1/2 75 3/4 76 76 1/4 76 1/2 76 3/4 77 77 1/4 77 1/2 77 3/4 78 78 1/4 78 1/2 78 3/4 79 79 1/4 79 1/2 79 3/4 80 80 1/4 80 1/2 80 3/4 81 81 1/4 81 1/2 81 3/4 82 82 1/4 82 1/2 82 3/4 83 83 1/4 83 1/2 83 3/4 84 84 1/4 84 1/2 84 3/4 85 85 1/4 85 1/2 85 3/4 86 86 1/4 86 1/2 86 3/4 87 87 1/4 87 1/2 87 3/4 88 88 1/4 88 1/2 88 3/4 89 89 1/4 89 1/2 89 3/4 90 90 1/4 90 1/2 90 3/4 91 91 1/4 91 1/2 91 3/4 92 92 1/4 92 1/2 92 3/4 93 93 1/4 93 1/2 93 3/4 94 94 1/4 94 1/2 94 3/4 95 95 1/4 95 1/2 95 3/4 96 96 1/4 96 1/2 96 3/4 97 97 1/4 97 1/2 97 3/4 98 98 1/4 98 1/2 98 3/4 99 99 1/4 99 1/2 99 3/4 100 100 1/4 100 1/2 100 3/4 101 101 1/4 101 1/2 101 3/4 102 102 1/4 102 1/2 102 3/4 103 103 1/4 103 1/2 103 3/4 104 104 1/4 104 1/2 104 3/4 105 105 1/4 105 1/2 105 3/4 106 106 1/4 106 1/2 106 3/4 107 107 1/4 107 1/2 107 3/4 108 108 1/4 108 1/2 108 3/4 109 109 1/4 109 1/2 109 3/4 110 110 1/4 110 1/2 110 3/4 111 111 1/4 111 1/2 111 3/4 112 112 1/4 112 1/2 112 3/4 113 113 1/4 113 1/2 113 3/4 114 114 1/4 114 1/2 114 3/4 115 115 1/4 115 1/2 115 3/4 116 116 1/4 116 1/2 116 3/4 117 117 1/4 117 1/2 117 3/4 118 118 1/4 118 1/2 118 3/4 119 119 1/4 119 1/2 119 3/4 120 120 1/4 120 1/2 120 3/4 121 121 1/4 121 1/2 121 3/4 122 122 1/4 122 1/2 122 3/4 123 123 1/4 123 1/2 123 3/4 124 124 1/4 124 1/2 124 3/4 125 125 1/4 125 1/2 125 3/4 126 126 1/4 126 1/2 126 3/4 127 127 1/4 127 1/2 127 3/4 128 128 1/4 128 1/2 128 3/4 129 129 1/4 129 1/2 129 3/4 130 130 1/4 130 1/2 130 3/4 131 131 1/4 131 1/2 131 3/4 132 132 1/4 132 1/2 132 3/4 133 133 1/4 133 1/2 133 3/4 134 134 1/4 134 1/2 134 3/4 135 135 1/4 135 1/2 135 3/4 136 136 1/4 136 1/2 136 3/4 137 137 1/4 137 1/2 137 3/4 138 138 1/4 138 1/2 138 3/4 139 139 1/4 139 1/2 139 3/4 140 140 1/4 140 1/2 140 3/4 141 141 1/4 141 1/2 141 3/4 142 142 1/4 142 1/2 142 3/4 143 143 1/4 143 1/2 143 3/4 144 144 1/4 144 1/2 144 3/4 145 145 1/4 145 1/2 145 3/4 146 146 1/4 146 1/2 146 3/4 147 147 1/4 147 1/2 147 3/4 148 148 1/4 148 1/2 148 3/4 149 149 1/4 149 1/2 149 3/4 150 150 1/4 150 1/2 150 3/4 151 151 1/4 151 1/2 151 3/4 152 152 1/4 152 1/2 152 3/4 153 153 1/4 153 1/2 153 3/4 154 154 1/4 154 1/2 154 3/4 155 155 1/4 155 1/2 155 3/4 156 156 1/4 156 1/2 156 3/4 157 157 1/4 157 1/2 157 3/4 158 158 1/4 158 1/2 158 3/4 159 159 1/4 159 1/2 159 3/4 160 160 1/4 160 1/2 160 3/4 161 161 1/4 161 1/2 161 3/4 162 162 1/4 162 1/2 162 3/4 163 163 1/4 163 1/2 163 3/4 164 164 1/4 164 1/2 164 3/4 165 165 1/4 165 1/2 165 3/4 166 166 1/4 166 1/2 166 3/4 167 167 1/4 167 1/2 167 3/4 168 168 1/4 168 1/2 168 3/4 169 169 1/4 169 1/2 169 3/4 170 170 1/4 170 1/2 170 3/4 171 171 1/4 171 1/2 171 3/4 172 172 1/4 172 1/2 172 3/4 173 173 1/4 173 1/2 173 3/4 174 174 1/4 174 1/2 174 3/4 175 175 1/4 175 1/2 175 3/4 176 176 1/4 176 1/2 176 3/4 177 177 1/4 177 1/2 177 3/4 178 178 1/4 178 1/2 178 3/4 179 179 1/4 179 1/2 179 3/4 180 180 1/4 180 1/2 180 3/4 181 181 1/4 181 1/2 181 3/4 182 182 1/4 182 1/2 182 3/4 183 183 1/4 183 1/2 183 3/4 184 184 1/4 184 1/2 184 3/4 185 185 1/4 185 1/2 185 3/4 186 186 1/4 186 1/2 186 3/4 187 187 1/4 187 1/2 187 3/4 188 188 1/4 188 1/2 188 3/4 189 189 1/4 189 1/2 189 3/4 190 190 1/4 190 1/2 190 3/4 191 191 1/4 191 1/2 191 3/4 192 192 1/4 192 1/2 192 3/4 193 193 1/4 193 1/2 193 3/4 194 194 1/4 194 1/2 194 3/4 195 195 1/4 195 1/2 195 3/4 196 196 1/4 196 1/2 196 3/4 197 197 1/4 197 1/2 197 3/4 198 198 1/4 198 1/2 198 3/4 199 199 1/4 199 1/2 199 3/4 200 200 1/4 200 1/2 200 3/4 201 201 1/4 201 1/2 201 3/4 202 202 1/4 202 1/2 202 3/4 203 203 1/4 203 1/2 203 3/4 204 204 1/4 204 1/2 204 3/4 205 205 1/4 205 1/2 205 3/4 206 206 1/4 206 1/2 206 3/4 207 207 1/4 207 1/2 207 3/4 208 208 1/4 208 1/2 208 3/4 209 209 1/4 209 1/2 209 3/4 210 210 1/4 210 1/2 210 3/4 211 211 1/4 211 1/2 211 3/4 212 212 1/4 212 1/2 212 3/4 213 213 1/4 213 1/2 213 3/4 214 214 1/4 214 1/2 214 3/4 215 215 1/4 215 1/2 215 3/4 216 216 1/4 216 1/2 216 3/4 217 217 1/4 217 1/2 217 3/4 218 218 1/4 218 1/2 218 3/4 219 219 1/4 219 1/2 219 3/4 220 220 1/4 220 1/2 220 3/4 221 221 1/4 221 1/2 221 3/4 222 222 1/4 222 1/2 222 3/4 223 223 1/4 223 1/2 223 3/4 224 224 1/4 224 1/2 224 3/4 225 225 1/4 225 1/2 225 3/4 226 226 1/4 226 1/2 226 3/4 227 227 1/4 227 1/2 227 3/4 228 228 1/4 228 1/2 228 3/4 229 229 1/4 229 1/2 229 3/4 230 230 1/4 230 1/2 230 3/4 231 231 1/4 231 1/2 231 3/4 232 232 1/4 232 1/2 232 3/4 233 233 1/4 233 1/2 233 3/4 234 234 1/4 234 1/2 234 3/4 235 235 1/4 235 1/2 235 3/4 236 236 1/4 236 1/2 236 3/4 237 237 1/4 237 1/2 237 3/4 238 238 1/4 238 1/2 238 3/4 239 239 1/4 239 1/2 239 3/4 240 240 1/4 240 1/2 240 3/4 241 241 1/4 241 1/2 241 3/4 242 242 1/4 242 1/2 242 3/4 243 243 1/4 243 1/2 243 3/4 244 244 1/4 244 1/2 244 3/4 245 245 1/4 245 1/2 245 3/4 246 246 1/4 246 1/2 246 3/4 247 247 1/4 247 1/2 247 3/4 248 248 1/4 248 1/2 248 3/4 249 249 1/4 249 1/2 249 3/4 250 250 1/4 250 1/2 250 3/4 251 251 1/4 251 1/2 251 3/4 252 252 1/4 252 1/2 252 3/4 253 253 1/4 253 1/2 253 3/4 254 254 1/4 254 1/2 254 3/4 255 255 1/4 255 1/2 255 3/4 256 256 1/4 256 1/2 256 3/4 257 257 1/4 257 1/2 257 3/4 258 258 1/4 258 1/2 258 3/4 259 259 1/4 259 1/2 259 3/4 260 260 1/4 260 1/2 260 3/4 261 261 1/4 261 1/2 261 3/4 262 262 1/4 262 1/2 262 3/4 263 263 1/4 263 1/2 263 3/4 264 264 1/4 264 1/2 264 3/4 265 265 1/4 265 1/2 265 3/4 266 266 1/4 266 1/2 266 3/4 267 267 1/4 267 1/2 267 3/4 268 268 1/4 268 1/2 268 3/4 269 269 1/4 269 1/2 269 3/4 270 270 1/4 270 1/2 270 3/4 271 271 1/4 271 1/2 271 3/4 272 272 1/4 272 1/2 272 3/4 273 273 1/4 273 1/2 273 3/4 274 274 1/4 274 1/2 274 3/4 275 275 1/4 275 1/2 275 3/4 276 276 1/4 276 1/2 276 3/4 277 277 1/4 277 1/2 277 3/4 278 278 1/4 278 1/2 278 3/4 279 279 1/4 279 1/2 279 3/4 280 280 1/4 280 1/2 280 3/4 281 281 1/4 281 1/2 281 3/4 282 282 1/4 282 1/2 282 3/4 283 283 1/4 283 1/2 283 3/4 284 284 1/4 284 1/2 284 3/4 285 285 1/4 285 1/2 285 3/4 286 286 1/4 286 1/2 286 3/4 287 287 1/4 287 1/2 287 3/4 288 288 1/4 288 1/2 288 3/4 289 289 1/4 289 1/2 289 3/4 290 290 1/4 290 1/2 290 3/4 291 291 1/4 291 1/2 291 3/4 292 292 1/4 292 1/2 292 3/4 293 293 1/4 293 1/2 293 3/4 294 294 1/4 294 1/2 294 3/4 295 295 1/4 295 1/2 295 3/4 296 296 1/4 296 1/2 296 3/4 297 297 1/4 297 1/2 297 3/4 298 298 1/4 298 1/2 298 3/4 299 299 1/4 299 1/2 299 3/4 300 300 1/4 300 1/2 300 3/4 301 301 1/4 301 1/2 301 3/4 302 302 1/4 302 1/2 302 3/4 303 303 1/4 303 1/2 303 3/4 304 304 1/4 304 1/2 304 3/4 305 305 1/4 305 1/2 305 3/4 306 306 1/4 306 1/2 306 3/4 307 307 1/4 307 1/2 307 3/4 308 308 1/4 308 1/2 308 3/4 309 309 1/4 309 1/2 309 3/4 310 310 1/4 310 1/2 310 3/4 311 311 1/4 311 1/2 311 3/4 312 312 1/4 312 1/2 312 3/4 313 313 1/4 313 1/2 313 3/4 314 314 1/4 314 1/2 314 3/4 315 315 1/4 315 1/2 315 3/4 316 316 1/4 316 1/2 316 3/4 317 317 1/4 317 1/2 317 3/4 318 318 1/4 318 1/2 318 3/4 319 319 1/4 319 1/2 319 3/4 320 320 1/4 320 1/2 320 3/4 321 321 1/4 321 1/2 321 3/4 322 322 1/4 322 1/2 322 3/4 323 323 1/4 323 1/2 323 3/4 324 324 1/4 324 1/2 324 3/4 325 325 1/4 325 1/2 325 3/4 326 326 1/4 326 1/2 326 3/4 327 327 1/4 327 1/2 327 3/4 328 328 1/4 328 1/2 328 3/4 329 329 1/4 329 1/2 329 3/4 330 330 1/4 330 1/2 330 3/4 331 331 1/4 331 1/2 331 3/4 332 332 1/4 332 1/2 332 3/4 333 333 1/4 333 1/2 333 3/4 334 334 1/4 334 1/2 334 3/4 335 335 1/4 335 1/2 335 3/4 336 336 1/4 336 1/2 336 3/4 337 337 1/4 337 1/2 337 3/4 338 338 1/4 338 1/2 338 3/4 339 339 1/4 339 1/2 339 3/4 340 340 1/4 340 1/2 340 3/4 341 341 1/4 341 1/2 341 3/4 342 342 1/4 342 1/2 342 3/4 343 343 1/4 343 1/2 343 3/4 344 344 1/4 344 1/2 344 3/4 345 345 1/4 345 1/2 345 3/4 346 346 1/4 346 1/2 346 3/4 347 347 1/4 347 1/2 347 3/4 348 348 1/4 348 1/2 348 3/4 349 349 1/4 349 1/2 349 3/4 350 350 1/4 350 1/2 350 3/4 351 351 1/4 351 1/2 351 3/4 352 352 1/4 352 1/2 352 3/4 353 353 1/4 353 1/2 353 3/4 354 354 1/4 354 1/2 354 3/4 355 355 1/4 355 1/2 355 3/4 356 356 1/4 356 1/2 356 3/4 357 357 1/4 357 1/2 357 3/4 358 358 1/4 358 1/2 358 3/4 359 359 1/4 359 1/2 359 3/4 360 360 1/4 360 1/2 360 3/4 361 361 1/4 361 1/2 361 3/4					

Ferrule Type—Power Electronic

Type KTK-R

$1\frac{1}{32}'' \times 1\frac{1}{2}''$ (10.3mm \times 38.1mm)

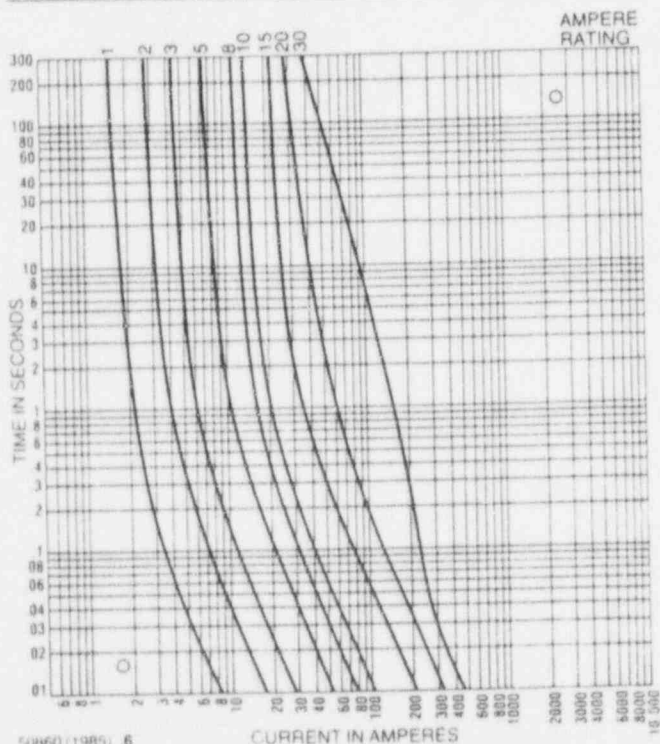
Non-Time-Delay

A Limitron[®] fast-acting fuse. Melamine. U.L. Listed for branch circuit protection. Class CC. Rejection type, for both standard holders or those which reject other type fuses. Mount in Buss Class CC fuseblocks (see catalog FLC) and Buss fuseholders HPS-RR (thru 30 amps). Interrupting rating—200,000AIC. Current limiting. Shipping weight per 100—31 oz. (877g) U.L. File 4273A, Guide JDDZ. CSA File 53787, Class 1422-01



Electrical Ratings (Catalog Symbol and Amperes)

600 Volts	600 Volts	600 Volts	600 Volts
KTK-R $\frac{1}{16}$	KTK-R $\frac{1}{8}$	KTK-R 5	KTK-R 15
KTK-R $\frac{1}{4}$	KTK-R $\frac{3}{8}$	KTK-R 6	KTK-R 20
KTK-R $\frac{1}{2}$ U.L.	KTK-R 1 U.L.	KTK-R 7 U.L.	KTK-R 25 U.L.
KTK-R $\frac{3}{4}$ Listed	KTK-R $1\frac{1}{2}$ Listed	KTK-R 8 Listed	KTK-R 30 Listed
KTK-R $\frac{5}{8}$ & CSA	KTK-R 2 & CSA	KTK-R 9 & CSA	— & CSA
KTK-R $\frac{3}{4}$	KTK-R 3	KTK-R 10	—
KTK-R $\frac{1}{2}$	KTK-R 4	KTK-R 12	—



50960 (1985) 6
Time-Current Curves—Typical

U.L. File 4273A; CSA File 53787

Type FNM

$1\frac{1}{32}'' \times 1\frac{1}{2}''$ (10.3mm \times 38.1mm)

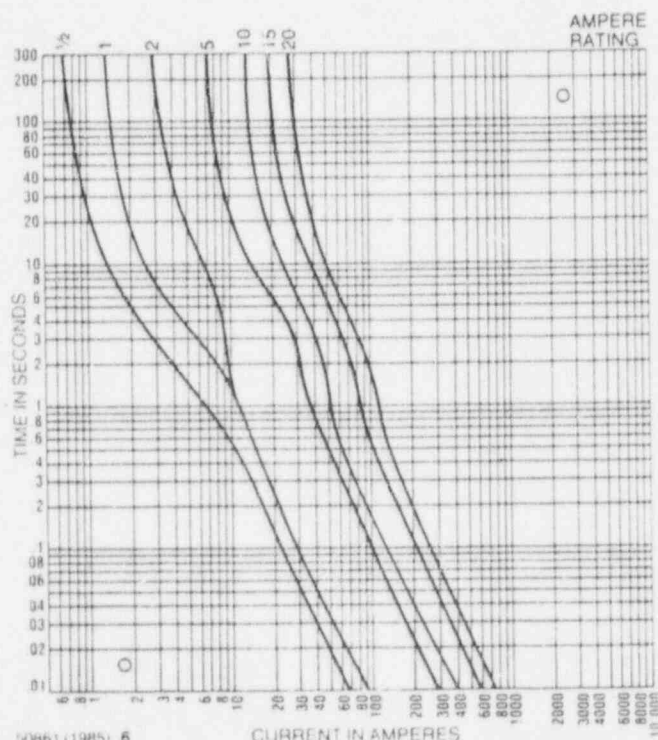
Time-Delay

Fibre. Formerly designated 5AB. A dual-element Fusetron[®] fuse. For circuits with high inrush currents. Mount in Buss fuseholders, fuseblocks, and clips. Shipping weight per 100—1.5 lbs (680g) U.L. File E19180, Guide JDYX. CSA File 53787; Class 1422-01.



Electrical Ratings (Catalog Symbol and Amperes)

250 Volts	250 Volts	250 Volts	250 Volts
FNM $\frac{1}{16}$	FNM $\frac{1}{8}$	FNM 3	FNM 8
FNM $\frac{1}{4}$	FNM $\frac{1}{4}$	FNM $3\frac{1}{2}$	FNM 9
FNM $\frac{1}{2}$	FNM $\frac{1}{2}$	FNM 4	FNM 10 U.L.
FNM $\frac{3}{4}$ U.L.	FNM $1\frac{1}{2}$ U.L.	FNM $4\frac{1}{2}$ U.L.	FNM 12 Listed
FNM $\frac{5}{8}$ Listed	FNM $1\frac{1}{2}$ Listed	FNM 5 Listed	FNM 15
FNM $\frac{3}{4}$ & CSA	FNM $1\frac{1}{2}$ & CSA	FNM $5\frac{1}{2}$ & CSA	32 Volts
FNM $\frac{5}{8}$	FNM 2	FNM 6	FNM 20
FNM $\frac{3}{4}$	FNM $2\frac{1}{4}$	FNM $6\frac{1}{4}$	FNM 25
FNM $\frac{5}{8}$	FNM $2\frac{1}{2}$	FNM 7	FNM 30
FNM 1	FNM $2\frac{3}{4}$		



50961 (1985) 6
Time-Current Curves—Typical

U.L. File E19180; CSA File 53787

KAB350Y

Selection Guide

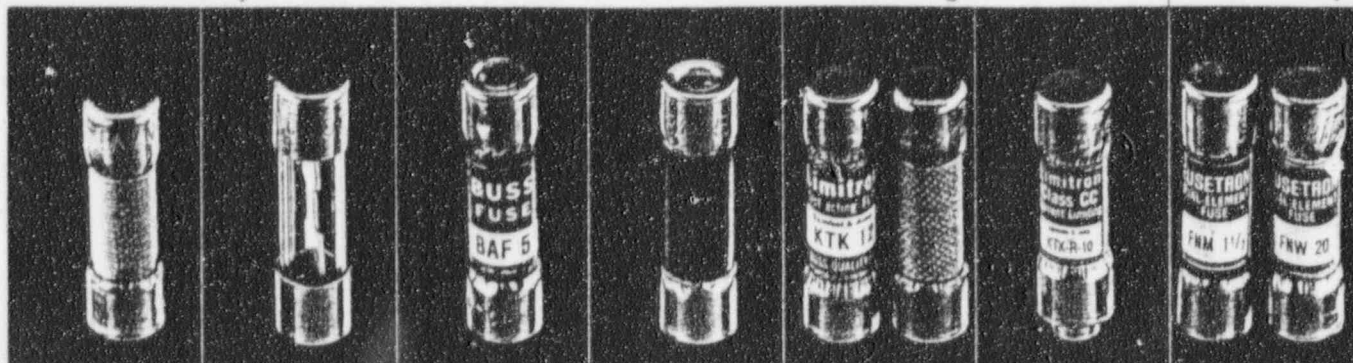
Ferrule Fuses

$1\frac{3}{32}" \times 1\frac{3}{8}"$	$1\frac{3}{32}" \times 1\frac{1}{2}"$
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Non-Time Delay

Fast-Acting

Time-Delay



KTQ	AGU	BAF	BAN	KTK/KLM**	KTK-R	FNM/FNW†
For control, gaseous vapor, and electronic circuits. Slightly more delay than BBS.	Glass. Formerly 5AG. See - Page - - For ratings above 30A.	Laminated.	Fibre. Formerly 5AB	Melamine. For circuits having high fault I. 100,000 AIC (KLM's have d-c rating of 500V, 0-30 Amps CSA Certified, 0-10 Amp U.L. Listed, 12-30 Amp 600V U.L. Listed).	KTK with rejection feature. U.L. Class CC. Branch circuit fuse. 200,000 AIC.	For circuits with high inrush currents. 10,000 AIC @ 125V †For motor control transformers. U.L. Listed. FNW available only 12-30 amps
(page 36)	(page 37)	(page 37)	(page 38)	(page 38)	(page 39)	(page 39)
—	—	—	—	—	—	—
—	—	—	—	KTK/KLM-1/10 600V ^{UC}	KTK-R-1/10 600V ^{UC}	FNM-1/10 250V ^{UC}
—	—	—	—	KTK/KLM-1/8 600V ^{UC}	KTK-R-1/8 600V ^{UC}	—
—	—	—	—	—	—	FNM-1/8 250V ^{UC}
—	—	—	—	—	—	—
—	—	—	—	KTK/KLM-3/16 600V ^{UC}	KTK-R-3/16 600V ^{UC}	FNM-3/16 250V ^{UC}
—	—	—	—	—	—	—
—	—	—	—	KTK/KLM-1/4 600V ^{UC}	KTK-R-1/4 600V ^{UC}	FNM-1/4 250V ^{UC}
—	—	—	—	KTK/KLM-3/8 600V ^{UC}	KTK-R-3/8 600V ^{UC}	FNM-3/8 250V ^{UC}
—	—	—	—	—	—	—
—	—	—	—	—	KTK-R-1/2 600V ^{UC}	FNM-1/2 250V ^{UC}
—	—	BAF-1/2 250V ^{UC}	—	KTK/KLM-1/2 600V ^{UC}	KTK-R-1/2 600V ^{UC}	FNM-1/2 250V ^{UC}
—	—	—	—	—	KTK-R-3/4 600V ^{UC}	FNM-3/4 250V ^{UC}
—	—	—	—	KTK/KLM-3/4 600V ^{UC}	KTK-R-3/4 600V ^{UC}	—
—	—	—	—	—	—	FNM-3/4 250V ^{UC}
—	—	—	—	—	—	—
—	—	—	—	—	KTK-R-1/2 600V ^{UC}	FNM-1/2 250V ^{UC}
—	—	BAF-1 250V ^{UC}	BAN-1 250V	KTK/KLM-1 600V ^{UC}	KTK-R-1 600V ^{UC}	FNM-1 250V ^{UC}
—	—	—	—	—	—	—
—	—	—	—	—	—	FNM-1 1/8 250V ^{UC}
—	—	—	—	—	—	FNM-1 1/4 250V ^{UC}
KTQ-1 600V	—	—	—	—	—	FNM-1 1/8 250V ^{UC}
—	—	BAF-1 1/2 250V ^{UC}	—	KTK/KLM-1 1/2 600V ^{UC}	KTK-R-1 1/2 600V ^{UC}	FNM-1 1/2 250V ^{UC}
—	—	—	—	—	—	FNM-1 1/4 250V ^{UC}
—	—	—	—	—	—	FNM-1 1/8 250V ^{UC}
—	—	—	—	—	—	FNM-1 1/4 250V ^{UC}
—	AGU-2 250V	BAF-2 250V ^{UC}	BAN-2 250V	KTK/KLM-2 600V ^{UC}	KTK-R-2 600V ^{UC}	FNM-2 250V ^{UC}
—	—	—	—	—	—	FNM-2 1/4 250V ^{UC}
—	—	BAF-2 1/2 250V ^{UC}	—	KTK-2 1/2 600V ^{UC}	—	FNM-2 1/2 250V ^{UC}
—	—	—	—	—	—	FNM-2 1/4 250V ^{UC}
KTQ-2 600V	AGU-3 250V	BAF-3 250V ^{UC}	BAN-3 250V	KTK/KLM-3 600V ^{UC}	KTK-R-3 600V ^{UC}	FNM-3 250V ^{UC}
—	—	—	—	—	—	FNM-3 1/4 250V ^{UC}
—	—	—	—	KTK-3 1/2 600V ^{UC}	—	FNM-3 1/2 250V ^{UC}
—	AGU-4 32V	BAF-4 250V ^{UC}	BAN-4 250V	KTK/KLM-4 600V ^{UC}	KTK-R-4 600V ^{UC}	FNM-4 250V ^{UC}
KTQ-3 600V	—	—	—	—	—	FNM-4 1/2 250V ^{UC}
—	AGU-5 32V	BAF-5 250V ^{UC}	BAN-5 250V	KTK/KLM-5 600V ^{UC}	KTK-R-5 600V ^{UC}	FNM-5 250V ^{UC}
—	—	—	—	—	—	FNM-5 1/4 250V ^{UC}
KTQ-4 600V ^U	—	BAF-6 250V ^{UC}	BAN-6 250V	KTK/KLM-6 600V ^{UC}	KTK-R-6 600V ^{UC}	FNM-6 250V ^{UC}
—	—	BAF-6 1/4 250V ^{UC}	—	—	—	FNM-6 1/4 250V ^{UC}
KTQ-5 600V ^U	—	BAF-7 250V ^{UC}	—	KTK-7 600V ^{UC}	KTK-R-7 600V ^{UC}	FNM-7 250V ^{UC}
—	—	—	—	—	—	—
KTQ-6 600V ^U	AGU-8 32V	BAF-8 250V ^{UC}	BAN-8 250V	KTK/KLM-8 600V ^{UC}	KTK-R-8 600V ^{UC}	FNM-8 250V ^{UC}
—	—	BAF-9 250V ^{UC}	—	—	KTK-R-9 600V ^{UC}	FNM-9 250V ^{UC}
—	AGU-10 32V	BAF-10 250V ^{UC}	BAN-10 250V	KTK/KLM-10 600V ^{UC}	KTK-R-10 600V ^{UC}	FNM-10 250V ^{UC}
—	—	BAF-12 250V ^{UC}	BAN-12 250V	KTK-12 600V ^{UC}	KTK-R-12 600V ^{UC}	FNM-12† 125V ^{UC}
—	AGU-15 32V	BAF-15 250V ^{UC}	BAN-15 250V	KTK/KLM-15 600V ^{UC}	KTK-R-15 300V ^{UC}	FNM-15† 125V ^{UC}
—	AGU-20 32V	BAF-20 125V	BAN-20 250V	KTK/KLM-20 600V ^U	KTK-R-20 600V ^{UC}	FNM-20† 32V
—	AGU-25 32V	BAF-25 125V	BAN-25 250V	KTK/KLM-25 600V ^U	KTK-R-25 600V ^{UC}	FNM-25† 32V
—	AGU-30 32V	BAF-30 125V	BAN-30 250V	KTK/KLM-30 600V ^U	KTK-R-30 600V ^{UC}	FNM-30† 32V

[†]U.L. Listed, [‡]CSA Certified. ^{**}U.L. and CSA Listings applicable only to KTK fuses.