MKW POWER SYSTEMS, Inc.

AUTHORIZED DISTRIBUTOR

April 24, 1995

Thomas Murley
Director
Office of Nuclear Reactor Regulation
11555 Rockville Pike
Rockville, MD 20852

Reference: Report No. 10CFR21-0071

Subject: Reportable defect with Square D type KPD relay

Dear Mr. Murley:

MKW Power Systems was notified on 2/23/95 by Wisconsin Electric - Point Beach about a contact failure of a Square D type KPD relay used in their diesel generator control panel. Our review of this subject is not yet complete. We estimate a completion date of 5/8/95.

An interim report is attached which describes the condition.

Yours very truly,

MKW POWER SYSTEMS, INC.

Michael Nuding

Michael Nuding
General Manager - Quality Assurance

MN:dg

Enclosure

Post Office Box 1928 • Rocky Mount, North Carolina 27802-1928 • Phone: (919) 977-2720
TWX: (510) 929-0725 • FAX: (919) 446-3830

MKW POWER SYSTEMS, Inc.

AUTHORIZED DISTRIBUTOR EMD ELECTRO MOTIVE

Report No. 10CFR21-0071I
April 24, 1995

INTERIM REPORT

10CFR21 REPORTING OF DEFECTS
AND NON-COMPLIANCE

COMPONENT: Square D Class 8501, Type KPD relay

SYSTEM: EMD Diesel Generator control systems

CONCLUSION: To be determined

PREPARED BY: _____ DATE: 4/24/95
Donald D. Galeazzi
Engineering Manager

APPROVED BY: _____ DATE: April 24, 1995
Michael Nuding
General Manager, Quality Assurance

Post Office Box 1928 • Rocky Mount, North Carolina 27802-1928 • Phone: (919) 977-2720
TWX: (510) 929-0725 • FAX: (919) 446-3830

SUMMARY

Recent information has revealed a change in published DC contact ratings of Square D type KPD relays . These relays are used by MKW Power Systems in diesel generator 125 VDC control circuits.

MKW Power Systems received notification on 2/23/95 from Wisconsin Electric - Point Beach about a contact failure of the BTR (breaker trip relay) within the diesel generator control panel. The contact was wired out for customer use; Wisconsin Electric utilized the relay contact to trip their 86 lockout relay. Investigation by Wisconsin Electric revealed that their circuit required approximately 1.3 amps @ 125 VDC. This lead Wisconsin Electric to verify the contact ratings of the BTR relay (Square D class 8501, type KPD-13). Square D indicated that the KPD-13 relay did not have any DC ratings. MKW Power Systems performed further investigation with Square D which revealed that Square D had recently corrected their catalog to remove the DC ratings. Previous issues of the Square D Digest provided the following contact ratings (see Exhibit 2):

1985: 10A continuous, make/break 60 VA @ 125 VDC.
1990: 10A continuous @ 6-120 VDC.
1992: no DC contact ratings.
1994: no DC contact ratings.

According to Square D, the above changes in contact ratings were due to catalog errors; not due to design changes of the KPD-13 relay.

MKW Power Systems informed Square D that they have been utilizing the KPD-13 relays in 125 VDC circuits for more than twenty years with successful results and therefore the relays have demonstrated their capability to handle DC loads. Square D contacted their supplier and provided the following ratings (see Exhibit 1):

10A continuous, make/break 50 VA (.4A) @ 125 VDC.

Some KPD contacts within the MKW Power Systems' control panels are wired-out to terminals for "customer's use". These contacts are used for applications such as: D/G circuit breaker close, D/G circuit break trip, 86 relay trip, etc.. The above contact make/break ratings are less than the original ratings of 60 VA and therefore users should be notified of this deviation.

COMPONENTS

Square D class 8501, type KPD relays.

KPD-13 (3 pole version)
KPD-12 (2 pole version)

CUSTOMERS AFFECTED

To be determined.

DEFECT

The defect has been identified as a change in the DC make/break contact rating of the Square D type KPD relay. Square D's most recent publications show the relay as not having any DC contact ratings, but they have verified with their relay supplier that the relay can make/break 0.4 amps (50 VA) and carry 10 amps continuously @ 125 VDC. This make/break rating is less than the originally published rating of 60 VA @ 125 VDC. MKW Power Systems has been utilizing the KPD relay in their 125 VDC control circuitry for more than twenty (20) years. During this time period, contact failures due to excessive current have not been a problem. All customers (except FP&L - Turkey Point and Wisconsin Electric - Point Beach) have at least ten (10) years of operating experience. Because of this operating experience, MKW Power Systems does not believe that the described change in contact ratings will affect the operability of its diesel generators in nuclear safety related service. Circuitry for FP&L and Wisconsin Electric control panels is being reviewed to determine if loads beyond the 50 VA contact rating exist.

CORRECTIVE ACTION

Users should review their circuitry which utilize "customer use" KPD relay contacts and verify that the new contact ratings are not exceeded.

For Wisconsin Electric-Point Beach, relays SDRX2 and BTR have been identified as being utilized in circuitry which exceeds the 50 VA contact rating. Wisconsin Electric has replaced these relays with ones having adequate contact ratings.

EXHIBIT 1
(1 pages)

SQUARE D TO MKW POWER SYSTEMS

KPD RELAY CONTACT RATINGS

SMITTAL FACSIMILE TRANSMITTAL FACSIMILE TRANSMITTA

SQUARE D COMPANY
AUTOMATION AND CONTROL BUSINESS
HIGHWAY 64 EAST, KNIGHTDALE, NC 27545

NUMBER OF PAGES INCLUDING THIS PAGE: 1
IF YOU HAVE NOT RECEIVED ALL PAGES CALL: 919-266-8298.

DATE: March 17, 1995

TO: Michael Nuding — FAX NO. 919 / 446 - 6112
MKW Power Systems
Copy to: Don Habegger

FROM: John Nussbaum - Raleigh Marketing — FAX NO. 919 / 266 - 8393

SUBJECT: 8501 KPD13 Relays
DC Contact Ratings

The 8501 KPD13 relay doesn't have any UL approved DC contact ratings. The information published in our 1990 Digest was incorrect. The information shown in our current Digest is correct.

Our supplier has done some in house testing and they say it will make and break 10 amp. at 28 VDC and 0.4 amps. at 125 VDC. The contacts will continuously carry, but not make or break, 10 amps. at 125 VDC. There is no testing available to support a 60 VA rating.

I hope this information helps you. If I can be of any further help, please call me at (919) 266 - 8298.

Regards,

MAR 20 1995

We Respond

EXHIBIT 2
(4 pages)

SQUARE D CATALOG PAGES

KPD RELAY CONTACT RATINGS (1985, 1990, 1992, 1994)

Revised Nov., 1985

GENERAL PURPOSE CONTROL RELAYS

TYPE K

CLASS 8501

Class 8501 Type K general purpose control relays are designed for multipole switching applications at 240 volts or below. Class 8501 Type K relays have an industry standard wiring and pin arrangement which allows their use as replacements for many similar relays without wiring or hardware modifications.

- 240 Volt 10 Amp.
- AC or DC Operation
- DPDT or 3PDT
- Manual Operator Option (Type KU Only)
- Pilot Light Option (Type KU & KP Only)
- DPDT Latching Relay

TYPE KP — TUBE TYPE TERMINATION

Type KP
Tube Type

Input Voltage	Contact Arrangement	Options	Type	Form
AC 50/60 Hz	DPDT	None	KP-12	...
	DPDT	Pilot Light	KP-12	P14
	3PDT	None	KP-13	...
	3PDT	Pilot Light	KP-13	P14
DC	DPDT	None	KPD-12	...
	DPDT	Pilot Light	KPD-12	P14
	3PDT	None	KPD-13	...
	3PDT	Pilot Light	KPD-13	P14

TYPE KF — FLANGE MOUNTED — SQUARE BASE TERMINATION

Type KF
Flange Mounted

Input Voltage	Contact Arrangement	Options	Type
AC 50/60 Hz	DPDT	None Available	KF-12
	3PDT		KF-13
DC	DPDT	None Available	KFD-12
	3PDT		KFD-13

TYPE KU — SQUARE BASE TERMINATION

Type KU
Square Base

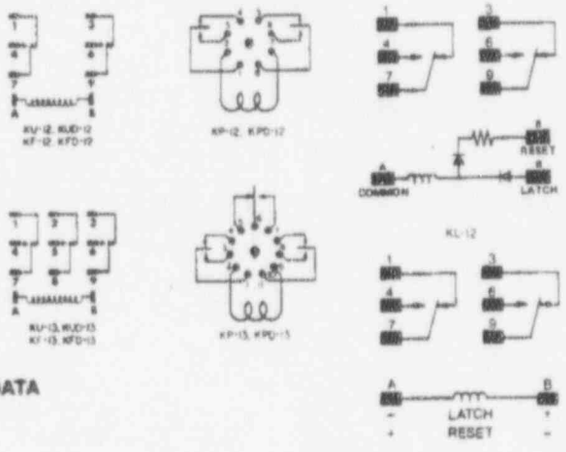
Input Voltage	Contact Arrangement	Options	Type	Form
AC 50/60 Hz	DPDT	None	KU-12	...
	DPDT	Manual Operator	KU-12	M1
	DPDT	Pilot Light	KU-12	P14
	DPDT	Manual Operator and Pilot Light	KU-12	M1P14
	3PDT	None	KU-13	...
	3PDT	Manual Operator	KU-13	M1
	3PDT	Pilot Light	KU-13	P14
	3PDT	Manual Operator and Pilot Light	KU-13	M1P14
DC	DPDT	None	KUD-12	...
	DPDT	Manual Operator	KUD-12	M1
	DPDT	Pilot Light	KUD-12	P14
	DPDT	Manual Operator and Pilot Light	KUD-12	M1P14
	3PDT	None	KUD-13	...
	3PDT	Manual Operator	KUD-13	M1
	3PDT	Pilot Light	KUD-13	P14
	3PDT	Manual Operator and Pilot Light	KUD-13	M1P14

TYPE KL — LATCHING RELAY — SQUARE BASE TERMINATION

Type KL
Square Base

Input Voltage	Contact Arrangement	Options	Type
AC 50/60 Hz	DPDT	None Available	KL-12
DC	DPDT	None Available	KLD-12

WIRING DIAGRAMS



APPLICATION DATA

COIL RESISTANCE — OHMS©

Volts	Type KP		Types KU, KF			Type KL	
	AC 50/60 Hz	DC	AC 50/60 Hz 2 Pole	AC 50/60 Hz 3 Pole	DC	AC 50/60 Hz	DC
6	6.0	32	6.0	4.2	32.1	10.5	32.1
12	24	120	24	18	120	37	120
24	85	472	85	72	472	176	472
48	—	1800	—	—	1800	585	1800
110	—	10,000	—	—	10,000	—	10,000
120	2250	—	2250	1700	—	3700	—
240	9110	—	9110	7200	—	17,900	—

©Resistance values for AC coils above are ±15% @ 25°C and resistance values for DC coils above are ±10% @ 25°C.

CONTACT RATINGS

Volts	AC Amperes Inductive 35% PF Make	Break	Continuous	Resistive 75% PF Make, Break & Continuous	HP	DC Volts	DC Amperes Make Break	DC Amperes Continuous
120	30	3	10	10	¼	6-120	60 VA	10 A
240	15	1.5	10*	10*	½			

* 3 pole devices have 6A5 Amps max. continuous rating

DIMENSIONS — See Page 4-7
APPLICATION DATA — See Pages 4-3, 4-4
ORDERING INFORMATION REQUIRED — See Page 4-10

12/90

LOGIC PRODUCTS
GENERAL PURPOSE RELAYS
TYPE K — PLUG-IN
CLASS 8501

APPLICATION DATA — TYPE K

CONTACT RATINGS

Type	AC Volts	AC Resistive 75% PF Continuous Amperes	AC HP	DC Volts	DC Resistive 75% PF Continuous Amperes
KP, KU, KL, KF	120	10	1/4△	6-120	10
	240	10#	1/4		
KX	120	15	1/3	28	10
	240	10#	1/2		
	480	3	1/2	125	.5
	600	3	1/2		

#3 pole devices have 6⅞ Amps max. continuous rating.
△Type KP rated ⅛ HP.

OPERATING DATA

Pick-Up Time:
Types KF, KP, KU, KX — Approximately 15 ms
Type KL — Approximately 25 ms

Drop-Out Time:
Types KF, KP, KU, KX — Approximately 10 ms
Type KL — Approximately 25 ms

Operating Temperature Range:
Types KF, KP, KU, KX
AC: 2 pole: −45°C to +55°C (−49°F to +131°F)
3 pole: −45°C to +45°C (−49°F to +113°F)
DC: −45°C to +70°C (−49°F to +158°F)
Type KL
AC/DC: −45°C to +70°C (−49°F to +158°F)

CONTACTS

Configuration: 2 or 3PDT (2 or 3 Form C)
Ratings: See table above
Material: Silver cadmium oxide

COILS

Duty: Continuous rated coils
Available Voltages:
See Stocked Relays page 12-11. For a 220VDC input, use a 110VDC relay with a 10,000 ohm 5W wire-wound resistor in series.

Operate:
AC: 85% of Nominal Voltage at 25°C (77°F)
DC: 75% of Nominal Voltage at 25°C (77°F)

Burden:
Type KP:
AC: 3 VA inrush, 2 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Types KU, KF:
AC: 2 pole — 3 VA inrush, 2 VA sealed
3 pole — 3.7 VA inrush, 2.7 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Type KX:
AC: 3.7 VA inrush, 2.7 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Type KL:
AC: 2.0 VA latch, 0.6 VA unlatch
DC: 1.22 watts

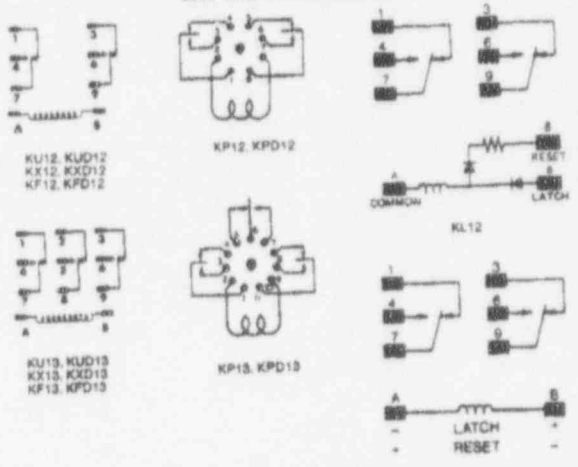
GENERAL

Terminals: Solder/plug-in
Sockets: See listing on page 12-15.
UL/CSA: Type K with recommended Class 8501 Type NR Socket:

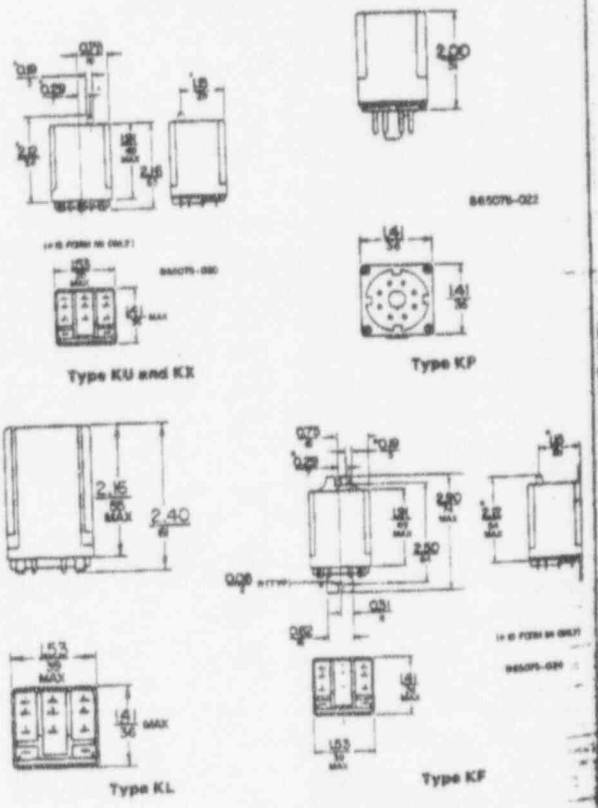
UL File E78351, CCN NLDX
UL component recognized under CCN NLDX2.

CSA File LR15734M51, Class 321104

WIRING DIAGRAMS



APPROXIMATE DIMENSIONS



12

We Respond

12/92

General Purpose Relays
Type K – Plug-in Relay
Application Data, Dimensions, Wiring Diagrams

Class 8501

Contact Ratings

Type	AC Volts	AC Resistive 75% PF Continuous Amperes	AC HP	DC Volts	DC Resistive Amperes
KP, KU, KL, KF	120	10	1/3 ▲	28	10*
	240	10*	1/3		
KX	120	15	1/2	28	10
	240	10*	1/2		

* 3 pole devices have 6 Amps max. continuous rating.
▲ Type KF rated 1/4 HP.
◆ Does not apply to KP or KPD relays.

Operating Data

Pick-Up Time:
Types KF, KP, KU, KX – Approximately 15 ms
Type KL – Approximately 25 ms

Drop-Out Time:
Types KF, KP, KU, KX – Approximately 10 ms
Type KL – Approximately 25 ms

Operating Temperature Range:
Types KF, KP, KU, KX
AC: 2 pole: -45°C to +55°C (-49°F to +131°F)
3 pole: -45°C to +45°C (-49°F to +113°F)
DC: -45°C to +70°C (-49°F to +158°F)
Type KL
AC/DC: -45°C to +70°C (-49°F to +158°F)

Contacts

Configuration: 2 or 3PDT (2 or 3 Form C)
Ratings: See table above
Material: Silver cadmium oxide

Coils

Duty: Continuous rated coils

Available Voltages:
See Stocked Relays page 12-11. For a 220VDC input, use a 110VDC relay with a 10,000 ohm 5W wire-wound resistor in series.

Operate:
AC: +10, -15% of Nominal Voltage at 25°C (77°F)
DC: +10, -25% of Nominal Voltage at 25°C (77°F)

Burden:
Type KP:
AC: 3 VA inrush, 2 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Types KU, KF:
AC: 2 pole – 3 VA inrush, 2 VA sealed
3 pole – 3.7 VA inrush, 2.7 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Type KX:
AC: 3.7 VA inrush, 2.7 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Type KL:
AC: 2.0 VA latch, 0.6 VA unlatch
DC: 1.22 watts

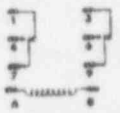
General

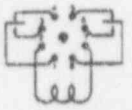
Terminals: Solder/plug-in
UL/CSA: Type K with recommended Class 8501 Type NR Socket:

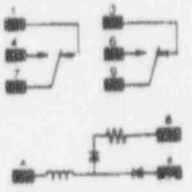
UL File E78351 CCN NLDX
CSA File Class LR15734M51 321104

UL component recognized under CCN NLDX2.

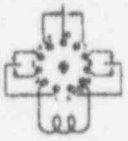
Wiring Diagrams

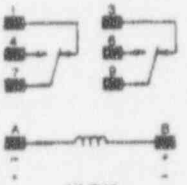

KU12, KUD12
KX12, KXD12
KF12, KFD12


KP12, KPD12

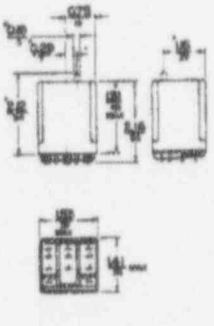

KL12


KU13, KUD13
KX13, KXD13
KF13, KFD13

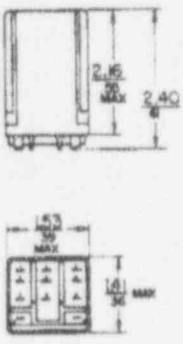

KP13, KPD13

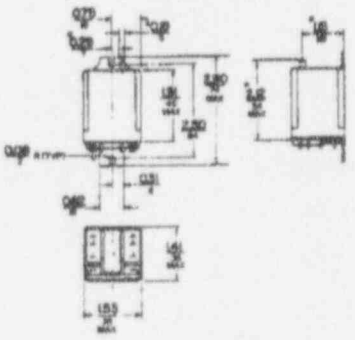

KLD12

Approximate Dimensions


Type KU and KX


Type KP


Type KL


Type KF

Dual Dimensions: Inches / Millimeters

12/94

General Purpose Relays

Type K – Plug-in Relay

Application Data, Dimensions, Wiring Diagrams

Class 8501

Contact Ratings

Type	AC Volts	AC Resistive 75% PF Continuous Amperes	AC HP	DC Volts	DC Resistive Amperes
KP	120	10	1/6	Does Not Apply	
	240	10*	1/3		
KU KF	120	10	1/2	28	10
	240	10*	1/2		
KX	120	15	1/3	28	10
	240	10*	1/2		
KL	120	10	1/4	28	10
	240	10	1/3		

* 3 pole devices have a 20 Amp max. total (sum of currents in all 3 poles), continuous rating.

Operating Data

Pick-Up Time:
Types KF, KP, KU, KX – Approximately 15 ms
Type KL – Approximately 25 ms

Drop-Out Time:
Types KF, KP, KU, KX – Approximately 10 ms
Type KL – Approximately 25 ms

Operating Temperature Range:
Types KF, KP, KU, KX
AC: 2 pole: -45°C to +55°C (-49°F to +131°F)
3 pole: -45°C to +45°C (-49°F to +113°F)
DC: -45°C to +70°C (-49°F to +158°F)
Type KL
AC/DC: -45°C to +70°C (-49°F to +158°F)

Contacts

Configuration: 2 or 3PDT (2 or 3 Form C)
Ratings: See table above
Material: Silver cadmium oxide

Coils

Duty: Continuous rated coils
Available Voltages:
See Stocked Relays page 2-52. For a 220VDC input, use a 110VDC relay with a 10,000 ohm 5W wire-wound resistor in series.
Operate:
AC: +10, -15% of Nominal Voltage at 25°C (77°F)
DC: +10, -25% of Nominal Voltage at 25°C (77°F)
Burden:
Type KP:
AC: 3 VA inrush, 2 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Types KU, KF:
AC: 2 pole – 3 VA inrush, 2 VA sealed
3 pole – 3.7 VA inrush, 2.7 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Type KX:
AC: 3.7 VA inrush, 2.7 VA sealed
DC: 1.2 watts standard, 3 watts maximum
Type KL:
AC: 2.0 VA latch, 0.6 VA unlatch
DC: 1.22 watts

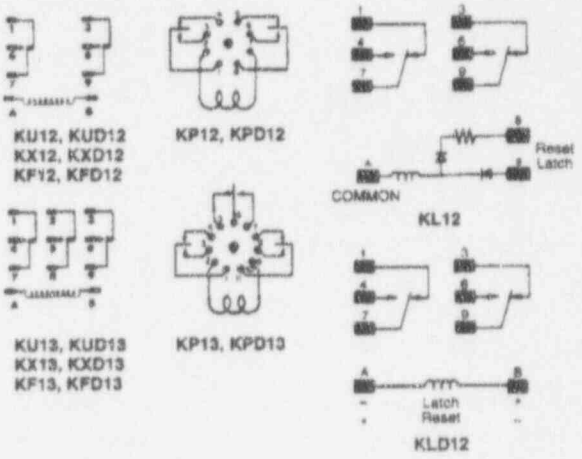
General

Terminals: Solder/plug-in
UL/CSA: Type K with recommended Class 8501 Type NR Socket

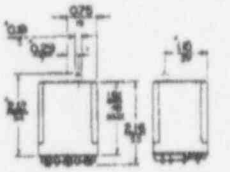
UL File E78351 CCN NLDX2 — CSA File Class LR15734 3211 04

UL component recognized under CCN NLDX2

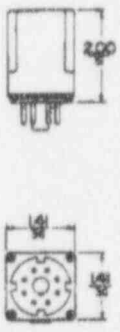
Wiring Diagrams



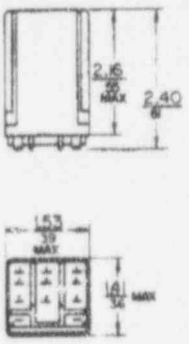
Approximate Dimensions



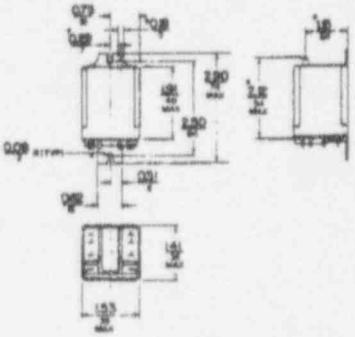
Type KU and KX



Type KP



Type KL



Type KF

Dual Dimensions: Inches / Millimeters

Pf 1951 22
v 95010

MKW POWER SYSTEMS, Inc.

301 South Church Street
Station Square, Suite 100
Rocky Mount, NC 27804
Phone: (919) 977-2720
TWX: (510) 929-0725
FAX: (919) 446-1134

RLD

AUTHORIZED ELECTRO-MOTIVE DISTRIBUTOR

Bisa Grimes
Approp Action

Pls. make sure the Vendor inspection section is ~~on~~ distrib. for these incoming (perhaps they will get the mailed copy automatically thru mail room distribution

TELEFAX

DATE: April 24, 1995

COMPANY: Office of Nuclear Reactor Regulation

FAX NUMBER: 301-415-1887

ATTENTION: Thomas Murley

REFERENCE: Interim Report #10CFR21-0071I

FROM: Michael Nuding

IF YOU DO NOT RECEIVE ALL PAGES LISTED, PLEASE CALL EXTENSION 253 .

PAGES (INCLUDING COVER SHEET): 12

Dear Sir:

Following this cover is a copy of an interim report for the Square D type KPD relay.

Should you have questions, please let us know.

Sincerely,

MKW POWER SYSTEMS, INC.

Michael Nuding

Michael Nuding
General Manager-Quality Assurance