

020 32498



KIDDE-FENWAL, INC.  
400 MAIN STREET  
ASHLAND, MA 01721  
TEL: (508) 881-2000  
FAX: (508) 881-6729

August 14, 1992

Director, Office of Nuclear  
Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attn: Ms. Torre Taylor, IMNS

Log Aug 9  
Remitter  
Check # 164148  
Amount \$ 1100  
Pay to the order of 3H Continuation?  
Date 8/17/92  
631250  
DK

Dear Ms. Taylor:

As advised in your letter of June 9, 1992, enclosed is Kidde-Fenwal, Inc.'s timely application for renewal of NRC License No. 20-15285-03E. We wish to continue the distribution of smoke detectors as authorized in License No. 20-15285-03E, as amended June 9, 1992.

Also enclosed is our \$1,100 check for the current license renewal fee (\$170.31(3)(H)). Please note that on September 9, 1991, we submitted a \$2,100 fee in expectation of receiving a five-year license, but the license issued was for only one year. If at this time our license can be renewed for four more years without payment of any fee, please return our \$1,100 check.

At the time of issuance of License No. 20-15285-03E, Ms. Susan Greene (NMSS) noted that the condition of our license file reflected the fact that since the early '70s we have been authorized by the NRC and the AEC to distribute smoke detectors. Over the years, there was a turnover of models and the license file became confusing. To correct the situation, Ms. Greene directed that the renewal application concern only our current models and include the information outlined in Sections 32.26, 32.27 and 32.29 without referencing previously submitted information.

In the enclosed renewal application we have followed Ms. Greene's direction with one possible exception. That exception is for our Model CPD 705X which was the subject of Amendment No. 1, issued June 9, 1992. For the CPD 705X we believe our submissions of December 9, 1991 and May 27, 1992 are still appropriate. Our letters of April 1, 1992 and April 16, 1992 concern the amount of activity per detector and QC for the Model CPD 705X and these letters are no longer needed because these subjects are more fully discussed in the enclosed application.

As mentioned, we have been distributing smoke detectors for many years and at one time distributed detectors for both the residential and the industrial markets. Presently we distribute only detectors designed for the industrial market and approved under

Rec'd 870CB 8/17/92

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021436

UL 268, "Standard for Smoke Detectors for Fire Protective Signaling Systems." Our Model CPD 705X is our new model and it is manufactured in Japan. Our models CPD 702X and CPD 704X use an ionization chamber that was first approved by NRC in 1979 and remains unchanged except for a modification which was authorized by NRC in 1981. We manufacture the CPD 702X and CPD 704X here in our Ashland facility.

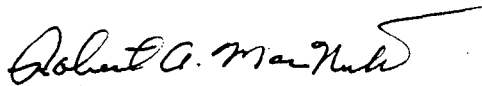
We believe that the enclosed renewal application is consistent with material now on file with NRC, among other material, except that we have updated the labeling information and we have revised the QC program. Although it may not be evident from the licensing file, we have complied with the current NRC labeling requirements which became effective January 1, 1981. The QC program has been revised to satisfy the requirements of NRC's "QC Program Requirements for the Manufacture and Distribution of Smoke Detectors," dated May 11, 1992.

As required by 10 CFR 32.29(c) at renewal of a license, enclosed is a product transfer report.

If you have any questions, please contact me at (508) 881-2000, extension 2733. I am also available to meet with you in Washington or we would be pleased to have you visit us here at Kidde-Fenwal.

Sincerely,

KIDDE-FENWAL, INC.



Robert A. MacNutt  
Quality Manager

RAM/b

Enc:

- (1) Application for renewal of  
License No. 20-15285-03E
- (2) Fee check to NRC for \$1,100
- (3) Report of product transfers

cc: Robert T. Wickham, President

## APPLICATION FOR MATERIAL LICENSE

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUIRES 325 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3160-0120), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

**APPLICATIONS FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:**

U.S. NUCLEAR REGULATORY COMMISSION  
DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY, NMSS  
WASHINGTON, DC 20555

**ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE LOCATED IN:**

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I  
NUCLEAR MATERIALS SAFETY SECTION B  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II  
NUCLEAR MATERIALS SAFETY SECTION  
101 MARIETTA STREET, SUITE 2900  
ATLANTA, GA 30333

**IF YOU ARE LOCATED IN:**

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III  
MATERIALS LICENSING SECTION  
799 ROOSEVELT ROAD  
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV  
MATERIAL RADIATION PROTECTION SECTION  
811 RYAN PLAZA DRIVE, SUITE 1000  
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V  
NUCLEAR MATERIALS SAFETY SECTION  
1460 MARIA LANE, SUITE 210  
WALNUT CREEK, CA 94696

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

**1. THIS IS AN APPLICATION FOR (Check appropriate item):**

- ☐ A. NEW LICENSE  
☐ B. AMENDMENT TO LICENSE NUMBER \_\_\_\_\_  
☒ C. RENEWAL OF LICENSE NUMBER 20-15285-03E

**2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip Code):**

Kidde-Fenwal, Inc.  
400 Main Street  
Ashland, Massachusetts 01721

**3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED:**

Kidde-Fenwal, Inc.  
400 Main Street  
Ashland, Massachusetts

**4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION**

Robert A. MacNutt, Quality Manager

**TELEPHONE NUMBER**

508-881-2000 Ext.

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2 x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE. 2733

**6. RADIOACTIVE MATERIAL**

a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time.

**6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.**

**7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE.**

**8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS**

**9. FACILITIES AND EQUIPMENT.**

**10. RADIATION SAFETY PROGRAM.**

**11. WASTE MANAGEMENT.**

**12. LICENSEE FEES (See 10 CFR 170 and Section 170.31)**

FEE CATEGORY 3.H. AMOUNT ENCLOSED \$ 1100.

**13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.**

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948, 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

**SIGNATURE—CERTIFYING OFFICER**

**TYPED/PRINTED NAME**

**TITLE**

**DATE**

*Robert T. Wickham*

Robert T. Wickham

President

Aug. 14, 1992

**FOR NRC USE ONLY**

TYPE OF FEE FEE LOG FEE CATEGORY COMMENTS

AMOUNT RECEIVED CHECK NUMBER

APPROVED BY

DATE

See  
letter  
dated  
8/24/92



KIDDE-FENWAL, INC.  
400 MAIN STREET  
ASHLAND, MA 01721  
TEL: (508) 881-2000  
FAX: (508) 881-6729

August 14, 1992

Director of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

PRODUCT TRANSFER REPORT FOR THE PERIOD OF TIME:

January 1, 1991 - December 31, 1991  
January 1, 1992 - August 12, 1992

NRC 10 CFR 32.29(c)

<u>Product</u>	<u>Time Period</u>	<u>Amount</u>
CPD 702X	Jan. 1, 1991 - Dec. 31, 1991	91,559 Microcuries
CPD 704X	Jan. 1, 1991 - Dec. 31, 1991	<u>7,917</u> Microcuries
	Total	99,476 Microcuries
CPD 702X	Jan. 1, 1992 - Aug. 31, 1992	37,007 Microcuries
CPD 704X	Jan. 1, 1992 - Aug. 31, 1992	<u>3,667</u> Microcuries
	Total	40,674 Microcuries

Renewal of Kidde-Fenwal, Inc. NRC License No. 20-15285-03E

Kidde-Fenwal, Inc. is authorized by the NRC under License No. 20-15285-01 and License No. 20-15285-03E to manufacture and distribute smoke detectors for use under the exemption provided in 10 CFR 30.20 and equivalent Agreement State regulations. Our activities under these licenses were inspected June 25, 1992, by Ms. Ullrich of NRC's Region I Office. We were informed of no items of non-compliance with NRC regulations or conditions of our licenses and we were found to be in full compliance.

License No. 20-15285-03E was issued and hopefully will be renewed pursuant to 10 CFR 32.26 which requires, among other things, satisfaction of the requirements of §30.33(a)(2) and (3). Since the matters stated in §30.33(a)(2) and (3) are covered by License No. 20-15285-01, and since we were so advised in Ms. Greene's letter of September 26, 1991 this application for renewal of 20-15285-03E will address our current distribution activities and smoke detector models and will not address "in-plant" safety.

We distribute the CPD 702X Series, CPD 704X Series, and CPD 705X Series smoke detectors. These detectors are correctly described, with one exception, in NRC's Sealed Source and Device Registration Certificate NR-668-D-101-E. The exception is on page 2 of the Certificate in lines 8 and 9 under "Description."

When the Certificate was re-issued on April 27, 1992, we neglected to notice the statement that the source holder is secured to the source assembly holder by using brass eyelets. This means of securing the source holder to the source assembly holder was used when the chamber was first made in 1979. An improvement was made in 1981 and by letter dated July 13, 1981, we informed the NRC that in lieu of the tabbed construction previously used, the source holder would be retained to its mounting plate via a riveted stake base. This technique is still used by our source supplier(s) who furnish us with the holder (with foil source) firmly attached to the "radiator assembly" for the ionization chamber by staking.

As stated, we distribute detector models CPD 702X and CPD 704X, and CPD 705X. Licensing authority to distribute the CPD 705X was provided June 9, 1992, by issuance of Amendment No. 1 to License No. 20-15285-03E. With the exception of the provisions for quality control, which are discussed below, we request that information on the CPD 705X submitted (by letters dated December 9, 1991 and May 27, 1992) in application for Amendment No. 1 be considered as part of this renewal application. Accordingly, the following will present quality control for the CPD 705X and the information as required by §32.26 for the CPD 702X and CPD 704X.

Quality Control for CPD 705X

The CPD 705X is manufactured by Nohmi Bosai, Ltd. in Japan and distributed in the U.S. by Kidde-Fenwal, Inc. The CPD 705X uses a single Amersham AMM 1001 foil containing a maximum of 1.5 microcurie of Am-241. The quality control programs of Amersham, Nohmi Bosai and here at Kidde-Fenwal combine to form a QC program for the product which is consistent with NRC's document "QC Program Requirements for the Manufacture and Distribution of Smoke Detectors," dated May 11, 1992.

*rev  
ctr  
8/24/92*  
The AMM 1001 foil is described in NRC's Registration Certificate NR-136-S-174-U. At Amersham foils are visually inspected for surface defects, sampled for check of activity content by gamma counting, and tested to assure contamination of less than ~~0.0005~~ *0.005* microcuries. A test certificate is supplied with foil shipments to Nohmi Bosai.

At Nohmi Bosai the Am-241 foil is inserted into a holder (also called "button") and the following wipe test performed:

1. A 100% Wipe Test will be performed on foils that have been retained in a button/holder.
2. The Wipe Test consists of wiping (without touching the foil) a tray of buttons/holders using the same filter paper (Whatman #40 or equivalent filter paper). Maximum of 100 buttons/holders per the same filter paper.
3. The filter paper will be analyzed with an alpha detecting instrument which is calibrated with an AM-241 alpha source that is traceable to a national standard.
4. Any wipe greater than 0.005 microcurie is cause for individual test of each button/holder. A button/holder showing greater than 0.005 microcurie shall be rejected.
5. Nohmi Bosai shall certify on each lot of detectors shipped that the foil button/holder test has been performed.

Also at Nohmi Bosai, the following final product tests will be performed upon manufacture of the detector and prior to final packaging:

1. Using the NRC SSSS Position Document dated May 11, 1992, select the sample size using the LTPD=3% for the proper sampling size.
  - a. LTD 3% sampling for:
    - (1) removable contamination
    - (2) design conformity.
  - b. Check the entire sample for proper labels and markings. One failure, missing label or marking and each detector in the lot must be checked.
  - c. Wipe Tests, proceed to step 2.
2. Wipe Tests:
  - a. Wipe the area of the detector that would be the most likely area of contamination, using a Whatman #40 or equivalent filter paper. A single filter paper will be used on a maximum of 25 detectors.

- b. The filter paper shall be analyzed with an alpha detecting instrument which is calibrated with an Am-241 alpha source that is traceable to a national standard.
- c. Record analysis results for history file.
- d. Any wipe greater than 0.005 microcurie shall be cause for rejection of the lot and shall be cause for wipe test of each detector.

When the Model CPD 705X is received at Kidde-Fenwal, the following QC procedures will be followed:

1. Verify that Nohmi Bosai has certified that the Foil/Button Holder Tests have been conducted on 100% of the Product shipped. If certificate is not included, do not proceed with the inspection. Place the incoming lot on hold and notify the Purchasing Department and Quality Manager.
2. Verify that Nohmi Bosai has certified that the final product tests have been conducted using the NRC SSSS Position Document dated May 11, 1992, sample size using the LTPD=3% and that 100% of sample was acceptable. Kidde-Fenwal using the NRC SSSS Position Document Dated May 11, 1992, select the sample size using the LTPD=5% for the proper lot size.
  - a. Check the entire sample for proper labels and markings. One failure, missing label or marking, the lot must be rejected.
  - b. Check the entire sample by Wipe Tests per Step 3.
3. Wipe Tests.
  - a. Wipe the area of the detector that would have the most likely area of contamination, using a Whatman #40 or equivalent filter paper. A single filter paper will be used on a maximum of 25 detectors.
  - b. Analyze the sample using the alpha scintillation probe and Ludlum Model 2000 scaler. Prior to analysis, the instrument shall be calibrated using source serial number 92AM2201225. (This is a 0.00966 microcurie Am-241 source obtained from The Source, Inc., and is traceable to a NIST standard. The source has an active diameter of 19 mm.)
4. Record results in log book.
5. Any wipe greater than 0.005 microcurie shall be cause for rejection. Notify the Quality Manager.  
The Quality Manager shall obtain corrective action. (Rejection lots will be screened 100%.)

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Information on CPD 702X and CPD 704X

Kidde-Fenwal is the manufacturer and distributor of the CPD 702X Series and the CPD 704X Series ionization smoke detectors. The "X" denotes variations of the Model CPD 7021 that are non-radiation-protection related, such as electronic circuit changes (with UL approval) or sensitivity range changes (with UL approval). All the CPD 702X Series and the CPD 704X Series use the sources and ion chamber design and have the safety characteristics that were approved by NRC in 1979 and 1981 for the CPD 7021.

Information about the CPD 7021 was submitted to NRC on September 13, 1979 and July 13, 1981. That information has been the principal basis for NRC's approval of our distribution of the CPD 7021 and is still largely applicable. Accordingly, that information with modifications to satisfy current labeling requirements and NRC's QC requirements of May 11, 1992, and with other minor additions, is given below.

(1) Product Description

The model 702X and model 704X are ionization type smoke detectors intended for detection of products of combustion and initiation of an alarm signal. Byproduct material is mounted to emit into a reference and sensing chamber, respectively, causing gas molecules to be ionized, creating a minute current flow. Under normal conditions, the electrical voltage created is balanced out in a bridge network arrangement to create a relative null. When smoke particles, or invisible products of combustion are introduced into the sensing chamber, the current flow in the sensing chamber is disrupted, creating a voltage imbalance which is amplified to drive alarm circuitry.

The models 702X and 704X are intended for installation as described in Kidde-Fenwal's Sales Brochure, effective April 1990 (enclosed). The detector head containing the byproduct material is assembled to the base of the unit by means of a twist lock mounting and locked into place by means of a concealed locking device. The base of the unit is permanently and securely mounted to a ceiling or wall in indoor locations. It is virtually impossible for the unit to become dislodged from its base by inadvertent means.

Typical installations are anticipated in hotel, motel, nursing home, hospital, commercial, industrial, transportation terminal and multiple dwelling housing applications. The design of the device is intended to be unobtrusive. Since there is no sounding device located within the unit, there is little likelihood of attracting attention of casual observers to the device. The secure mounting of the device should make removal highly unlikely. Testing has been conducted by Underwriters Laboratories on the subject detectors and the 702X and 704X have passed all of the requirements set forth in UL 268 Standard for Safety.



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(2) Byproduct Material

The byproduct material is Americium 241 used as an alpha emitter. A maximum of 1.5 microcuries will be used in a detector. The Am-241 will be contained in two foil sources or in one double sided foil source.

(3) Chemical and Physical Form of Byproduct Material

The byproduct material is in the form of americium oxide contained in a sealed foil source which is captured in a 300 series stainless steel rivet shown in Fig. 3. The source is further riveted into a 300 series stainless steel sheet metal cup (Fig. 3) by the source supplier. The foil source model numbers are Amersham's AMM-1001H and AMM-1001D and NRD's A-001.\*

(4) Solubility of Sources

Laboratory tests performed by ORNL and reported in 1969 in ORNL-TM-2684, "Containment Integrity of Ra-226 and Am-241 Foils Employed in Smoke Detectors," and by the Radiochemical Centre Ltd., Amersham, England and reported in 1975 in TRC Report No. 378, "A Summary of an Integrity Testing Programme on Alpha Foils Used in Ionization Chamber Smoke Detectors" show the solubility of the foils to be very low.

An Argonne National Laboratory article published in Health Physics, 1977, "Ingestion of Am-241 Sources Intended for Domestic Smoke Detectors: Report of a Case" concludes:

"... If the sources of Am-241 involved in this incident are representative of those incorporated in domestic smoke detectors, then the most important conclusion that can be drawn is that they are remarkably secure. Apparently they lose very little (less than 1% in the present case) of their radioactive content when exposed to body fluids (although not necessarily gastric juices all the time) for 16 days or more. Furthermore, what activity is released under these circumstances is so inert that there is negligible (must less than 1.5%) absorption into the blood. This is an important and comforting finding in view of the growing numbers of smoke detectors available to the general public."

A study prepared for U.S. NRC (NMSS) by Science Applications, Inc. (SAI) NUREG/CR-1156 "Environmental Assessment of Ionization Chamber Smoke Detectors Containing Am-241" considers published data related to leaching of contamination from ICSD sources and uses that data to estimate dose commitments resulting from

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\*Registration Certificate NR-668-D-101-E as issued 4/28/92 and License No. 20-15285-03E as amended 6/9/92 incorrectly include an NRD Model A-100 foil source. Discussion 8/10/92 with Mr. Larry Keating, NRD, indicates NRD does not supply a Model A-100 foil.

ground water contamination. The results, based on leach rate, transport of the contaminant in ground water and other factors, are very low. In reviewing published data on release from foils, SAI found " . . . The greatest amount released was about 0.1 percent in an immersion test after exposure to a corrosive SO<sub>2</sub> environment for two years."

(5) Construction

Details of construction of the product are reported in Addendum 1. The byproduct material is contained in foils which are securely housed within a steel enclosure which provides excellent physical protection even if the exterior plastic housing is destroyed. Opening of the steel enclosure can only be accomplished by the use of tools or extreme force and it cannot occur inadvertently. The steel enclosure ensures containment of the byproduct material.

The outer plastic housing provides additional mechanical protection of the byproduct material, shielding it from view and from abuse during use, handling, storage, and disposal of the product.

The sealed source holder fixes the foil in its protected location within the steel enclosure.

(6) Maximum External Radiation

Maximum external radiation levels at 5 cm and 25 cm from all external surfaces of the product were measured and the results and test method are described in Addendum 2.

(7) Access of Human Beings to the Detector

In normal use, the product will be mounted to a wall or ceiling and will not be subject to handling. The radiation levels measured at the external surfaces of the detector are reported in Addendum 2. The byproduct material is inaccessible during normal use and handling and the radiation leakage is very low. The CPD 702X and CPD 704X are typically installed on ceilings up to 15 feet high. The detector cannot be removed from the base without a special tool, and an alarm is indicated on the control panel when the detector is removed from the base. Persons frequently will be in the vicinity within 5-10 feet, but rarely in contact with the detector.

(8) Total Annual Quantity

The estimated total quantity of byproduct material expected to be distributed in the CPD 702X and CPD 704X annually is 100 millicuries of Am-241. An additional 150 millicuries is estimated to be distributed annually in the CPD 705X. These estimates

are based on the use of a maximum of 1.5 microcurie per detector, although less than the maximum quantity will normally be used.

(9) Useful Product Life

The anticipated useful life of the product is 15 years.

(10) Labeling

Labeling of the detector will be permanent in nature, consisting of a permanent pressure sensitive label adhered to the plastic housing of a detector head. The label will be readily visible when the detector head is removed from its mounting base without the need to disassemble the detector head.

Enclosed is the label drawing No. 06-231865-081. The model of the detector will be given on the label. Fig. 1 shows where the label is attached to the detector. In addition, on the SMALLEST point of sale package and on the 10 unit sales package for detectors containing Am-241, the following markings are used:

- A. Name of radionuclide and quantity  
(1.5 microcurie americium 241)\*
- B. Kidde-Fenwal, Inc. will be identified.
- C. The following statement:

THIS DETECTOR CONTAINS RADIOACTIVE MATERIAL AND  
HAS BEEN MANUFACTURED IN COMPLIANCE WITH U.S. NRC  
SAFETY CRITERIA IN 10 CFR 32.27. THE PURCHASER IS  
EXEMPT FROM ANY REGULATORY REQUIREMENTS.

\*Note: The above marking will be revised to reflect lower source strength if lower source strengths are used.

(11) Prototype Testing Procedures

The CPD 7020 (representative of the CPD 7021) has been subjected to prototype testing to demonstrate the effectiveness of the containment and shielding under both normal and severe conditions of handling, storage, use and disposal of the product. The procedures for testing are outlined in Addendum 2.

A CPD 7021 detector also was subjected to a drop of 10 m onto pavement. This prototype test is prescribed in Section 2.1(c) of the ANNEX to the Nuclear Energy Agency document, "Recommendations for Ionization Chamber Smoke Detectors in Implementation of Radiation Protection Standards." The test and test results are given in Appendix F of our application of December 9, 1991 for NRC Authorization to distribute the CPD 705X.

(12) Prototype Test Results

The prototype test results indicate that there is no significant change in the form of the byproduct material or evidence that the material may be released to the environment under the test conditions utilized. There was no evidence of an increase in external radiation levels as a result of these tests. The prototype test results are presented in Addendum 2 and in Appendix F of our application of December 9, 1991.

(13) Estimated Radiation Dose and Internal Dose Commitment

See appendix "u" of our application of December 9, 1991, "Radiation Levels and Dose Commitments." This document covers Models CPD 7010 and CPD 7011. Also applies to CPD 7020 and CPD 7021 plus CPD 705X.

The safety analysis performed for earlier Fenwal detectors, and found acceptable to the NRC, is also generally applicable to the Kidde-Fenwal Models CPD 702X, CPD 704X and CPD 705X. It should be noted that these models use a maximum quantity of about 1/3 the amount, in the same type foil, as is used in earlier Fenwal detectors. Accordingly, the estimated external radiation doses and dose commitments would be lower than determined for the earlier Fenwal detectors and also would satisfy the safety criteria in Section 32.27.

(14) Probabilities of Doses and Dose Commitments

The estimated probabilities with respect to the doses referred to in Section 13 are reported in appendix "u" of our application of December 9, 1991.

The estimated probability of a person receiving an internal or external radiation dose or dose commitment in any one year, exceeding the levels of internal and external radiation dose and dose commitment specified in Section 32.28, Column I, for normal use and disposal and normal handling and storage of quantities of units, is negligible.

The estimated probability of a person receiving an external radiation dose or dose commitment in any one year, exceeding the levels of external dose or dose commitment specified in Section 32.28, Column II, as a result of failure of the containment and shielding of the product is:

Low for use and disposal of a single unit and handling and storage of the quantities of units likely to accumulate in one location during marketing, distribution, installation and servicing of the product.

The estimated probability of a person receiving an external radiation dose or dose commitment in any one year, exceeding the external dose or dose commitment

specified in Section 32.28, Column III, as a result of failure of the containment and shielding of the product is:

Negligible for use and disposal of a single unit and handling and storage of the quantities of units likely to accumulate in one location during marketing, distribution, installation and servicing of the product.

The estimated probability that there will be a significant reduction in the effectiveness of the containment, shielding or other safety features from wear and abuse likely to occur in normal handling and use of the product during its useful life is judged to be negligible.

(15) Quality Control Procedures

Prior to packaging, completed orders of Kidde-Fenwal manufactured units CPD 702X and CPD 704X must be tested as follows, using NRC's "QC Program Requirements for the Manufacture and Distribution of Smoke Detectors," SSSS Position dated May 11, 1992.

LTPD 5% sampling for:

1. Removable contamination
  2. Design conformity
1. Using the NRC SSSS Position Document, select the sample size using LTPD=5% for the proper lot size.
  2. Wipe the area of the detector that would be the most likely area of contamination, using a Whatman #40 or equivalent filter paper (4.25 cm diameter). A single filter paper will be used on a maximum of 25 detectors.
  3. Analyze the filter paper by using the alpha scintillation probe and Ludlum Model 2000 scaler. Prior to analysis, the instrument shall be calibrated using source serial number 92AM2201225. (This is a 0.00966 microcurie Am-241 source obtained from The Source, Inc. and is traceable to a NIST standard. The source has an active diameter of 19 mm.)
  4. Record results in log book. Any wipe greater than 0.005 microcurie shall be brought to the attention of the QA Manager for corrective action. No detector indicating greater than 0.005 microcurie contamination will be distributed for use.
  5. Check all samples selected from Step 1 for proper labels and marking and general appearance for design conformity. One failure, missing label or marking or departure from design, the lot must be screened 100%.

ADDENDUM #1 DESCRIPTION OF DETECTOR CONSTRUCTION AND BYPRODUCT MATERIAL CONTAINMENT
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The byproduct material used in the detector is contained in a sealed foil which is securely mounted into a stainless steel holder (button). The source holder is then riveted into a stainless steel radiator disc to form the Radiator Assembly (Figure 3 and Figure 1). The foil source and its holder (button) are manufactured by the foil source supplier (Amersham or NRD). The radiator assembly disc ("E" in Fig. 3) is manufactured by Kidde-Fenwal and sent to the foil supplier who then installs the holder with foil into the Radiator Assembly and returns the unit to Kidde-Fenwal. Completion of manufacture of the detector occurs at Kidde-Fenwal.

The total enclosure of the byproduct material is shown in Fig. 1. The Radiator Assembly, Item E, includes the Source Holder Item J, and source Item D, is secured to the Radiator Assembly Holder Item H, by means of three staked pins molded integral to the holder. The Radiator Assembly Holder is fabricated out of Valox. The Radiator Assembly Holder is secured to the all stainless steel Chamber Enclosure, Item G, by means of integral molded slots, which engage tabs which are integral to the Chamber Enclosure. The stainless steel Chamber Enclosure thereby forms the lower enclosure of the Radiator Assembly. A stainless disc, Item F, is secured to the Radiator Assembly Holder, Item H, by means of three staked pins which are molded to the holder. This stainless steel disc forms the upper enclosure of the Radiator Assembly.

The glass, or phenolic laminate circuit board, Item B, serves as an additional enclosure and as the mounting point for the Chamber Enclosure. Stainless steel, integral tabs, attach to the Chamber Enclosure are twisted to secure the ionization chamber assembly to the circuit board.

The Adapter Ring, Item A, forms a tertiary upper enclosure and provides additional shielding. It fastens to the circuit board by means of integral molded snap tabs. It serves to mount the detector head to the base which is not shown in Figure 1. Lower Housing, Item C, forms a secondary lower enclosure and provides additional shielding. Even if the foil source were to be somehow released (a highly improbable supposition) from the Radiator Assembly (Item E), either the Reference Chamber Cover (Item F) or the Chamber Enclosure (Item G) would capture and retain the foil. It is virtually impossible for the source to exit the assembly even under the worst case imaginable abuse or misuse.

Fig. 1 graphically demonstrates the total enclosure of the byproduct material. It is surrounded on all sides by stainless steel parts (shown in heavy solid black lines) and at least one secondary layer of thermoplastic material which provides additional shielding and protection. The air flow channel does not provide a straight line path between the

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source and the exterior of the detector. Any straight line path from the source to the exterior encounters at least 0.013" of steel and a minimum distance of about 0.8".

Fig. 2 is included to provide additional detail on source containment and overall construction.

CUTAWAY VIEW OF DETECTOR HEAD ASSEMBLY

- A - ADAPTER RING -- CYCOLAC KJB 2500 THERMOPLASTIC  
B - CIRCUIT BOARD -- GLASS OR PHENOLIC LAMINATE  
C - LOWER HOUSING -- CYCOLAC KJB 2500 THERMOPLASTIC  
D - SEALED SOURCE  
E - RADIATOR ASSEMBLY -- STAINLESS STEEL WITH RIVET MOUNTED SOURCE  
F - REFERENCE CHAMBER COVER -- STAINLESS STEEL 0.013 THICK  
G - CHAMBER ENCLOSURE -- STAINLESS STEEL TOP AND BOTTOM (0.013 THICK) WITH  
STAINLESS STEEL MESH SIDES ALL WELDED CONSTRUCTION  
H - RADIATOR ASSEMBLY HOLDER -- VALOX THERMOPLASTIC  
I - LOCATION OF LABEL  
J - SOURCE HOLDER



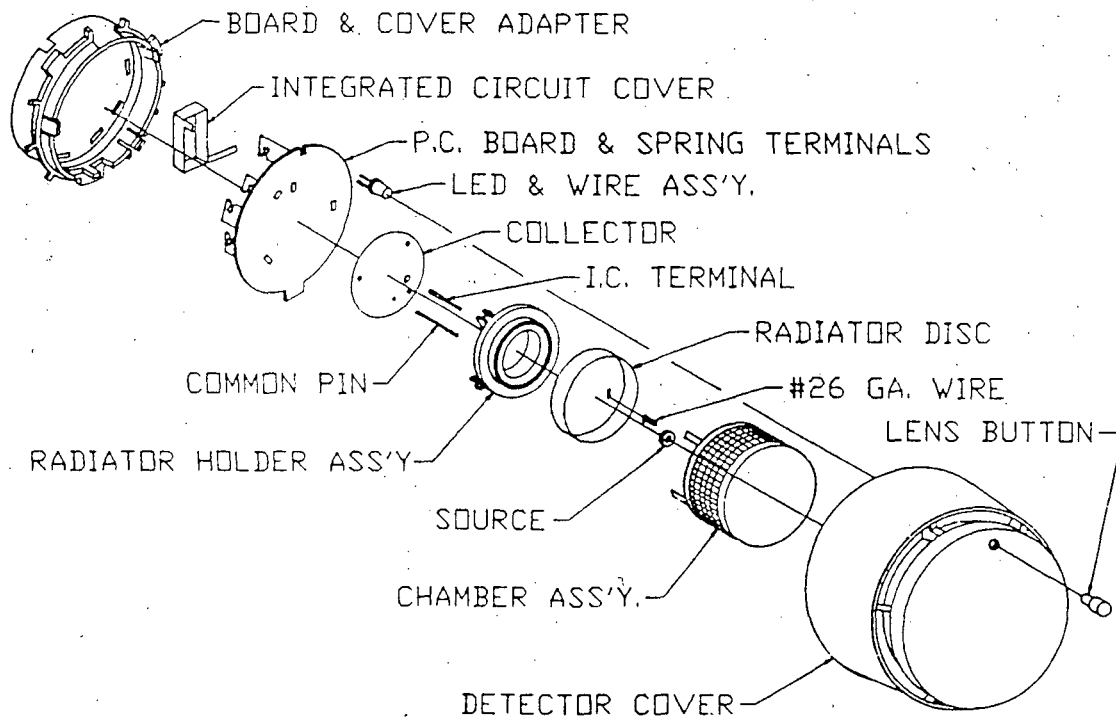


FIGURE 2

MODELS 702X & 704X

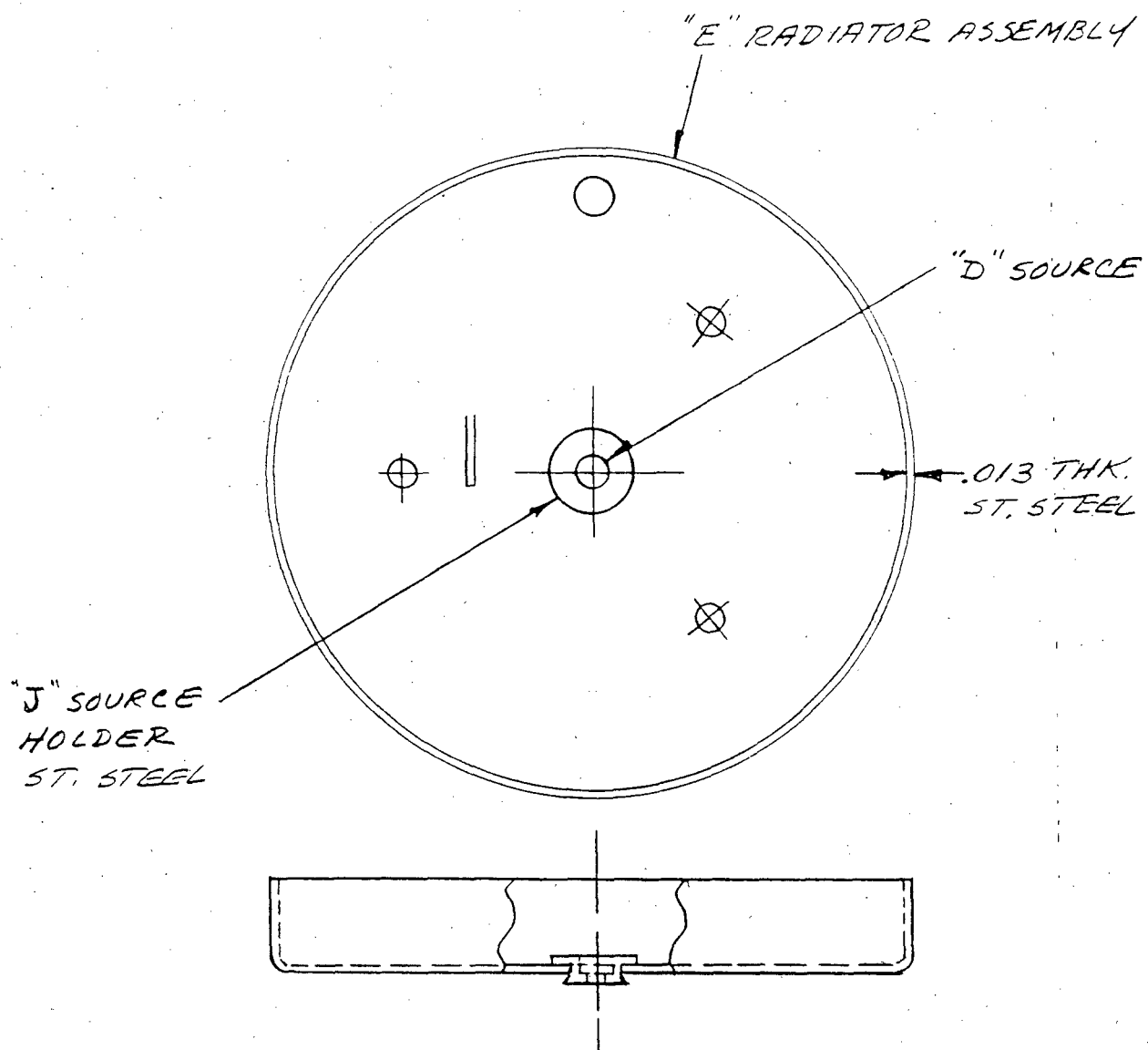
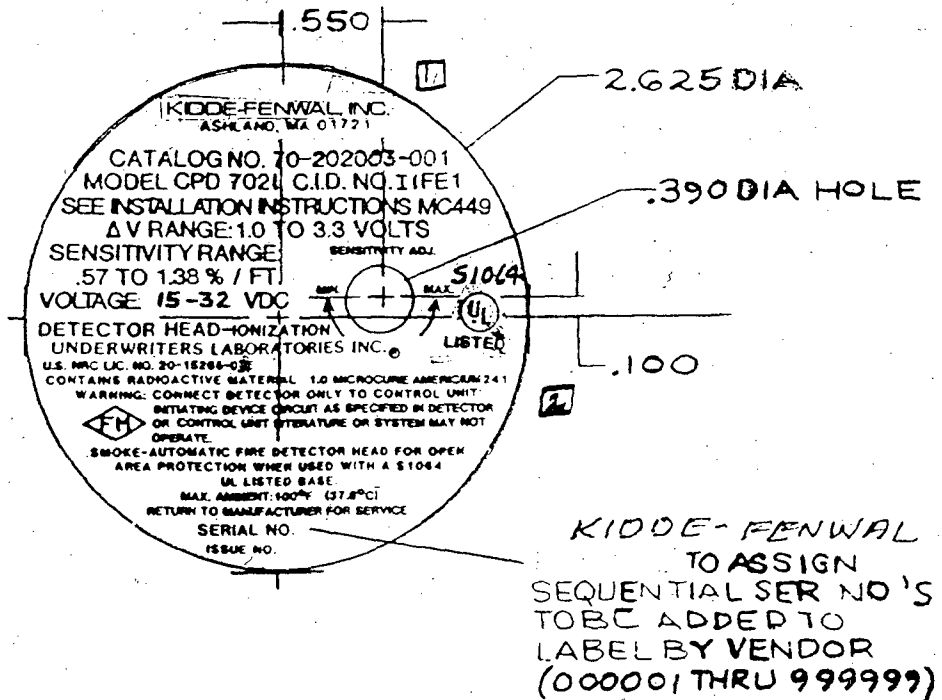


FIG. 3

REVISIONS			
REV.	DESCRIPTION	DATE	APPR.
DA	ECO 23234 [1] REV 1060		
	[2] A0080 (UL)	8-10-92	

LABELS ARE TO BE FURNISHED IN ROLL FORM MOUNTED ON STANDARD CARRIER PAPER (WITH PERFORATIONS) FOR COMPUTER PRINTING. PATTERNS TO BE SPACED .375 EDGE TO EDGE.




KIDDE-FENWAL TO ASSIGN SEQUENTIAL SER NO'S TO BE ADDED TO LABEL BY VENDOR (000001 THRU 999999)

MATERIAL: .004 ± .003 THICK PAPER WITH UL 814 ADHESIVE BACK (PERMANENT TYPE).  
 FINISH: UL WHITE BACKGROUND WITH BLACK CHARACTERS (POSITIVE PRINT).  
 PURCHASE FROM: UL INDEX OF LISTING MARK SUPPLIERS JUNE 1, 1972.

PREPARE & SEND ORDER TO VENDOR WITH COPY OF PRINT. SEND 2 COPIES OF ORDER & 2 COPIES OF PRINT TO: UNDERWRITERS LABORATORIES INC., FOLLOW UP SERVICE, 1285 WALT WHITMAN RD., MELVILLE, LONG ISLAND, NY 11747. THE VENDOR WILL PROCESS THE ORDER AS SOON AS ISSUE NUMBERS AND AUTHORIZATION ARE RECEIVED FROM U.L. AND WILL DELIVER LABELS TO ABOVE U.L. ADDRESS.

MAY BE MADE FROM A06-231865-503 BY KIDDE-FENWAL

UNLESS OTHERWISE SPECIFIED		DR. <i>Amfite</i> 3-17-89		 KIDDE-FENWAL, INC. 400 MAIN STREET ASHLAND, MA 01721	
DIMENSIONS ARE IN INCHES		CHK. <i>W.B.</i> 4-12-89			
DO NOT SCALE PRINT		DES.		TITLE LABEL-UL & INFORMATION	
UNLESS OTHERWISE SPECIFIED		MFG. <i>W.B.</i> 5-17-89			
TWO PLACE DECIMAL ± .015		ENG. <i>W.B.</i> 4-12-89		CODE IDENT NO. OKDP7	
THREE PLACE DECIMAL ± .001		ISSUED			
ANGLES ±		MATERIAL		SIZE A	
FINISH		SEE NOTES		DWG. NO. 06-231865-081	
FMF. 70-202003-001		PROJ. NO.		REV DA	
				SCALE 1/1 WT SHEET 1 OF 1	

ADDENDUM #2

DETECTOR PROTOTYPE TESTING

License No. 20-15285-02E

September 17, 1979

ADDENDUM #2 DETECTOR PROTOTYPE TESTING
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## PROTOTYPE TESTS

### Method - Radiation Profile

One detector, which had been assembled using normal production processes, was subjected to the testing described below. The sample unit contained source material having a total strength of approximately 1.0 microcuries.

#### 1. Initial Visual Inspection

The sample units were subjected to visual inspection to determine the integrity of mounting of the circuit board to the enclosure and the containment of the sources.

#### 2. Initial Radiation Profile

Radiation levels were measured by means of positioning the sensing probe at distances of 0, 5cm and 25cm from all exposed surfaces of the detector, with the mounting base removed.

A Ludlum Measurements Model 3 Count Rate Meter with thin window Geiger-Mueller Probe was utilized. Meter readings in counts per minute were converted to radiation intensity and recorded.

### Method of Calibration of Meter

Instruments were calibrated every six (6) months using NBS traceable standards. The instruments were calibrated at two points on each scale.

### Window Thickness

2 mg/cm<sup>2</sup>

### Factors Utilized to Correct for Scatter, Geometry

Measurements are made in 2  $\beta$  geometry, scatter is negligible.

### Type of Radiation Being Measured

The above detector is capable of detecting  $\alpha$ ,  $\beta$ ,  $\gamma$ , radiation.

### 3. Wipe Test - New Unit

One unit was disassembled (circuit board removed) and subjected to a wipe test on all accessible internal and external surfaces. Wipes were counted in a fixed geometry using the Ludlum Scintillation Count Rate Meter. Two-inch filter paper was used for the wipes.

Formula: Detectable Limit for  $\alpha = < 25\text{DPM}$

or  $(1.126 \times 10^{-5} \mu \text{ CI})$

$\text{DPM} = \frac{\text{net counts/minute}}{\text{efficiency}}$

$\text{AM}^{241} \text{ Efficiency} = 14\%$

Instrument is calibrated with NBS traceable  $^{241}\text{AM}$  Standard.

### 4. Drop Test

One sensing chamber assembly, with outer plastic cover removed, was subjected to a drop test consisting of 20 drops from a height of 7-1/2 feet onto a concrete surface.

### 5. Post Drop Wipe Test

The sensing chamber assembly was subjected to a wipe test as described in "3" above. The results were recorded.

### 6. Post Drop Visual Inspection

The sensing chamber assembly was examined for evidence of compromise of the containment of the sources. The results were recorded.

## RESULTS OF PROTOTYPE TESTS

### 1. Initial Visual Inspection

The circuit board and source holder assembly were securely fastened in place. The sources were inaccessible, mounted within the steel sensing chamber.

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2. Initial Radiation Profile

The maximum recorded were as follows: (readings in MR/hr)

<u>Location</u>	<u>0cm</u>	<u>5cm</u>	<u>25cm</u>
Above Unit	.04	B/G	B/G
Below Unit	.07	B/G	B/G
Side of Unit	.03	B/G	B/G

B/G - Background level = < 0.02 MR/hr.

3. Wipe Test

Background Level: 0.02 MR/hr.

4. Drop Test

The sample was dropped 20 times. The plastic adapter plate to which the circuit board is mounted separated from the circuit board.

5. Post Drop Wipe Test

There was no evidence of contamination. No detectable activity was measured.

6. Post Drop Visual Inspection

The circuit board and steel chamber assembly remained intact. The chamber was slightly dented, but showed no evidence of compromise of integrity of the containment of the sources. The sources remained securely mounted in place. Two of the radiator assembly holder legs fractured, but the radiator assembly remained fully enclosed, surrounded and captured by the chamber enclosure and circuit board.

# KIDDE-FENWAL

## PROTECTION SYSTEMS

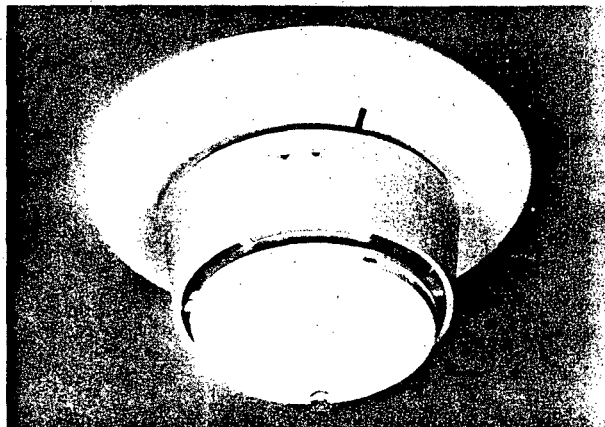
CPD 7021, 7023  
IONIZATION  
SMOKE DETECTOR  
Installation & Technical Data  
00-MC4640-000

Effective: April 1990

### DESCRIPTION

The CPD-7021 and CPD-7023 are dual chamber, ionization type detectors designed to sense both visible and invisible products of combustion. These detectors incorporate all solid state low voltage circuitry and are designed for two-wire and four-wire installation. The detectors are UL Listed for Open Area Protection and Duct Housing Applications. It may be installed in systems intended for Releasing Device Service through use of a compatible control unit.

Detector base options are available to provide for auxiliary indication and/or control functions.



### ELECTRICAL SPECIFICATIONS

These detectors are designed for operation with control units and releasing devices having specific voltage-current characteristics which are compatible with the detector circuitry. The information provided under the headings DETECTOR, CONTROL UNIT and BASE are intended to assist in proper application of the detector in a system.

#### DETECTOR

RATING:	CPD-7021	CPD-7023
Standby Voltage:	15 to 32VDC	11.4 to 33.5VDC
Standby Current:	60 $\mu$ A @ 24VDC	70 $\mu$ A @ 24VDC
Alarm Current:	10 to 100mA	10 to 100mA
Max. Ripple:	20% DC Input	25% DC Input
Compatibility ID:	I1FE1	I3FE1

Alarm currents below 15mA result in diminished brilliance of LED alarm indicator and precludes the use of the auxiliary relay option.

### ENVIRONMENTAL SPECIFICATIONS

The CPD-7021 and CPD-7023 have been tested by Underwriters Laboratories for environmental stability. Some of the basic conditions that must be met for compliance are listed below and are presented to help serve as application guidelines:

1. Temperature:  
32°F to 120°F (0°C to 49°C) at 30% to 50% relative humidity and 0°F to 150°F (-17.8°C to 66°C) rapid cycle test.  
Installation in ambients above 100°F (37.8°C) is not recommended.
2. Humidity:  
85% at 86°F (30°C), 168 hour test. 20% RH to 90% RH at 73°F (23°C) rapid cycle test.
3. Air Velocity:  
1000 FPM (5 m/s) continuous. Gust to 2000 FPM (10 m/s).
4. Air Pressure:  
2 inch (51mm) rapid drop of air pressure starting from 31 inches (787mm) of mercury.
5. Altitudes:  
For altitudes above 7500 ft., consult factory.
6. Corrosive Atmosphere:
  - A. An atmosphere containing 0.1% hydrogen sulfide by volume in air saturated with water vapor at room temperature for 10 days.
  - B. An atmosphere containing 1% carbon dioxide by volume in air saturated with water vapor at room temperature for 10 days.

In all cases, a Kidde-Fenwal technical representative should be consulted if the detectors are to be operated under adverse environmental conditions.



## CONTROL UNIT

These detectors are compatible with the Kidde-Fenwal Control Units and interface modules listed below. Consult Kidde-Fenwal for information regarding other control units for which compatibility has been established.

**TABLE I – BASE/CONTROL UNIT SELECTION**

CONTROL UNIT MODEL NUMBER	COMPATIBILITY IDENTIFIER NUMBER	MAXIMUM NUMBER OF DETECTORS PER LOOP
2210	C10FE1	40
2212	C12FE1	40
2220	C20FE1	5
3210	ZDM01, VZM01, ZDMD01	25
FENWALNET 4000	S40FE1	60

## BASE

Various base options are available to provide auxiliary relay, and/or remote indication or selected current limiting functions.

Auxiliary Relay: SPDT 2A @ 26VDC  
1A @ 115VAC

Remote LED Indication: 15–50mA  
(See Base Options and Table I) 1.4–2.5VDC

**TABLE II – DETECTOR BASE OPTIONS**

PART NUMBER UNIT	COMPATIBILITY IDENTIFIER NUMBER	DESCRIPTION
70-201000-001	FE01A	Connects to 2-wire detection circuit via screw terminals.
70-201000-002	FE02A	Same as above plus provision for remote LED indicator. Min. alarm current: 15mA, 24VDC.
70-201000-003	FE03A	Connects to 2-wire detection circuit via pigtail leads. Equipped with SPDT supplementary relay. Min. alarm current: 15mA, 24VDC.
70-201000-005	FE05A	Same as above plus provision for remote LED indicator. Min. alarm current: 30mA, 24VDC.
70-201000-101		Connects to 4-wire detection circuit via pigtail leads. Equipped with SPDT supplementary relay. Min. alarm current: 35mA, 24VDC.
70-201000-105		Connects to 4-wire detection circuit via pigtail leads. Equipped with one N/O contact. Min. alarm current: 15mA, 24VDC.
29-116788-001		End of line supervisory relay. 24VDC.
70-200000-022	Not Required	Accessory Kit for mounting to 4" square junction box and 3" plaster rings.

Model CPD-7021 and 7023 may also be used with Kidde-Fenwal DH-22 Duct Detector (see Kidde-Fenwal MC-426).

## LOCATION

Per UL Listing, open area smoke detectors are intended for mounting on a ceiling not less than 6 inches from a wall, or on a wall not less than 4 inches nor more than 6 inches from the ceiling.

## CAUTION

The following locations should always be avoided: areas with excessive exhaust fumes, kitchen areas, near fireplaces or furnace rooms, within 3 feet of air supply ducts or air diffusers.

## SPACING (OPEN AREA LOCATION)

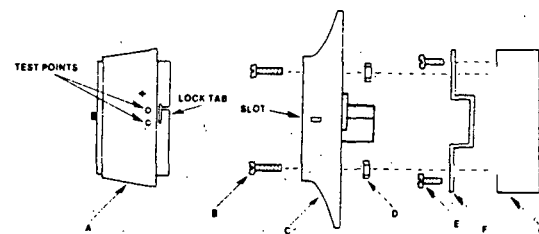
The CPD-702X is to be installed on maximum 30-foot centers, typically on smooth ceilings up to 15 feet high and will operate with minimum air circulation. Resultant maximum 900 square foot spacing may be used as a reasonable guide for comparable applications. Where special conditions exist (ceiling obstructions, high air exchange rates, etc.), reduced square footage spacing must be used to achieve adequate protection. Computer rooms and other such installations may require spacing with a maximum of 200 square feet due to high air exchange rates. For additional information, consult National Fire Protection Association Standard 72E and the Kidde-Fenwal Automatic Fire Detector Application Engineering Manual.

## SPECIAL APPLICATIONS

For further assistance in the application of the CPD-702X consult your Kidde-Fenwal technical representative.

## INSTALLATION – GENERAL

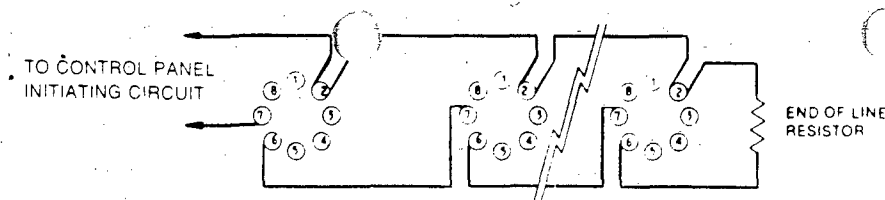
The following diagram will be of assistance to you in the installation procedure. Familiarize yourself with it as well as all other installation instructions before installing detectors.



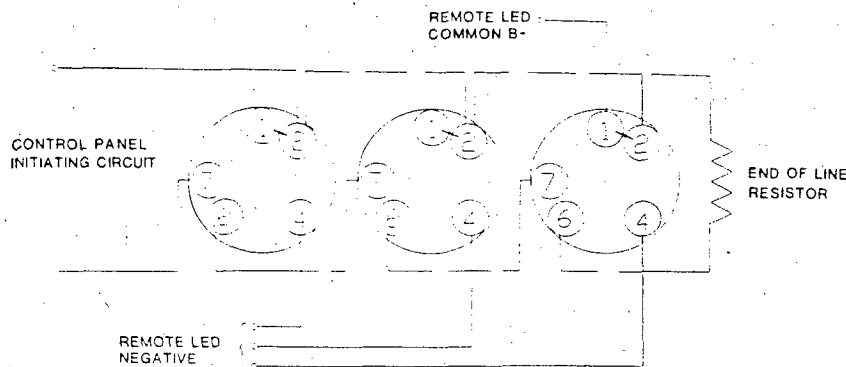
**FIGURE 2**

- A. Detector Head
- B. Base Mounting Bolts - 2 provided with Accessory Kit
- C. Base - P/N 70-201000-X0X
- D. Bolt Retainer - 2 provided with Accessory Kit
- E. Junction Box Cover Bolts - Part of Junction Box
- F. Offset Adaptor - Part of Accessory Kit
- G. Junction Box - Installer supplied for surface mounting use Wiremold #5739 Adaptor. For 4-wire bases, two #5739 adaptors may be needed.

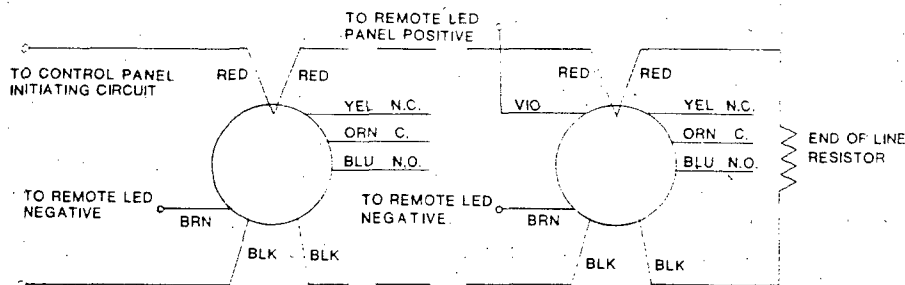
- NOTES:**
- When using 3" box or ring or 4" square box, order Accessory Kit P/N 70-200000-022.
  - When installing Kidde-Fenwal base on 4" octagonal boxes, items B, D and F are not required.



Using Base (Less Options) 70-201000-001



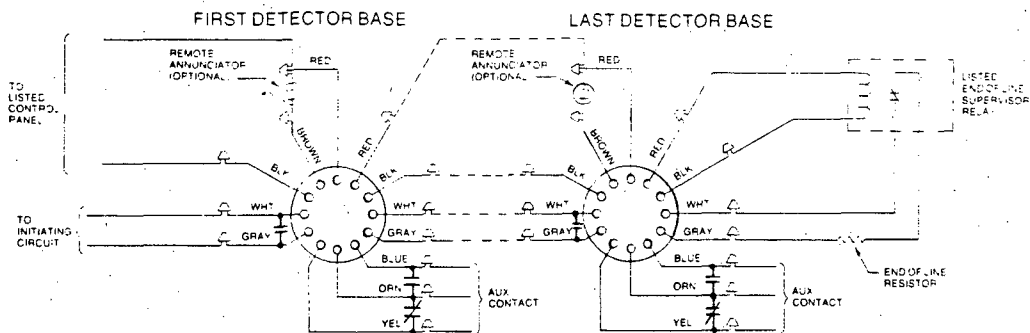
Using Base with Remote Indicator Option 70-201000-002



Using Bases with Relay Option 70-201000-005.

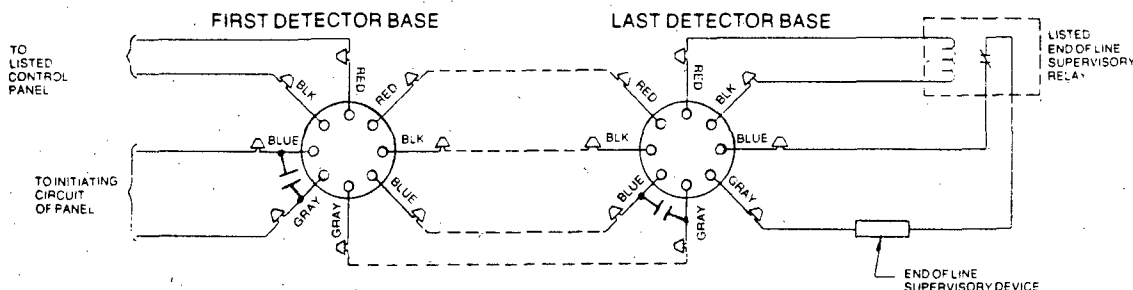
The -003 base is the same as shown minus Remote LED Option.

**NOTE:** When Remote LED is not used, insulate the end of the violet wire or cut it off at the connector.



Using 4-wire base. 70-201000-101

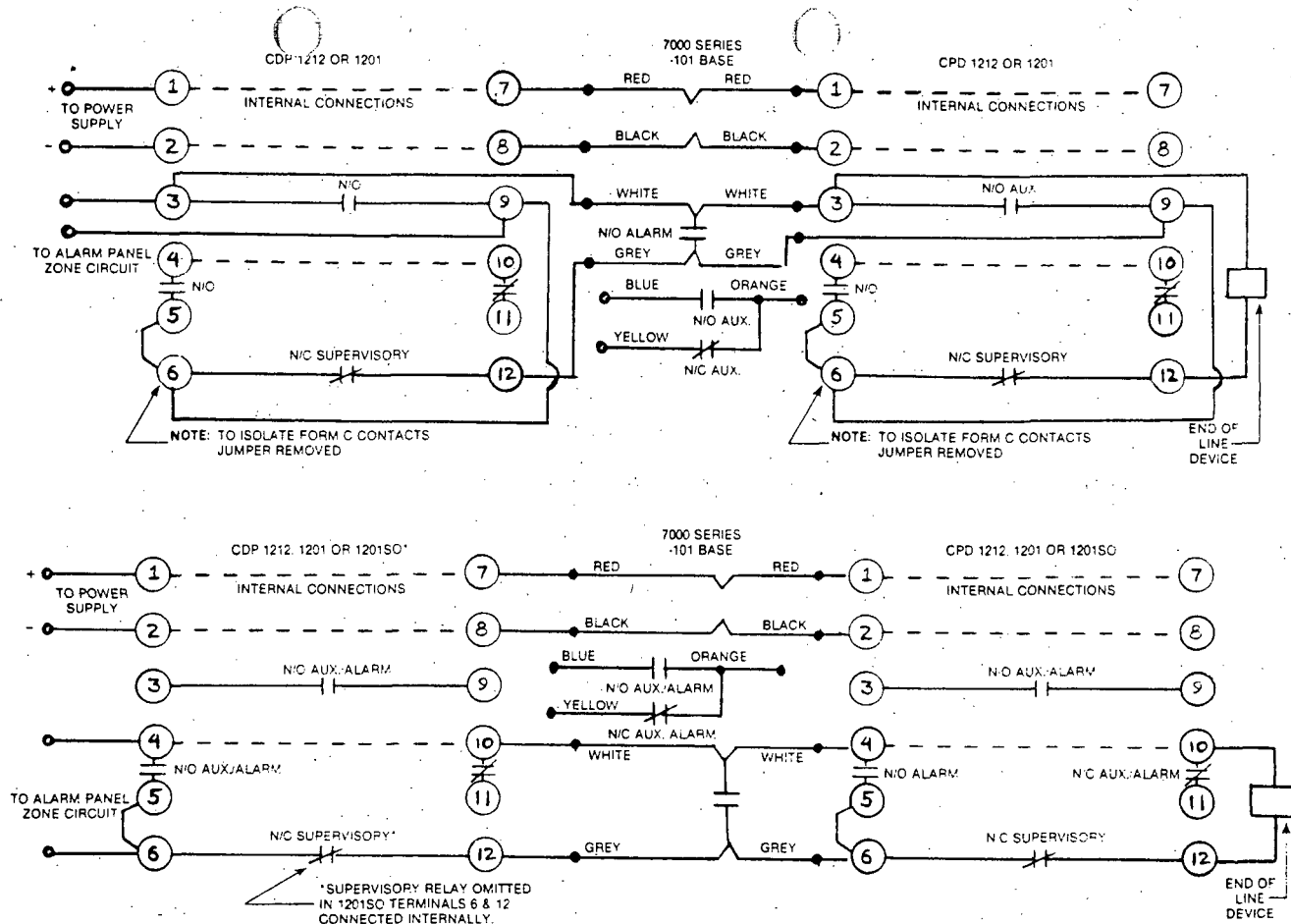
**NOTE:** When Remote LED is not used, insulate the end of the brown wire or cut it off at the connector.



Using 70-201000-105 24 VDC 4-wire base

## NOTES

1. To insure proper installation of the detector head to the base, be sure wires are properly dressed at installation:
  - a. Position all wires flat against the base.
  - b. Take up all slack in the outlet box.
  - c. Route wires away from connector terminals.
2. If you have installed a jumper between terminals 6 and 7 to test detector loop continuity, be sure to remove the jumper before installing detector head.
3. **CAUTION** — Do not use looped wire under terminal 2. Break wire runs to provide supervision of connections.
4. Observe uniform polarity of detector circuit connections when using direct return wire for LED connections.
5. When utilizing common return for remote LED indicators, test detector circuit for supervisory continuity. Removing detector circuit terminal connections must initiate control panel trouble sequence.



## INSTALLATION BASE

The 70-201000-XXX Series mounting base can be attached directly to a 3 inch plaster ring or to a standard 4 inch octagonal box. 4 inch square junction box mounting requires an adaptor. For surface mounting, use WIREMOLD Adaptor #5739. SEE: **INSTALLATION: GENERAL.**

1. Route all leads outward from the junction box.
2. To connect field wiring on bases not equipped with pig-tails, feed wires individually through holes in base cover. DO NOT ATTEMPT TO REMOVE FOAM FROM HOLES, SIMPLY PUSH WIRES THROUGH THE FOAM TO RETAIN SEAL. Make connections to base terminals according to appropriate wiring diagram.
3. For bases equipped with pigtail leads, make all pigtail connections using approved connection means. Be sure to insulate any unused pigtails and the end of line resistor. Refer to Installation Wiring Information for color code and interconnect details.
4. Position wires and connectors in the junction box so as to leave the center of the box as clear as possible.
5. Mount the optional adaptor bar with the detector base to the junction box (4" square box or 3 inch plaster ring only).
6. Mount the detector base to the adaptor bar using the screws provided. Route pigtail leads to allow clearance for the relay on bases so equipped.
7. Dress wires terminating at detector base terminals.

8. After all detector bases are installed, including the end-of-line relay and resistor, check loop continuity. To make the continuity check, a jumper must be installed by inserting lead ends into the holes in base connector terminals 6 and 7 at each detector location. An open circuit condition exists until jumper or detector is installed in the base. See Figure 3.
9. If loop continuity is acceptable, remove the jumper lead connecting base terminals 6 & 7 at each detector location.
10. Proceed to detector head installation.

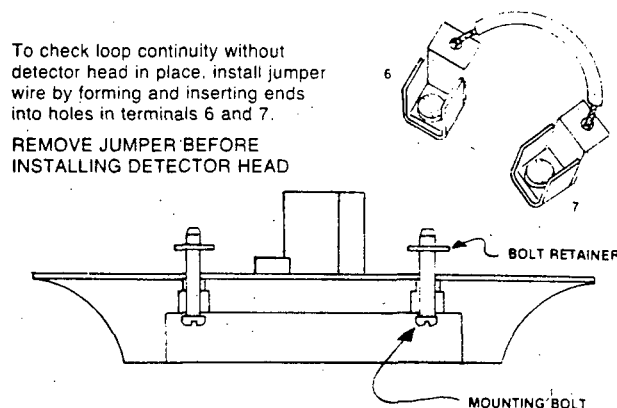


FIGURE 3

To facilitate base installation, insert #8 mounting bolts into holes in base and slide bolt retainer over end of screw thread. This will retain mounting screws in place until the base is secured to the adaptor.

## INSTALLATION OF DETECTOR HEAD

1. Set the sensitivity adjustment potentiometer at the base of the detector head to the high (min. volts) or low (max. volts) setting, depending upon desired sensitivity.
2. Push the detector head into the base and rotate until the detector key tabs drop into place. Rotate clockwise about  $\frac{1}{2}$ " travel to engage electrical connections. The head will automatically lock into place.
3. To remove, insert a maximum  $\frac{1}{4}$ " wide screwdriver blade into the lock access slot and push with moderate pressure while rotating the detector head counterclockwise. Once rotation starts, remove the screwdriver. Continue to rotate the detector head counterclockwise until a stop is reached. Then pull downward to disengage from base.

**NOTE:** The locking feature may be removed by breaking away the lock tab. See illustration below, and Installation Wiring Information.

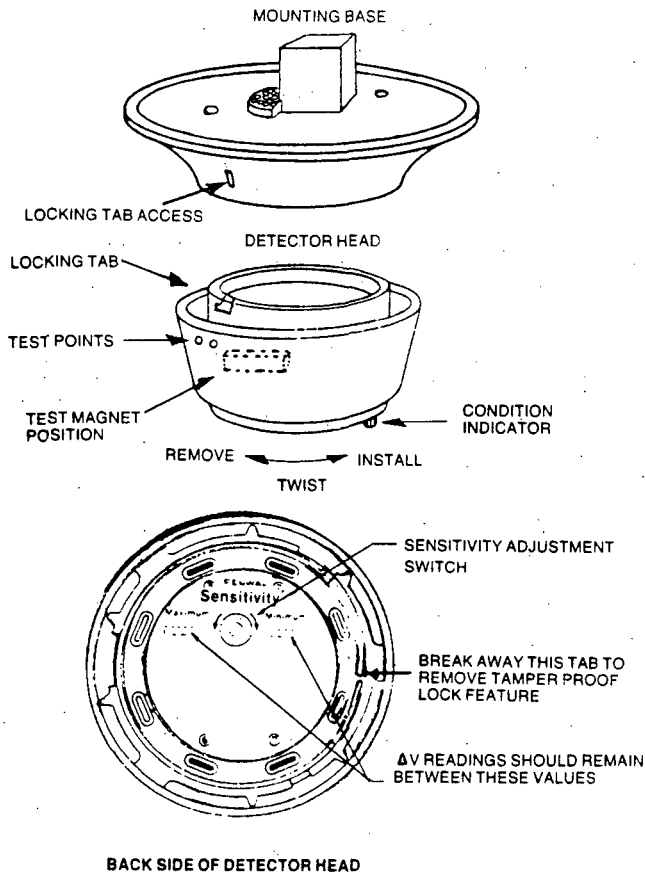
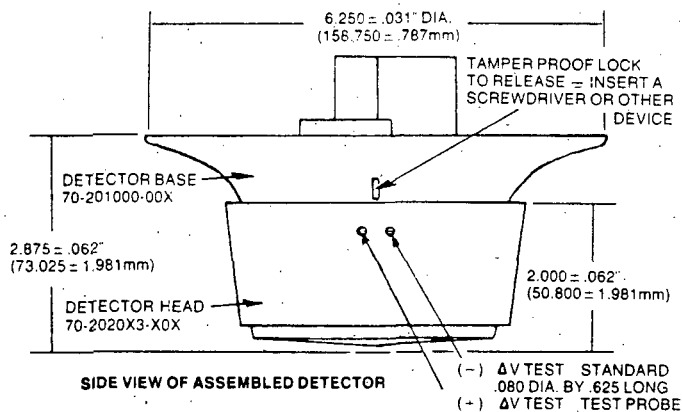


FIGURE 4

## TESTING GENERAL

All alarm signal devices, releasing devices and extinguishing systems should be disengaged while the test is being performed and reengaged at the conclusion of testing.

1. After powering the detector head for approximately one minute, check to see that the alarm indicator LED flashes. Failure to flash indicates a non-functioning detector or faulty wiring. Recheck wiring and replace detector head if necessary.
2. Position a test magnet\* against the detector housing approximately 1 inch to the right of the right hand test point for at least 15 seconds. The detector should alarm, indicated by steady illumination of the alarm indicator. To return each detector to normal operation reset the control unit.

OR

3. Allow smoke to enter the detector sensing chamber and observe the red alarm indicator. When sufficient smoke has entered the chamber, an alarm will be indicated by continuous illumination of the LED. Reset each detector and/or control unit after it alarms before attempting to test additional detectors in the same zone.

Failure to alarm in tests 2 & 3 indicates a defective detector requiring service.

## SENSITIVITY TEST EQUIPMENT

To conduct sensitivity testing for the CPD-702X you will need the following test equipment:

- 10 megohm input impedance voltmeter (FLUKE, Model No. 8000A or equivalent) with test probes of .080 diameter.
- magnet with a pull strength of one pound (Kidde-Fenwall P/N 06-232739-001).

## SENSITIVITY METERING TEST

1. Disengage alarm signal devices, releasing devices, and extinguishing systems while test is being performed.
2. Remove the detector head from the base as described above.
3. Note the voltages marked on the detector label under "Maximum" and "Minimum" sensitivity.
4. Reinstall the detector head to the base. Allow 1 minute for stabilization. The alarm indicator should flash approximately once every 10 seconds. No flash indicates a non-functioning detector or faulty wiring. Steady illumination indicates an alarm state.

\*Use extreme caution when using magnet in EDP Facilities. To be sure, notify EDP management of intent to use magnet in their facilities. The long axis of the magnet should be positioned against the side of the detector housing and parallel to the test points. (See Fig. 4).

5. Connect a 10 megohm input impedance voltmeter between the metering test points located on the side of the detector head assembly using .080 diameter by .625 long test probes. Observe proper polarity (+ on left). Reading should be within the range indicated on the detector head label by the Maximum and Minimum markings. Refer to Fig. 4 for details.

**NOTE:** If any one detector wired into the zone is in alarm, the above readings will be out of tolerance. Be sure that none of the detectors in the zone are in alarm before taking voltage readings.

6. Voltage readings outside the given ranges indicate a shift in sensitivity and the need for corrective action.
  - a. Clean the detector as outlined under maintenance and repeat Steps 2 through 4.
  - b. If readings are still out of the allowable range, replace the detector. Except in cases of suspected terminal or cable problems, it is not necessary to return the ceiling mounting plate with the detector.
7. After all the tests are complete, be certain that complete system is returned to normal.

## SENSITIVITY ADJUSTMENT

Refer to Installation of Detector Head.

## TO FIELD CHECK FOR ALARM RESPONSE TO SMOKE

1. Disengage alarm signal devices, releasing devices and extinguishing systems while test is being performed.
2. With a 10 megohm input impedance voltmeter connected to the test points, alarm response can be tested by allowing smoke to enter the detection chamber. As the smoke density increases in the chamber, the meter voltage will proportionately decrease. At zero voltage or below, the detector should alarm within approximately 15 seconds.

**NOTE:** Alarm is indicated at the detector head by constant illumination of a Light Emitting Diode (LED). Depending upon control unit characteristics, it may not be

possible to alarm more than one detector at a time. Make sure that each detector is reset prior to testing additional detectors. To return detection to normal operation, reset the control unit.

3. After all tests are complete, be certain that the alarm system devices are returned to normal.

## MAINTENANCE

1. The recommended requirement for detector maintenance consists of an annual cleaning of dust from the detector head by using the suction of a vacuum cleaner. Cleaning programs should be geared to the individual environment in conformance with NFPA 72E Standard.

**CAUTION: DO NOT ATTEMPT DISASSEMBLY OF THE FACTORY SEALED SENSING CHAMBER. THIS ASSEMBLY IS SEALED FOR YOUR PROTECTION AND IS NOT INTENDED TO BE OPENED FOR SERVICING. OPENING OF THE ASSEMBLY WILL VOID THE WARRANTY.**

2. Perform the Sensitivity Metering Test as outlined on this document. Confirm that the voltage readings (Delta V) are within tolerance.
3. If calibration voltage readings are out of specification tolerance, contact the factory customer service department for details concerning the detector **EXCHANGE PROGRAM**.
4. The detector **EXCHANGE PROGRAM** offers the customer new product of the latest design as direct replacement for existing detectors. The exchange program is available to all customers for a nominal fee, regardless of the age of the detector.

## SPARE PARTS

None. Unit is factory repairable only. No field repair should be attempted.

## RADIOACTIVE MATERIAL

Total radioactivity: 1.0 microcuries (maximum) Americium 241 shielded by stainless steel housing. For service, return detector head, intact to: KIDDE-FENWAL.

## KIDDE-FENWAL PROTECTION SYSTEMS

400 Main Street • Ashland, MA 01721-2150  
Tel. (508) 881-2000 Fax (508) 881-8920

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These instructions do not purport to cover all the details or variations in the equipment described, nor do they provide for every possible contingency to be met in connection with installation, operation and maintenance. All specifications subject to change without notice. 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 KIDDE-FENWAL, Ashland, Massachusetts.

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