



Model 90100 TRACKER™

Therapy Beam Evaluation System



- Dose acquisition and simultaneous display from five detectors
- Measures dose or dose rate
- Constancy, flatness, and symmetry in one measurement
- Absolute and percent-of-center display modes
- 4-line by 20-character Vacuum Fluorescent Display (VFD) for excellent readability in all lighting conditions
- Temperature and pressure corrections

The TRACKER Therapy Beam Evaluation System, Model 90100, is a quality assurance system that measures therapy radiation sources, including dose and dose rate, enabling user calculation of beam constancy, flatness, and symmetry. The system consists of the Model 35300A Detector and Model 35360A Display.

The Model 35300A TRACKER detector array incorporates four orthogonally-placed ion chambers on a 10cm radius from a fifth isocentrally-located ion chamber, allowing ratio-to-center dose measurement. Each ion chamber, which is identical to the others and vented to the atmosphere, is a circular, parallel-plate configuration and is fully guarded for low leakage. An overlay indicates ion chamber locations for alignment with a therapy beam light field system. The Model 35360A TRACKER display contains five electrometers and is characterized by a microprocessor controlled, 4-line by 20-character Vacuum Fluorescent Display (VFD) that enables excellent readability of dose and dose rate measurements in virtually any lighting condition.

APPLICATION

The TRACKER Therapy Beam Evaluation System performs quality assurance tests for linear accelerators, Cobalt 60, and therapeutic x-ray equipment. The system's quick setup and operational ease make it ideal for daily checks of beam constancy, symmetry, and flatness.

A five-channel electrometer enables measurement of dose or dose rate in either absolute or ratio to center. Dose measurement values may be displayed in units of R, rad, Sv, or Gy. Dose rate measurement values may be displayed in units of R/min, rad/min, Sv/min, or Gy/min.

The TRACKER System may be operated from either AC line power or from its high capacity internal battery. The battery is charged automatically when the unit is connected to AC line power, either during use or when idle.

Consulting physicists and service engineers will appreciate the TRACKER System's portability. An optional carrying case eases transport and storage. Other optional accessories include buildup plates of various thickness' and materials and a buildup retaining hardware kit.

FEATURES

- Measurement values from peripheral ion chambers displayed in either absolute dose measurement units or as percentage of center ion chamber's measurement value.
- Microprocessor-controlled, 4-line by 20-character VFD corrects for air density and displays measurement results directly in user's choice of radiological units.
- Precision five channel electrometer provides +/-0.05% linearity.
- High performance rechargeable system allows eight hours of continuous operation from a three-hour charge; low battery annunciator indicates when <30 minutes of operation remains.
- Levels of internal 300V electronic bias supply and rechargeable battery supply are continuously monitored; annunciators indicate abnormal bias or low battery voltage.

Front Panel Features

- Power On/Off Key: All front panel settings are stored at power-down and recalled at power-up.
- Test/Detector Key: Sequence of screens display Firmware Revision, Last Calibration Date, Bias Voltage Level, Battery Voltage Level, Battery Current, Ion Chamber Calibration Factors, and optional text line.
- Units Select Key: Allows user selection of dose or dose rate units (rad and rad/min). Display Units Conversion Factor (DUCF) as entered during customization.
- Air Density Key: Allows user selection of temperature and pressure, and displays Air Density Correction Factor (ADCF). Also allows air density correction to be switched on or off.
- Gain Select Key: Allows user to switch Front Panel Gain Factors (FPGF) on and off. Displays and provides a means of setting five individual gain factors.
- Measure Select Key: Displays measurement screen and allows user selection of measurement display mode for peripheral ion chambers (absolute or percentage of center).
- Reset Key: Resets the displayed dose measurement values.
- 4-Line by 20-Character Vacuum Fluorescent Display (VFD): Provides excellent visibility in all lighting conditions. Measurement values updated at a rate of three per second.

Rear Panel Features

- RS-232 Receptacle (RJ-45 Style): User customization and field calibration via supplied MS-DOS Customization Program. Fully remote and automated operation.
- AC Line Power Receptacle: AC Line Input Range of 100 - 240 VAC without operator switching. IEC 320/C13 style receptacle enables worldwide operation by simply switching line cords.

Electrometer/A-D Converter

- Nominal Dose and Rate Display
- Dose Full Scale Dose Sensitivity Rate Full Scale Rate Sensitivity
- 3093 rad 0.1 rad 3093rad/min 0.1 rad/min

SPECIFICATIONS

Source Modes and Energies

Photons: 300keV to 25MeV, with suitable buildup material.
Electrons: 2MeV to 25MeV, with suitable buildup material.

Recommended Operating Conditions

Source Distance: 100cm.
Collimated Field Size: 25cm x 25cm.
Source Dose Rate Range: 50 to 500 rads/min.

Nominal Chamber Characteristics

Window Area Density: 600mg/sq cm (0.51cm acrylic plastic).
Sensitivity: 3.52 R/nC at 22°C and 760mm Hg.
Active Cross-Sectional Area: 0.93 sq cm.
Collection Efficiency: >99% at 500 rads/min pulsed; >99.9% at 500 rads/min continuous.

Ion Chamber Factory Calibration

Method: Each of the five ion chambers within the detector array is calibrated by comparison with a reference standard ion chamber in a ⁶⁰Co beam. The comparison is performed in free air and results in a R/nC Calibration Factor for each of the five ion chambers.

STANDARD SYSTEM COMPONENTS

- Display - 35360A
- Detector - 35300A.
- 49ft/15m Detector to Display Interface Cable - 37783-15.
- AC Line Cord. (Both U.S. and European styles available.)
- Instruction Manual - 37826.

Total Weight: 26lbs/11.7kg.

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