

Carestream



Quantum
MEDICAL IMAGING
Division of Carestream

Q-Rad System

Operator's Manual



Manual Part No. DC30-091 Revision F

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Quantum Medical Imaging, LLC
Division of Carestream
2002-B Orville Drive North
Ronkonkoma, NY 11779-7661 USA
Phone: (631) 567-5800
Fax: (631) 567-5074
E-mail: info@qmiteam.com
www.quantummedical.net

Made in U.S.A.



Revision History

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A	2011-02-24	Initial Release
B	2011-11-02	Added DX-D DR configuration
C	2011-08-30	Added QG-DIG-DRX integration option
D	2012-01-30	Incorporated ECO 2568, 2609
E	2012-02-10	Renamed Operator Manual, changed EU Representative
F	2012-05-09	Updated per IEC 60601-1: 2005, IEC 60601-1-3, IEC 60601-2-54

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Chapter

1

CHAPTER 1: SAFETY NOTICES



General Safety Information

This product has been designed to meet stringent safety standards. All medical electrical equipment requires proper installation, operation, and maintenance (particularly with regard to safety).

It is vital that the user read, understand, note, and where applicable, strictly observe all Warnings, Cautions, Notes and Safety markings within this document and on the equipment, and that the user strictly follow all safety directions in this manual to help ensure the safety of users and patients.

Every reasonable precaution has been taken during manufacture to safeguard the health and safety of persons who will operate this equipment. The following precautions must be observed at all times.

Warnings, Cautions, Notes

The following samples show how warnings, cautions, and notes appear in this document. The text explains their intended use.



Warning

Indicates injury or death is possible if the instructions are not obeyed. Instructs users to refer to documentation if displayed without warning text.



Caution

Indicates that damage to equipment is possible if the instructions are not obeyed.



Note

Notes provide advice and highlight unusual points. A note is not intended as an instruction.

The purpose of safety icons, such as those shown below, is to indicate at a glance the type of caution, warning or danger.



Warning

Ionizing radiation: indicates the possibility of increased levels of radiation.



Warning

Dangerous voltage: indicates the presence of high voltage.



Warning

Warning, hot surface.

Chapter 1 Safety Notices



WARNING

Quantum Medical Imaging, LLC disclaims all responsibility from any injury resulting from improper application of this equipment.

This equipment is sold to be used exclusively under the prescribed direction of a person who is licensed by law to operate equipment of this nature. This equipment must be used in accordance with all safety procedures described in this manual and must not be used for purposes other than those described herein. In the United States, Federal law restricts this device to sale, distribution, and use by or on order of a licensed physician.

Quantum Medical Imaging, LLC cannot assume responsibility for any malfunctioning of this equipment resulting from improper operation, maintenance, or repair, or from damage or modification of its components.

Failure to observe these warnings may cause serious injuries.



WARNING

X-rays are hazardous to both patient and operator unless established safe exposure factors and operating instructions are observed.

Only qualified and authorized personnel shall operate this system. In this context, qualified means those legally permitted to operate this equipment in the jurisdiction in which the equipment is being used, and authorized means those authorized by the authority controlling the use of the equipment. Full use must be made of all radiation protection features, devices, systems, procedures and accessories.

It is important that everyone having anything to do with x-radiation be properly trained and fully acquainted with the recommendations of the National Council on Radiation Protection and Measurements as published in NCRP Reports available from NCRP Publications, 7910 Woodmont Avenue, Suite 800, Bethesda, Maryland 20814-3095 (www.ncrp.com), and of the International Commission on Radiological Protection (www.icrp.org), and take adequate steps to protect against injury.



WARNING

X-ray equipment may cause injury if used improperly. The instructions contained in this manual must be read and followed when operating this unit. Personal radiation monitoring and protective devices are available. You are urged to use them to protect against unnecessary x-ray exposure.



WARNING

Exterior surfaces of the X-ray Tube can rise in temperature to levels where the operator or patient could suffer burns. Avoid contact with the tube housing.



WARNING

Changes, additions or maintenance to the equipment carried out by persons without appropriate qualifications and training and/or using unapproved spare parts may lead to serious risk of injury and damage to the equipment as well as making the warranty void.

Regulatory Compliance

This certified Quantum Medical Imaging, LLC medical device has been designed, manufactured, and calibrated to comply with governing Federal Regulations 21 CFR Subchapter J and the performance standards attendant thereto. Upon installation, all certified products require the filing of Form FD-2579 "Report of Assembly of a Diagnostic X-ray System" by the assembler (i.e., the installer) with the appropriate agencies; the "Installation Quality Assurance Checklist" must also be completed and properly distributed upon installation. A copy of each form (pink copy) is provided to the user. The installation report is completed by the installer and returned to Quantum Medical Imaging, LLC.

Those responsible for the planning of x-ray equipment installations must be thoroughly familiar and comply completely with NCRP Report No. 49, "Structural Shielding Design and Evaluation for Medical Use of X-Rays and Gamma Rays of Energies up to 10 MeV", as revised or replaced in the future. Those authorized to operate, test, participate in or supervise the operation of the equipment must be thoroughly familiar and comply completely with the currently established safe exposure factors and procedures described in publications such as Subchapter J of Title 21 of the Code of Federal Regulations, "Diagnostic X-Ray Systems and Their Major Components," and NCRP Report No. 102, "Medical X-Ray, Electron Beam and Gamma Ray Protection for Energies Up to 50 MeV—Equipment Design and Use" as revised or replaced in the future.

This equipment must only be used in rooms that comply with all applicable laws or regulations that have the force of law, concerning electrical safety for this type of equipment.

Scheduled maintenance is essential to the assurance of continued integrity of this equipment with respect to regulatory compliance. The continuance of certified performance to the regulatory standard is incumbent upon the user's diligent conformance to recommended maintenance instructions.

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Complies with EC Directive 93/42/EEC for Medical Devices,
FDA Center for Devices and Radiological Health (CDRH) - Title 21 CFR Subchapter J

EU Authorized Representative:



Carestream Health France
1, rue Galilée
93192 NOISY-LE-GRAND CEDEX
France

Classification

This product has been classified as Class I, Type B. This equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or with nitrous oxide. Protection against Harmful Ingress of Water (Ordinary), enclosed equipment without protection against ingress of liquids.



Intertek

MEDICAL ELECTRICAL EQUIPMENT
WITH RESPECT TO ELECTRIC SHOCK, FIRE,
MECHANICAL HAZARDS ONLY
IN ACCORDANCE WITH UL 60601-1-1 AND
CAN/CSA C22.2 NO. 601.1

The following symbols may be used for marking on this equipment or equipment documentation:



Non-ionizing Radiation



Consult operating instructions



Earth (ground)



Dangerous Voltage



Protective Earth (ground)



Type B Equipment

N

Connection point for the
neutral conductor on
PERMANENTLY INSTALLED
EQUIPMENT



Alternating current

Compatibility

The equipment described in this manual must only be used in combination with other equipment or components if these are expressly recognized by Quantum Medical Imaging, LLC as compatible.

Intended Operator

This equipment is intended to be installed, used and operated only in accordance with the safety procedures given within this manual for the purpose for which it was designed. Before attempting to work with this equipment, read, understand, note and strictly observe all warnings, cautions and safety markings on the equipment.

Users include those persons who actually handle the equipment and those who have authority over the equipment.

Training

Users of this equipment shall have received adequate training on its safe and effective use before attempting to work with the equipment. Training requirements may vary from country to country. The User shall make sure that training is received in accordance with local laws or regulations that have the force of law.

Applicable Standards

The Q-Rad Radiographic System complies with:

- IEC 60601-1: 2005
- IEC 60601-1-2: 2007
- IEC 60601-1-3: 2008
- IEC 60601-1-6:2010
- IEC 62366: 2007

Accompanying Documentation

The documentation consists of a System Operator's manual (this document), System Service manual (DC30-109) and related documentation, depending on system configuration, as shown in Chapter 2, GENERAL INFORMATION, Table 2-1. The documentation shall be kept with the system for easy reference.

Chapter 1 Safety Notices

Environmental Protection

This equipment contains certain materials and chemical compounds incidental to the manufacture of electrical and electronic equipment, and improper "end-of-life" disposal of such equipment can result in environmental contamination. Therefore, this equipment should not be disposed of as ordinary household waste, but should instead be delivered to a designated electrical and electronic waste disposal or recycling center. For further information on disposing of electrical and electronic waste, contact the cognizant authority within the jurisdiction.

Electromagnetic Compatibility (EN 60601-1-2:2007/IEC 60601-1-2:2007)

The Q-Rad Radiographic System is intended for use in the electromagnetic environment specified below. As such, Q-Rad Radiographic System must be installed and put into service according to the information provided in the accompanying Service Manual. Unauthorized changes to this product Do not make any modifications

Portable and mobile RF communications equipment can affect medical electrical equipment. It is therefore recommended that the operation of equipment of this type such as mobile telephones, cordless microphones and other similar mobile radio equipment be restricted from the vicinity of this device.

Use of accessories, transducers and cables other than those specified in the accompanying documents, may result in increased emissions or decreased immunity of the equipment.

Guidance and manufacturer's declaration - electromagnetic emissions		
<i>The Q-Rad Radiographic System is intended for use in the electromagnetic environment specified below. The customer or the user of the Q-Rad Radiographic System should assure that it is used in such an environment.</i>		
Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The Q-Rad Radiographic System uses RF energy only for their internal functions. Therefore, the RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.

Chapter 1 Safety Notices

Guidance and manufacturer's declaration - electromagnetic emissions

RF emissions CISPR 11	Class A	The Q-Rad Radiographic System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity

The Q-Rad Radiographic System is intended for use in the electromagnetic environment specified below. The customer or the user of the Q-Rad Radiographic System should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.

Chapter 1 Safety Notices

Guidance and manufacturer's declaration - electromagnetic immunity


Voltage dips, short interruption, and voltage variations on power supply input lines IEC 60601-4-11	<p>< 5 % U_T (>95 % dip in U_T) for 0.5 cycle</p> <p>40 % U_T (60 % dip in U_T) for 5 cycles</p> <p>70 % U_T (30 % dip in U_T) < 5 % U_T (> 95 % dip in U_T) for 5 s</p>	<p>< 5 % U_T (>95 % dip in U_T) for 0.5 cycle</p> <p>40 % U_T (60 % dip in U_T) for 5 cycles</p> <p>70 % U_T (30 % dip in U_T) < 5 % U_T (> 95 % dip in U_T) for 5 s</p>	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Q-Rad Radiographic System requires continued operation during power mains interruptions, it is recommended that the Q-Rad Radiographic System be powered from an uninterruptible power supply or battery.
Power frequency (50/60 Hz) IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment

NOTE: U_T is the A.C. mains voltage prior to application of the test level.

Guidance and manufacturer's declaration - electromagnetic immunity

The Q-Rad Radiographic System is intended for use in the electromagnetic environment specified below. The customer or the user of the Q-Rad Radiographic System Q-Rad Radiographic System should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
			<p>Portable and mobile RF communications equipment should be used no closer to any part of the Q-Rad Radiographic System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance</p>

Guidance and manufacturer's declaration - electromagnetic immunity			
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1,2\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	<p>, 80 MHz to 800 MHz $d = 1,2\sqrt{P}$</p> <p>, 800 MHz to 2,5 GHz $d = 2,3\sqrt{P}$</p> <p>where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey^a, should be less than the compliance level in each frequency range.^b Interference may occur in the vicinity of equipment marked with the following symbol:</p> <div style="text-align: center;">  </div>
<p>NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>			
<p>^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Q-Rad Radiographic System is used exceeds the applicable RF compliance level above, the Q-Rad Radiographic System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Q-Rad Radiographic System.</p> <p>^b Over the frequency range 150 kHz to 80 kHz, field strengths should be less than 3 V/m.</p>			

Chapter 1 Safety Notices

Recommended separation distances between portable and mobile RF communications equipment and the Q-Rad Radiographic System

The Q-Rad Radiographic System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Q-Rad Radiographic System Q-Rad Radiographic System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Q-Rad Radiographic System as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1,2\sqrt{P}$	80 MHz to 800 MHz $d = 1,2\sqrt{P}$	800 MHz to 2,5 GHz $d = 2,3\sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Abbreviation Definition

The following abbreviations and acronyms may be found in this document. Their definition is explained below.

AEC	Automatic Exposure Control
Btu	British Thermal Unit
CR	Computed Radiography
d	Distance
DR	Digital Radiography
HF	High Frequency
hPa	Hecto-Pascal
hr	Hour
kg	Kilogram
kHz	Kilohertz
KVA	Kilovolt-Ampere
lb	Pound
m	Meter
MHz	Megahertz
mm	Millimeter
OCP	Operator Control Panel
P	Power (max.)
RF	Radio Frequency
V	Volt
W	Watt
WEEE	Waste Electrical and Electronic Equipment

Chapter 1 Safety Notices

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Chapter

2

CHAPTER 2: GENERAL INFORMATION



Instructions for Use

The instructions for using Quantum's Q-Rad Radiographic System, including an explanation of the function of controls, displays and signals, and the sequence of operation, are contained in each of the system component user's manual indicated in [Table 2-1](#).



WARNING: This equipment must be operated with reasonable care. Manufacturer's equipment recommendations described in this manual must be observed.



WARNING: Use a focal spot-to-film distance as large as possible in order to keep the absorbed dose to the patient as low as reasonably achievable.



WARNING: During each exposure, the individual operating the X-ray machine must exit the radiographic operatory and stand behind a leaded wall.

Chapter 2 General Information

Overview

This chapter describes the configurations of the Q-Rad Radiographic System, which typically includes Quantum Medical Imaging HF Series X-ray Generators, radiographic tables, free-standing tube support, upright cassette holder, collimator, X-ray tube, ion chamber (when equipped with AEC option), and image receptor.

Detailed instructions for successful integration of the compatible Quantum components are published in the Service Manuals for each of the various system components.

Table 2-1. Q-Rad System Components User/Service Documents

Component Type	Model(s)	User Manual P/N	Service Manual P/N
X-ray Generator, Single-phase, non-Stored Energy	QG-25, QG-25-5, QG-32, QG-32-5, QG-40, and QG-40-5	Odyssey - DC30-010 Quest - DC30-015 Q-Vision - DC30-101	Q-Vision/Odyssey - DC30-011 Quest - DC30-063
X-ray Generator, Single-phase, Stored Energy	QG-20-SE, QG-32-SE, QG-40-SE, QG-50-SE	Odyssey - DC30-010 Quest - DC30-015 Q-Vision - DC30-101	Q-Vision/Odyssey - DC30-011 Quest - DC30-063
X-ray Generator, Three-phase	QG-32-2, QG-32-3, QG-40-2, QG-40-3, QG-50, QG-50-2, QG-65, and QG-80	Odyssey - DC30-010 Quest - DC30-015 Q-Vision - DC30-101	Q-Vision/Odyssey - DC30-011 Quest - DC30-063
TechVision Supplementary Generator Control Panel	QG-TV-Q, QG-TV-IP-Q, QG-TV-F, QG-TV-IP-F, QG-TV-C, QG-TV-IP-C	DC30-048 (Quantum non-integrated systems, DC30-120 (Q-Vision non-integrated systems) DC30-126 (Carestream integrated systems)	DC30-049
Radiographic Table, Elevating Tabletop	QT-750	DC30-006	DC30-007
Radiographic Table, Non-Elevating Tabletop	QT-740	DC30-006	DC30-007
Radiographic Table, Non-Elevating Tabletop	QT-730	DC30-003	DC30-003
Tube Support, Floor/Wall Mounted	QS-500	DC30-034	DC30-005
Tube Support, Free-Standing (Floor) Mounted	QS-550	DC30-034	DC30-009

Chapter 2 General Information

Table 2-1. Q-Rad System Components User/Service Documents

Component Type	Model(s)	User Manual P/N	Service Manual P/N
Radiographic Upright Cassette Holder,	QW-420, QW-420-S, QW-420-D, QW-400	DC30-039	DC30-040
Collimator, Manual	Progeny, MC150 Huestis, 150MC Ralco R108	00-02-1078 CM-21-001 MTR108	00-02-1078 CM-21-001 MTR108
Collimator, Automatic	Progeny, Linear II Progeny, Linear IV	00-02-1559 00-02-1517	00-02-1559 00-02-1517
Collimator, Programmable	Huestis, CM-32211-QMI	CM-21-002	CM-21-002
X-ray tube	Toshiba E7239X, E7242X, E7252X, E7254X, E7869X Varian RAD-14, RAD-60, RAD-92 Dunlee DA 1092, DA 1036	Refer to data sheet provided with tube	Refer to data sheet provided with tube
DX-D 500 ⁷ Q-Rad Digital DRX Series Integration Software (QG-DIG-DRX) (Optional)	QG-DIG-DRX	DC30-123	DC30-123
Dose Area Product (DAP) meter (Optional)	Vacutec VacuDAP OEM	DAP-std-fl-tw_BA011.3.doc	DAP-std-fl-tw_BA011.3.doc

Chapter 2 General Information

Component Weights

Generators (Cabinet)

Single-Phase, non-Stored Energy (SE) units:	135.2 kg (298.0 lb)
32, 40, and 50 kW, SE units:	195.5 kg (431.0 lb)
Three-Phase units:	172.4 kg (380.0 lb) without internal High Speed Starter (HSS) 176.0 kg (388.0 lb) with internal High Speed Starter (HSS)

Generators (Control Panel)

Odyssey (without pedestal):	2.3 kg (5.0 lb)
Odyssey (with pedestal):	11.3 kg (25.0 lb)
Quest (without pedestal):	1.8 kg (4.0 lb)
Quest (with pedestal):	10.9 kg (24.0 lb)
Q-Vision:	5.9 kg (13.0 lb)
TechVision Option:	4.3 kg (9.5 lb)

Tables

Model QT-730:	79.4 kg (175.0 lb)
Model QT-740:	158.8 kg (350.0 lb)
Model QT-750:	226.8 kg (500.0 lb)

Tube Supports

Model QS-550:	272.2 kg (600.0 lb)
Model QS-500:	230.4 kg (508.0 lb)

Upright Cassette Holders

Model QW-420:	102.1 kg (225.0 lb)
Model QW-420-S:	102.1 kg (225.0 lb)
Model QW-420-D:	90.7 kg (200.0 lb)
Model QW-400:	45.4 kg (100.0 lb)

Chapter 2 General Information

Heat Dissipation

Generators

Cabinet Typical Heat Output: 3600 BTU per hour
Control Panel Typical Heat Output: 130 BTU per hour

X-Ray Tube

Max. Heat Output (600 khu tube): 2000 BTU per hour

Tables

QT-730 Typical Heat Output: 40 BTU per hour (from receptor)
QT-750 Typical Heat Output: 400 BTU per hour
QT-740 Typical Heat Output: 100 BTU per hour

Tube Supports

QS-500/QS-550: 200 BTU per hour

Upright Cassette Holders

Typical Heat Output: 50 BTU per hour

NOTE: *The above calculations are typical, based upon average usage. Air circulation around the electronic cabinets must be provided. This includes the sides, back, front, and top of cabinet.*

System Operating Environment

Ambient Temperature: 10–40 °C (50–104 °F)
Relative Humidity: 15–75 %
Atmospheric Pressure: 700–1060 hPa

Transport and Non-Operating Environment

Ambient Temperature: -25 to +55 °C (-13 to 131 °F)
Relative Humidity: 5–95 %
Atmospheric Pressure: 500–1060 hPa

Chapter 2 General Information

System Configuration

The Quantum Q-Rad System consists of a combination of integrated radiographic components, typically including an X-ray generator, X-ray tube and tube support, collimator, radiographic table, and an upright cassette holder. Different types of image receptors may be utilized with the Q-Rad System, including computed radiography (CR) receptors, as well as conventional analog film cassettes.

Q-Rad Floor-Mounted System

The Q-Rad Floor-Mounted system is configured around either a free-standing, floor-mounted tube support (Model QS-550) or a wall/ceiling mounted tube support (Model QS-500). Because the free-standing version does not require wall attachment for support, it provides enhanced freedom of movement in the patient vicinity for the operator.

Recumbent examinations are accomplished utilizing an elevating (Model QT-750) or the non-elevating (Model QT-740 and QT-730) radiologic tables. Standing (weight-bearing) examinations are performed using an upright, non-tilting (Model QW-420 Series) chest stand (cassette holder).

The X-ray generator is available in various power output and operator control panel types, with the typical configuration including a 80 kW output generator with an Odyssey operator control.

Table 2-2. Q-Rad Floor Mounted System

COMPONENT	COMPONENT DESIGNATION	COMPONENT MODEL#
GENERATOR	QG1	<u>SINGLE-PHASE</u> : QG-25-1, QG-32-1, QG-40-1 <u>STORED ENERGY</u> : QG-20-SE, QG-32-SE, QG-40-SE, QG-50-SE <u>THREE-PHASE</u> : QG-32-2, QG-32-3, QG-40-2, QG-40-3, QG-50-3, QG-65-3, QG-80-3
GENERATOR CONTROL PANEL	OCP1	<u>QUEST SERIES</u> : QG-200, QG-250, QG-320, QG-400, QG-500 <u>ODYSSEY SERIES</u> : QG-3200, QG-4000, QG-5000, QG-6500, QG-8000 <u>Q-VISION SERIES</u> : QGV-32, QGV-40, QGV-50, QGV-65, QGV-80
SUPPLEMENTAL GENERATOR CONTROL PANEL (TECHVISION)	OCP2	QG-TV-IP-F
TABLE	QT1	QT-730, QT-740, QT-750
TUBE SUPPORT	QS1	QS-500, QS-550
WALL STAND	QW1	QW-420, QW-420-D, QW-420-S, QW-400
X-RAY TUBE	TU1	<u>TOSHIBA</u> : E7239X, E7242X, E7252X, E7254X, E7869X <u>VARIAN</u> : RAD-14, RAD-60, RAD-92 <u>DUNLEE</u> : DA 1092, DA 1036

Chapter 2 General Information

Table 2-2. Q-Rad Floor Mounted System

COMPONENT	COMPONENT DESIGNATION	COMPONENT MODEL#
COLLIMATOR	QC1	<u>PROGENY</u> : MC150, MC150 PINNACLE, LINEAR II, LINEAR IV <u>RALCO</u> : R 108/464 DHHS <u>HUESTIS</u> : 150MC (MANUAL), CM 32211-QM1
DAP	QD1	VacuDAP-OEM DISPLAY + ION CHAMBER, VacuDAP ION CHAMBER
ION CHAMBER	IN1	<u>AID</u> : ICX 1153
IMAGE RECEPTOR	RC1	<u>GRID CABINET</u> : R50-17GC <u>BUCKY CABINET</u> : PROGENY KLB10-08011, KLB10-08013

Q-Rad "DRX Series" Integrated Radiography System

The Q-Rad DRX Series Integrated Digital Radiography (DR) System combines the Q-Rad System's HF Series X-ray Generator and Carestream DRX-1 Digital Imaging Systems by way of a common user interface (QG-DIG-DRX Software) running on the Carestream DRX-1 Digital Imaging System's Workstation computer.

When QG-DIG-DRX Software is implemented, all user interaction (except PREP and EXPOSE) with the HF Series X-ray Generator is accomplished via the Digital Imaging System's touchscreen computer, thereby eliminating the need for a separate generator Operator Control Panel.

The Q-Rad DRX Series Integrated System consists of either a fixed DR Detector, and/or a Portable DR Detector, and a Workstation Computer. The DR System is connected to the Quantum X-Ray Generator by way of a software interface module.

Table 2-3. Q-Rad System, DRX Series Integration

COMPONENT	COMPONENT DESIGNATION	COMPONENT MODEL#
GENERATOR	QG1	<u>SINGLE-PHASE</u> : QG-32-1, QG-40-1 <u>STORED ENERGY</u> : QG-32-SE, QG-40-SE, QG-50-SE <u>THREE-PHASE</u> : QG-32-2, QG-32-3, QG-40-2, QG-40-3, QG-50-3, QG-65-3, QG-80-3
GENERATOR CONTROL PANEL	OCP1	<u>Q-CONNECT (WITH DRX-1 WORKSTATION)</u> : QG-DIG-DRX
SUPPLEMENTAL GENERATOR CONTROL PANEL (TECHVISION)	OCP2	QG-TV-IP-C, QG-TV-IP-F
TABLE	QT1	QT-730, QT-740, QT-750

Chapter 2 General Information

Table 2-3. Q-Rad System, DRX Series Integration

COMPONENT	COMPONENT DESIGNATION	COMPONENT MODEL#
TUBE SUPPORT	QS1	FLOOR-MOUNTED: QS-500, QS-550
WALL STAND	QW1	QW-420, QW-420-D, QW-420-S
X-RAY TUBE	TU1	<u>TOSHIBA</u> : E7239X, E7242X, E7252X, E7254X, E7869X <u>VARIAN</u> : RAD-14, RAD-60, RAD-92 <u>DUNLEE</u> : DA 1092, DA 1036
COLLIMATOR	QC1	<u>PROGENY</u> : MC150, MC150 PINNACLE, LINEAR II, LINEAR IV <u>RALCO</u> : R 108/464 DHHS <u>HUESTIS</u> : 150MC (MANUAL), CM-32211-QMI (PROGRAMMABLE)
DAP	QD1	VacuDAP-OEM DISPLAY + ION CHAMBER, VacuDAP ION CHAMBER
ION CHAMBER	IN1	<u>AID</u> : ICX 1153
IMAGE DETECTOR CABINET	RC1	<u>FIXED DETECTOR</u> : Q-FDR (WALL STAND), Q-FDR-T (TABLE) <u>PORTABLE DETECTOR</u> : Q-DRT (WALL STAND), Q-DRT-T (TABLE)
DR IMAGING DETECTOR/SYSTEM	QR1, QR2	CARESTREAM DRX-1 IMAGING SYSTEM (PORTABLE, WIRELESS) CARESTREAM DRX-1 IMAGING SYSTEM (FIXED, 4343R)

Chapter 2 General Information

Intended Use

The Quantum Q-Rad System provides diagnostic quality images to aid the physician with diagnosis. The system can be used to perform radiographic exposures of the skeleton (including skull, spinal column, and extremities), chest, abdomen, and other body parts. The Q-Rad Radiographic System is not indicated for use in mammography.

General Application Specification

Patient Population:

Age:	Newborn to geriatric
Weight:	Up to 294.8 kg (650.0 lb)
Region of Body:	Produces images of any bone in the human body, including the hand, wrist, arm, foot, ankle, knee, leg, or spine.

Operator Requirements:

Education/Training:	This equipment is sold to be used exclusively under the prescribed direction of a person who is licensed by law to operate equipment of this nature.
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Application:

Location:	Professional use only, indoor use only.
Physical Environment:	Refer to Q-Rad System operating and non-operating specifications in this chapter.
Frequency of Use:	Intermittent operation, limited primarily by loading characteristics specific to tube type used in the system.
Mobility:	Stationary

Cleaning, Preventive Inspection and Maintenance

Instructions for cleaning, preventive inspection and routine maintenance of Q-Rad Radiographic System, are included in each of the system component user's and service manuals indicated in [Table 2-1](#).

Instructions for Disposal of Waste Equipment

In the European Union, this symbol indicates that when the last user wishes to discard this product, it must be sent to appropriate facilities for recovery and recycling. Contact your local representative for additional information on the collection and recovery programs available for this product.

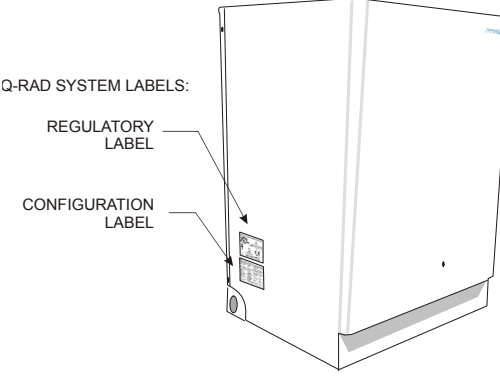
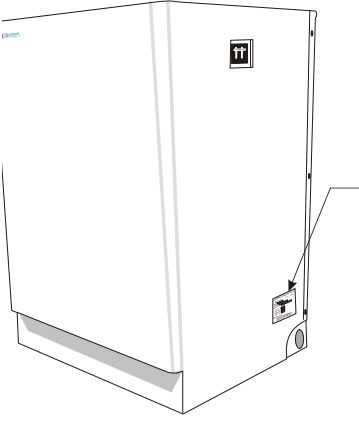


Chapter 2 General Information

Labeling

Each component of the Q-Rad System has its own rating plate/serial label. The following table provides the general location of the rating plate/serial label on each of the various types of components that could be incorporated in a Q-Rad System.

Table 2-4. Q-Rad System Components Labeling Guide

Component Type	Model(s)	Label Location
Q-Rad System	Q-Rad	<p style="text-align: center;">GENERATOR CABINET</p>  <p>Q-RAD SYSTEM LABELS: REGULATORY LABEL CONFIGURATION LABEL</p>
X-ray Generator	Single-phase, non-Stored Energy QG-25, QG-25-5, QG-32, QG-32-5, QG-40, and QG-40-5	 <p>GENERATOR COMPLIANCE LABEL</p>
	Single-phase, Stored Energy QG-20-SE, QG-32-SE, QG-40-SE, QG-50-SE	
	Three-phase QG-32-2, QG-32-3, QG-40-2, QG-40-3, QG-50, QG-50-2, QG-65, and QG-80	

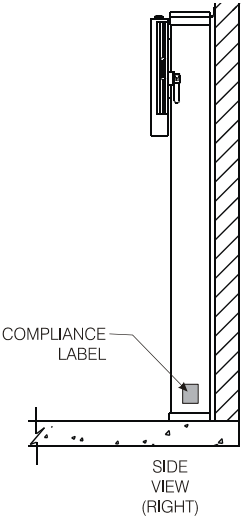
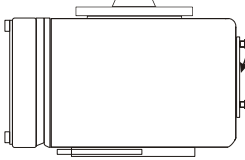
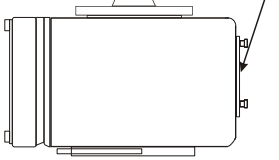
Chapter 2 General Information

Table 2-4. Q-Rad System Components Labeling Guide

Component Type	Model(s)	Label Location
TechVision Supplementary Generator Control Panel	QG-TV-F, QG-TV-IP-F, QG-TV-C, QG-TV-IP-C	
Radiographic Table	Fixed Non-Float Tabletop QT-730	
Radiographic Table	Non-Elevating Tabletop QT-740 Elevating Tabletop QT-750	
Tube Support, Floor Mounted	QS-500 QS-550	

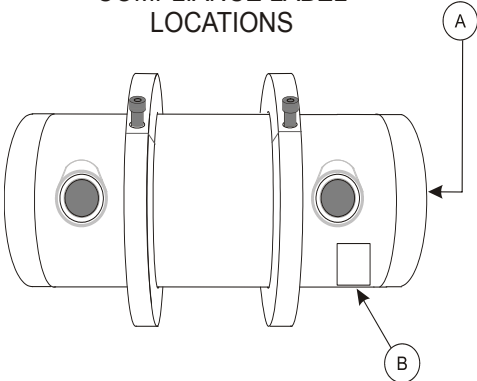
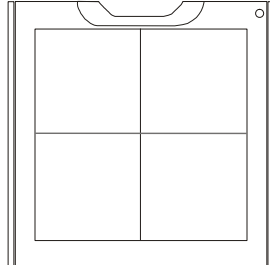
Chapter 2 General Information

Table 2-4. Q-Rad System Components Labeling Guide

Component Type	Model(s)	Label Location
Radiographic Upright Cassette Holder	QW-420, QW-420-S, QW-420-D QW-400	 <p>COMPLIANCE LABEL</p> <p>SIDE VIEW (RIGHT)</p>
Collimator, Manual	PROGENY MC-150 HUESTIS 150MC RALCO R108/484 DHHS	 <p>COMPLIANCE LABEL (Rear Panel)</p>
Collimator, Automatic	PROGENY Linear II, Linear IV HUESTIS CM-32211-QM1	 <p>COMPLIANCE LABEL (Rear Panel)</p>

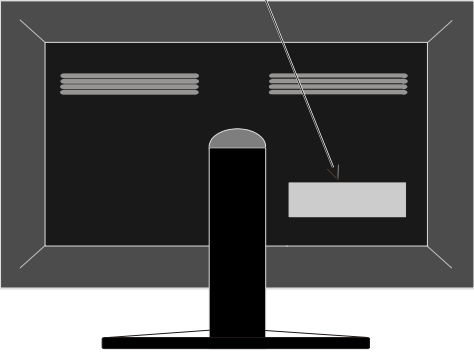
Chapter 2 General Information

Table 2-4. Q-Rad System Components Labeling Guide

Component Type	Model(s)	Label Location
<p>X-ray tube</p> <p>Ⓐ VARIAN:</p> <p>Ⓑ TOSHIBA:</p> <p>Ⓑ DUNLEE:</p>	<p>RAD-14, RAD-60, RAD-92</p> <p>E7239X, E7242X, E7252X, E7254X, E7869X</p> <p>DA 1092, DA 1036</p>	<p>X-RAY TUBE COMPLIANCE LABEL LOCATIONS</p>  <p>REAR VIEW</p>
<p>Digital Image Detector Cabinet</p>	<p>Q-DRT Q-DRT-T Q-FDR Q-FDR-T</p>	<p>CABINET (FRONT)</p>  <p>COMPLIANCE LABEL/DATAPLATE</p>

Chapter 2 General Information

Table 2-4. Q-Rad System Components Labeling Guide

Component Type	Model(s)	Label Location
Integration Option	Q-Rad DRX Series (QG-DIG-DRX)	<p data-bbox="797 443 954 491">COMPLIANCE LABEL</p>  <p data-bbox="959 905 1094 926">REAR VIEW</p>

Chapter 2 General Information

Power Disconnection

Refer to the following table for Q-Rad System component power disconnection methods.

Table 2-5. DX-D 500"Q-Rad System Component Power Disconnection Method

Component Type	Model	Means of Power Disconnect
X-ray Generator, Single-phase, non-Stored Energy	QG-25, QG-25-5, QG-32, QG-32-5, QG-40, and QG-40-5	ON/OFF circuit breaker CB1 on generator cabinet
X-ray Generator, Single-phase, Stored Energy	QG-20-SE, QG-32-SE, QG-40-SE, QG-50-SE	ON/OFF circuit breaker CB1 on generator cabinet
X-ray Generator, Three-phase	QG-32-2, QG-32-3, QG-40-2, QG-40-3, QG-50, QG-50-2, QG-65, and QG-80	ON/OFF circuit breaker CB1 on generator cabinet
TechVision Supplementary Generator Control Panel	QG-TV-Q, QG-TV-IP-Q, QG-TV-F, QG-TV-IP-F, QG-TV-C, QG-TV-IP-C	ON/OFF circuit breaker CB1 on generator cabinet
Radiographic Table, Non-Elevating Tabletop	QT-730	ON/OFF circuit breaker CB1 on generator cabinet
Radiographic Table, Non-Elevating Tabletop	QT-740	Unplug Line Cord
Radiographic Table, Elevating Tabletop	QT-750	Unplug Line Cord
Tube Support, Floor/Wall Mounted	QS-500	ON/OFF circuit breaker CB1 on generator cabinet
Tube Support, Free-Standing (Floor) Mounted	QS-550	ON/OFF circuit breaker CB1 on generator cabinet

Chapter 2 General Information

Table 2-5. DX-D 500^QRad System Component Power Disconnection Method

Component Type	Model	Means of Power Disconnect
Radiographic Upright Cassette Holder, Non-Tilting	QW-420, QW-420-S, QW-420-D, QW-400	ON/OFF circuit breaker CB1 on generator cabinet
Collimator, Manual	Progeny, MC150 Huestis, 150MC Ralco, R108	ON/OFF circuit breaker CB1 on generator cabinet
Collimator, Automatic	Progeny, Linear II Progeny, Linear IV Huestis Programmable, CM-32211-QMI	Unplug Line Cord (ACS Power Supply & Junction Box)
X-ray tube	Toshiba E7239X, E7242X, E7252X, E7254X, E7869X Varian RAD-14, RAD-60, RAD-92 Dunlee DA 1092, DA1036	ON/OFF circuit breaker CB1 on generator cabinet
Dose Area Product Meter (optional)	Vacutec Display Unit: VacuDAP OEM (QD1-2) Vacutec Ion Chamber: Vac- uDAP OEM (QD1-1)	Unplug Line Cord
Carestream Digital Imaging System	DRX-1	Quick Reference Card for the Carestream DRX-1 System, document 8G8318 Carestream DRX-1 System Safety and Regulatory Information with Hardware User's Guide, document 7H8166 Carestream DRX-1 System Battery Charger User's Guide, document 8H6193

Detachable Parts and Accessories

Instructions for detachable parts and accessories of Q-Rad Radiographic System are included in each of the system component user's manual indicated in [Table 2-1](#).

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