HOLOGIC®

InSight™ FD Mini C-arm Imaging System Technical Reference Manual

MAN-09973 Revision 001

InSight FD Mini C-arm Imaging System

Part Number MAN-09973

Revision 001

Caution: Federal (U.S.A.) law restricts this device to sale by or on the order of a physician (or properly licensed practitioner).

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5 Product Specifications

Table 1 Power Requirements

Parameter	Value
AC Input Voltage	Nominal 100/120/220/230/240 VAC selectable, Single-Phase
Wattage	750 watts maximum
AC Input Frequency	Nominal 50/60 Hz
Power Failure Protection	Images software protected

Table 2 Environmental Requirements

Parameter	Value
Temperature Range (Operating)	+15.5 °C to +32 °C (+60 °F to +90° F)
Temperature Range (Storage)	-20 °C to +50 °C (-4 °F to +122 °F)
Relative Humidity (Operating)	20 – 80% non-condensing
Relative Humidity (Storage and Transport)	20 – 85% non-condensing
Atmospheric Pressure	500 -1060 hPa (375 - 795 mm Hg)

Table 3 Weights/Dimensions

Height	66 in. (168 cm)
Width	28 in. (71 cm)
Depth	32 in. (81 cm)
Weight	475 lb (215 kg)

Table 4 Space Requirements

Required Floor Space:	5 ft x 6.6 ft (1.5 m x 2.0 m)
Door Size	30 in. (76.2 cm) minimum
Ground Clearance:	3.875 in. (9.8 cm) minimum
Floor Capacity	151.1 lb/ft^2 (737.2 kg/m^2)

Table 5 X-Ray Specifications

Source - Image receptor distance	44 cm (17.5 in.)
X-ray source	Grounded tungsten anode X-ray tube with custom designed high voltage generator
X-ray tube window	0.005 in. (0.127 mm) Beryllium
Beam filtration	Aluminum with minimum thickness 3.0 mm
Focal spot	0.045 mm (0.0018 in.) @ 7.5 watts
Field of View (FOV)	Operator selectable collimation of Limited Field or Full Field. Limited Field uses a 4.4 in. x 4.4 in. collimation mode, which magnifies a small area. Full Field uses a 5.7 in. x 4.5 in. collimation mode, which displays large area.
Rated peak tube potential	75 kVp
Tube kVp range	40 to 75 kVp
Tube current range	0.020 to 0.100 mA
Accuracy of displayed values for kV/mA	kVp ± 5% of displayed value mA ± 8% ≤0.035 mA of displayed value mA ± 5% >0.035 mA of displayed value
Maximun Duty cycle at 75 kVp@0.100 mA	50%
Maximum Output	0.100 mA @75 kVp

Table 6 Performance

Parameter	Value
Acquisition Frame Rate	Non-cine recording 30 FPS Cine recording 25 FPS
Fluoroscopic Time Alarm Range	15 seconds – 5 minutes, adjustable in 15 second increments (default is 5 minutes)
Image Storage Capacity	10000 Images (maximum)
Cine Loop Capacity	40 minutes maximum
Laser Alignment Guide Timeout	60 seconds (press and release) No timeout (press and hold for 2 seconds)

Table 7 Imaging Specifications

CMOS detector	75 micron pixel array 2k x 1.5k resolution Full +/-90 degree rotation Auto-tracking collimation
C-arm dimensions	Source to detector distance: 17.5 in. (44 cm) Free space: 13.5 in. (34.3 cm) Depth of arc: 20 in. (50.6 cm) Orbital rotation: 120 degrees Horizontal travel: 23 degrees Vertical travel: 23 in. (58 cm) Pivot rotation: 380 degrees Panning motion: 320 degrees
Image processing	Digital, with up to 32 frames of video averaging and last frame freeze 16-bit image processing
Video system	24 in. (61 cm) LED touch screen monitor with a native resolution of 1920 x 1200 and an aspect ratio of 16:10. Solid state video camera HDMI output
Resolution (using Nuclear Associates test tool 07-539, located at the minimum SSD in normal (Full Field) mode)	7.0 lp/mm, minimum
Contrast (using Nuclear Associates test tool 07-647, located at the surface of the CMOS detector housing in normal (Full Field) mode)	Must resolve, at minimum, 30# mesh At least 3 of 4 low contrast masses (2,4,6,8 mm) visible Low contrast inserts in both monitor adjustment squares visible
Brightness	On first use, a warning will be displayed if the saved physician preference for brightness is below the value (20) specified in the <low_brightness_threshold> system configuration field

Table 8 Laser Performance Specifications

Parameter	Condition	Value
Laser Power	Device on	IEC Class 1
Laser Wavelength	Device on	635 nm
Projected Line Width	At CMOS detector surface	0.05 ± 0.03 in.

Table 8 Laser Performance Specifications (Continued)

Parameter	Condition	Value
Projected Line Length	At center of CMOS detector surface	7.00 ± 0.50 in.
Line Intersection Location Accuracy	At center of CMOS detector surface	± 0.125 in.
Auto-off delay Auto-off disabled	Press and release Press and hold for 2 seconds	Off in 60.0 ± 2.0 seconds Laser remains on until turned off (press again)
Input Power Voltage	N/A	5.00 ± 0.25 volts
Input Power Current	Device off	0.010 mA, max.
Input Power Current	Device on	0.100 mA, max.

The InSight™ FD Mini C-arm Imaging System is classified* as follows:

Table 9 Equipment Classification

Type of protection against electric shock	CLASS 1
Degree of protection against electric shock	TYPE B
Laser per IEC-60825-1	CLASS 1
Degree of protection against harmful ingress of water	IPXO
Mode of operation	Continuous Operation

The InSight FD Mini C-arm Imaging System is also classified* as:

Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

* Medical Electrical Equipment - UL 60601-1.

2 InSight FD Entrance Exposure Rate Data

Typical entrance exposure rates, measured at a point in center of the CMOS detector, 2 cm above surface of the housing.

Table 10 Typical Entrance Exposure Rates — Auto Mode

kV	μA	μGy/s
43	30	2.10
44	34	2.57
45	38	3.13
46	42	3.70
47	44	4.10
48	46	4.60
49	52	5.60
50	56	6.30
51	58	7.00
52	60	7.60
53	62	8.35
54	64	9.01
55	66	9.75
56	68	10.56
57	70	11.33
58	72	12.11
59	74	13.03
60	76	13.87
61	78	14.79
62	80	16.39
63	82	16.74
64	84	18.27
65	86	18.82
66	88	20.46
67	90	21.08

Table 10 Typical Entrance Exposure Rates — Auto Mode (Continued)

kV	μA	μGy/s
68	92	22.99
69	94	24.32
70	96	25.51
71	99	27.08
72	100	28.08
73	100	28.89
74	100	29.74
75	100	30.58

Table 11 Typical Entrance Exposure Rates — Auto IQ Mode

kV	μA	μGy/s
43	51	3.538
44	58	4.416
45	65	5.324
46	71	6.257
47	75	7.081
48	78	7.793
49	88	9.376
50	95	10.800
51	99	11.910
52	100	12.790
53	100	13.480
54	100	14.110
55	100	14.720
56	100	15.940
57	100	16.130
58	100	16.800
59	100	17.590
60	100	18.300

Table 11 Typical Entrance Exposure Rates — Auto IQ Mode (Continued)

kV	μA	μGy/s
61	100	18.920
62	100	20.110
63	100	20.440
64	100	21.490
65	100	21.840
66	100	23.050
67	100	23.910
68	100	24.510
69	100	25.330
70	100	26.070
71	100	27.080
72	100	27.790
73	100	28.590
74	100	29.470
75	100	30.300

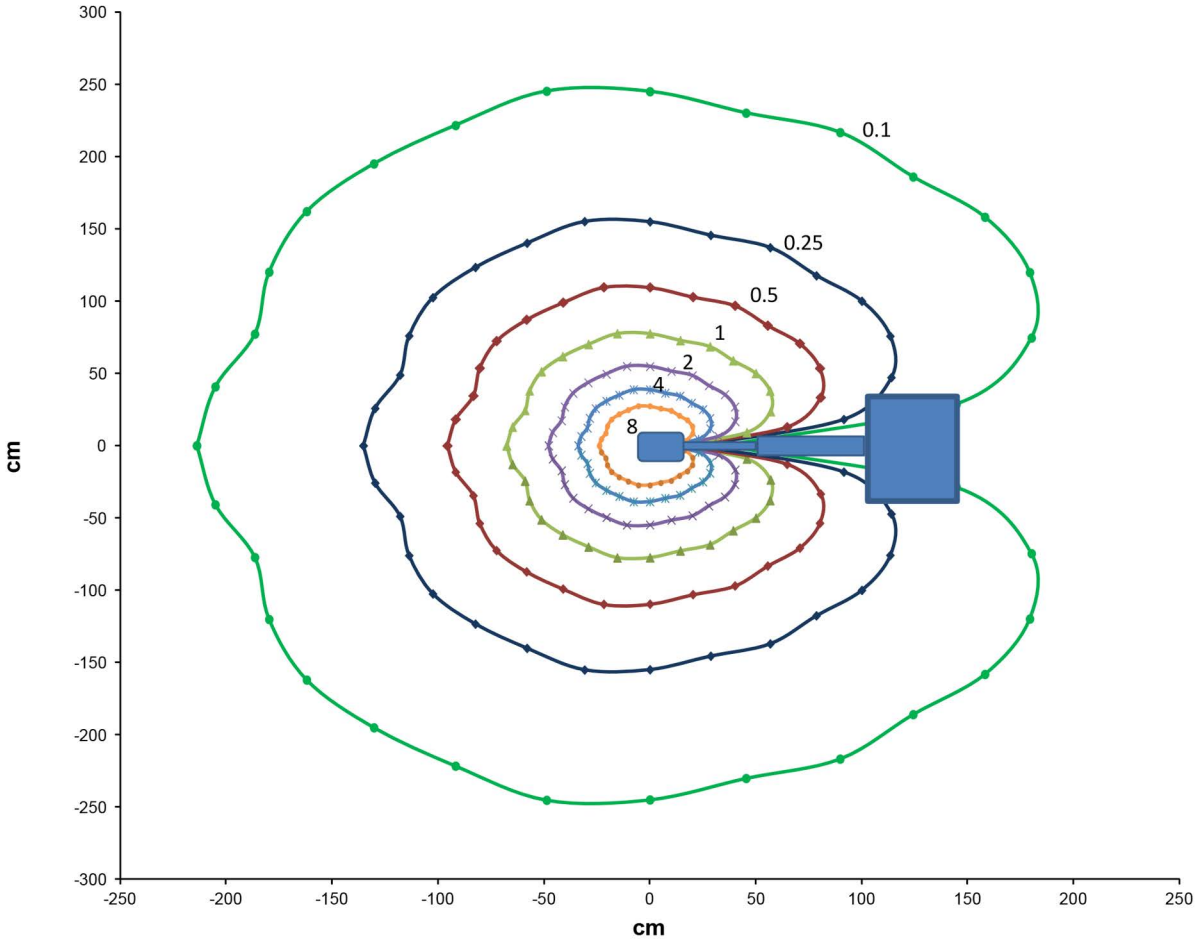
5 Iso-Exposure Rates

Scatter radiation measurements around the Fluoroscan InSight FD Mini C-arm were made with a hand phantom and a foot phantom placed on the imaging assembly as scatter sources.

Figure 1 Phantom Positioning

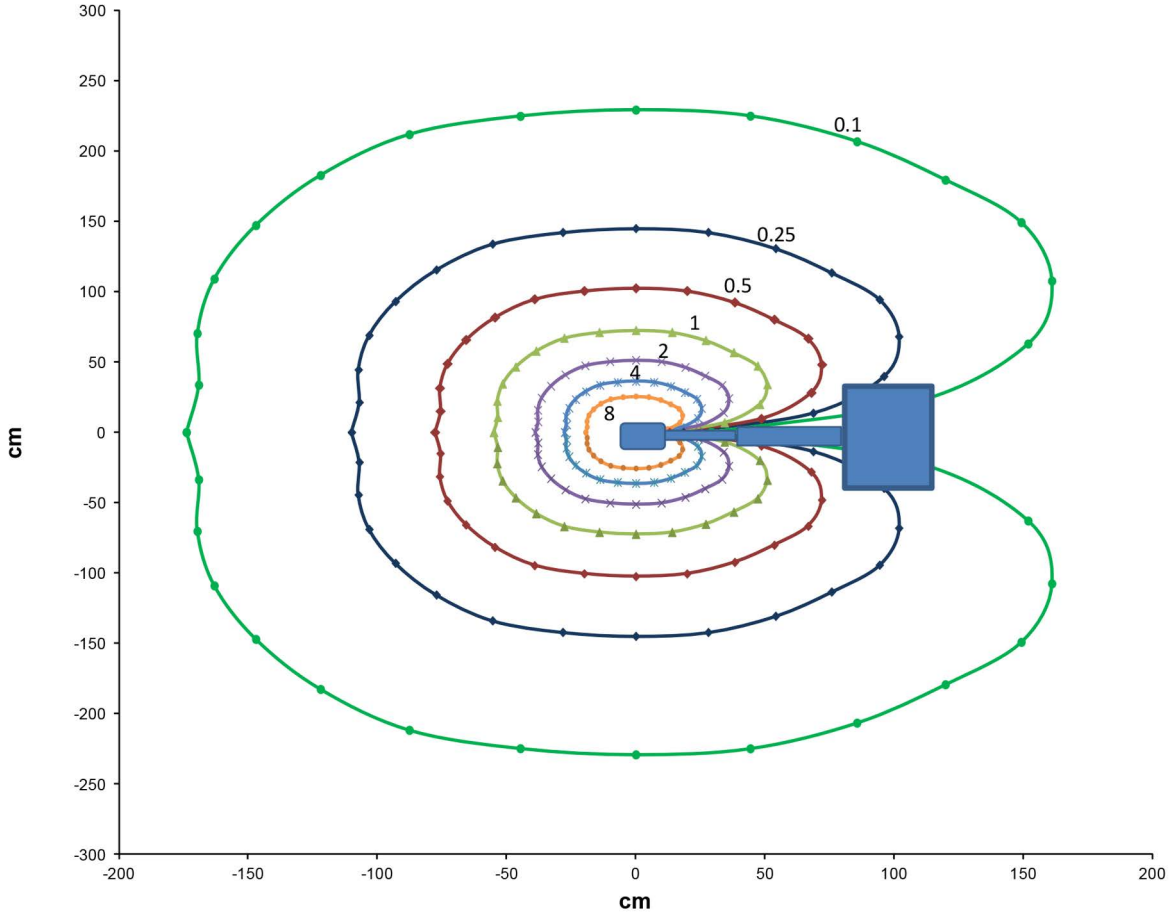
Phantom	Hand
Field	Full
Mode	Auto IQ
Technique	kV 50
	mA 0.100

Figure 2 Contours: 0.1, 0.25, 0.5, 1, 2, 4 and 8 mR/h



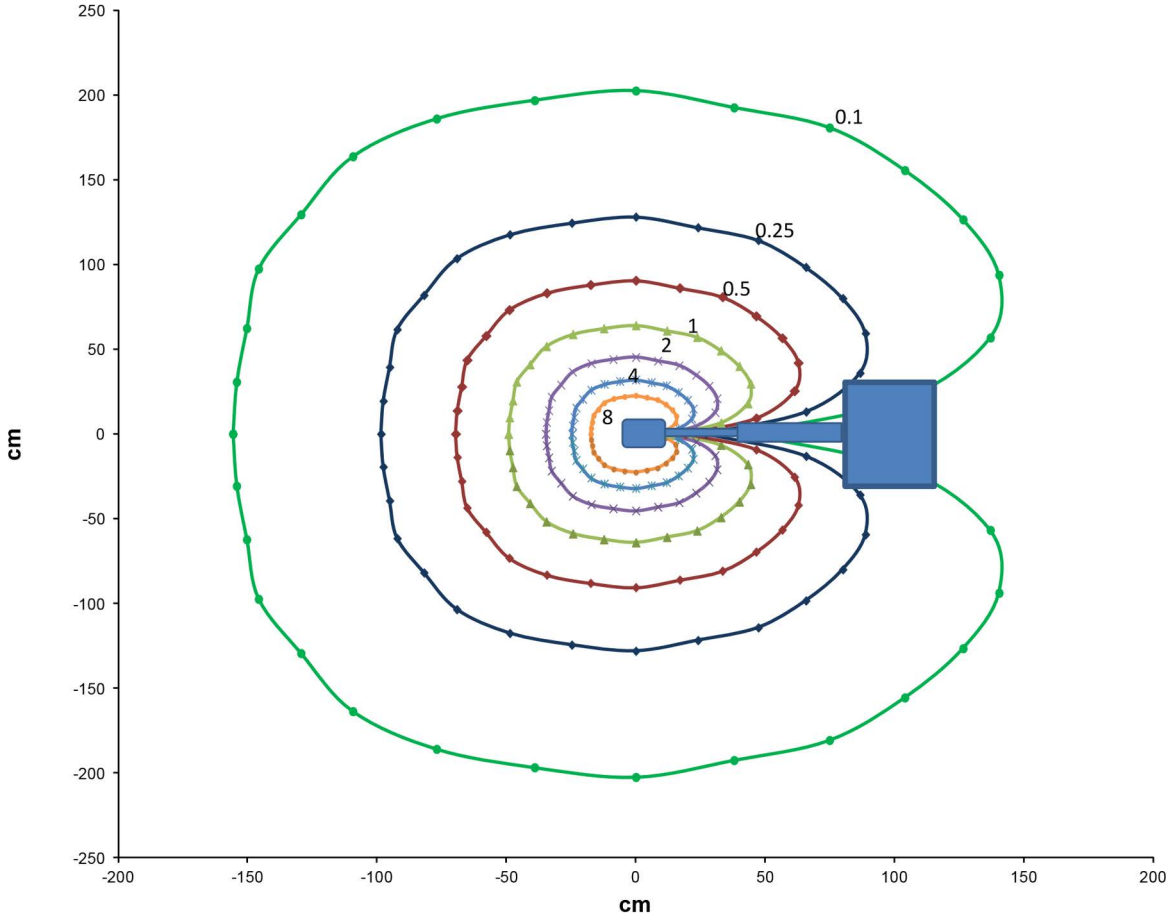
Phantom	Hand
Field	Limited
Mode	Auto IQ
Technique	kV 51
	mA 0.100

Figure 3 Contours: 0.1, 0.25, 0.5, 1, 2, 4 and 8 mR/h



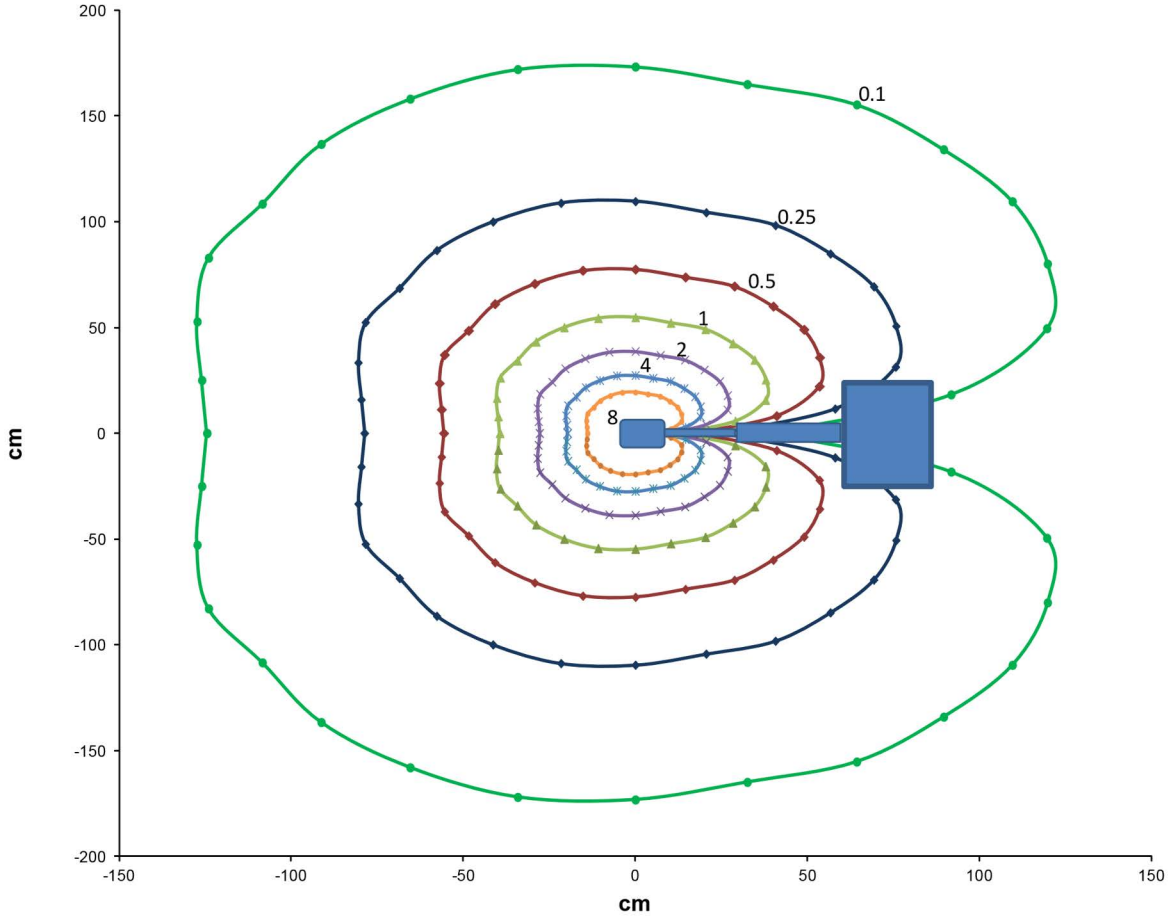
Phantom	Hand
Field	Full
Mode	Auto
Technique	kV 50
	mA 0.088

Figure 4 Contours: 0.1, 0.25, 0.5, 1, 2, 4 and 8 mR/h



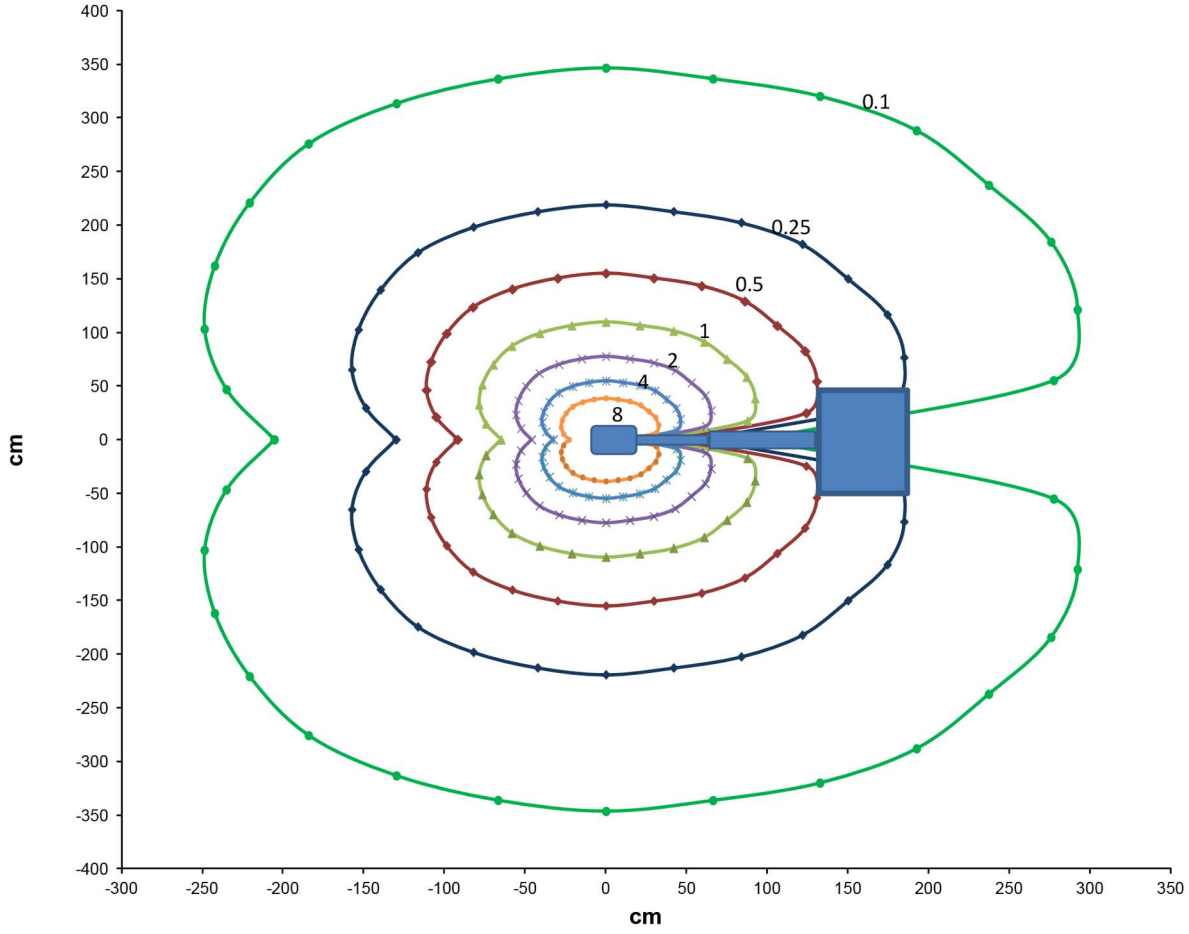
Phantom	Hand
Field	Limited
Mode	Auto
Technique	kV 50
	mA 0.058

Figure 5 Contours: 0.1, 0.25, 0.5, 1, 2, 4 and 8 mR/h



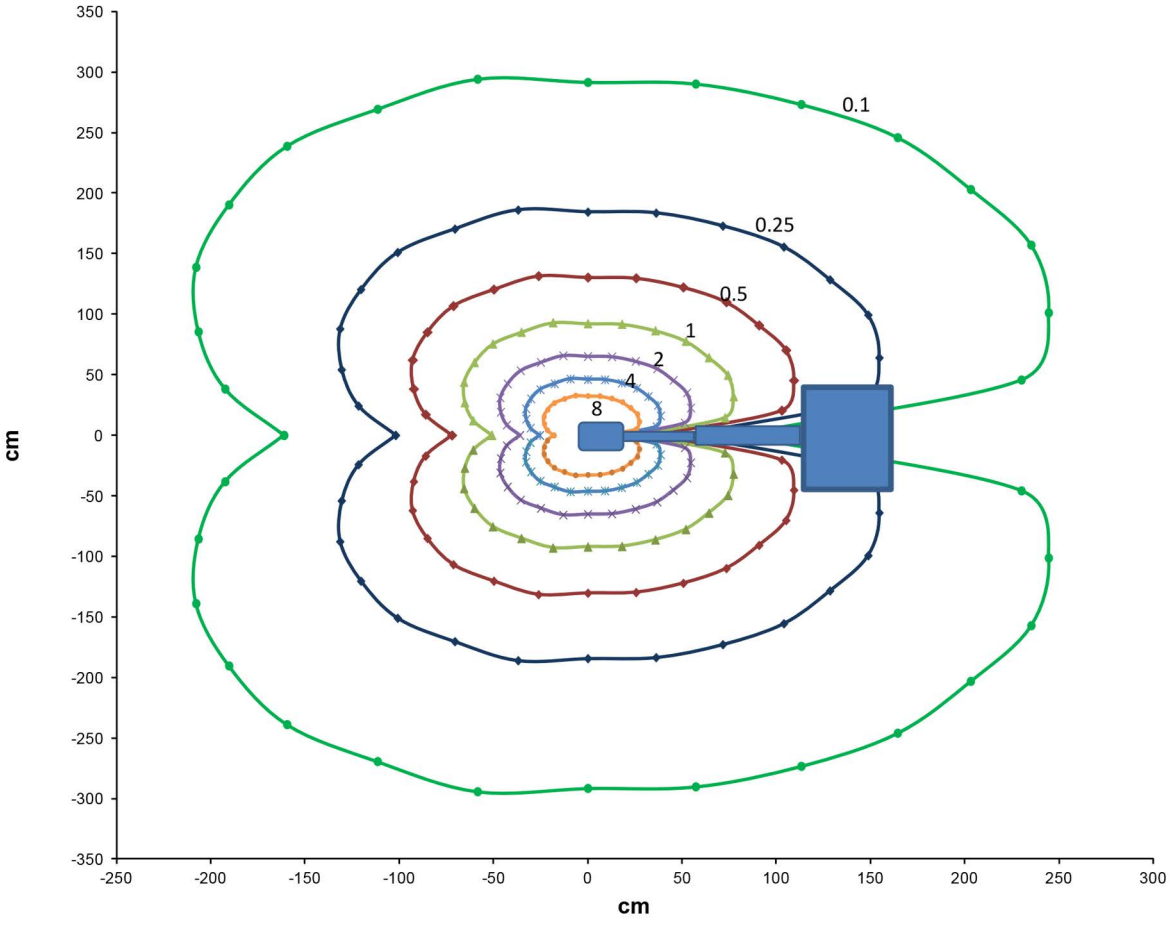
Phantom	Foot
Field	Full
Mode	Auto IQ
Technique	kV 53
	mA 0.100

Figure 6 Contours: 0.1, 0.25, 0.5, 1, 2, 4 and 8 mR/h



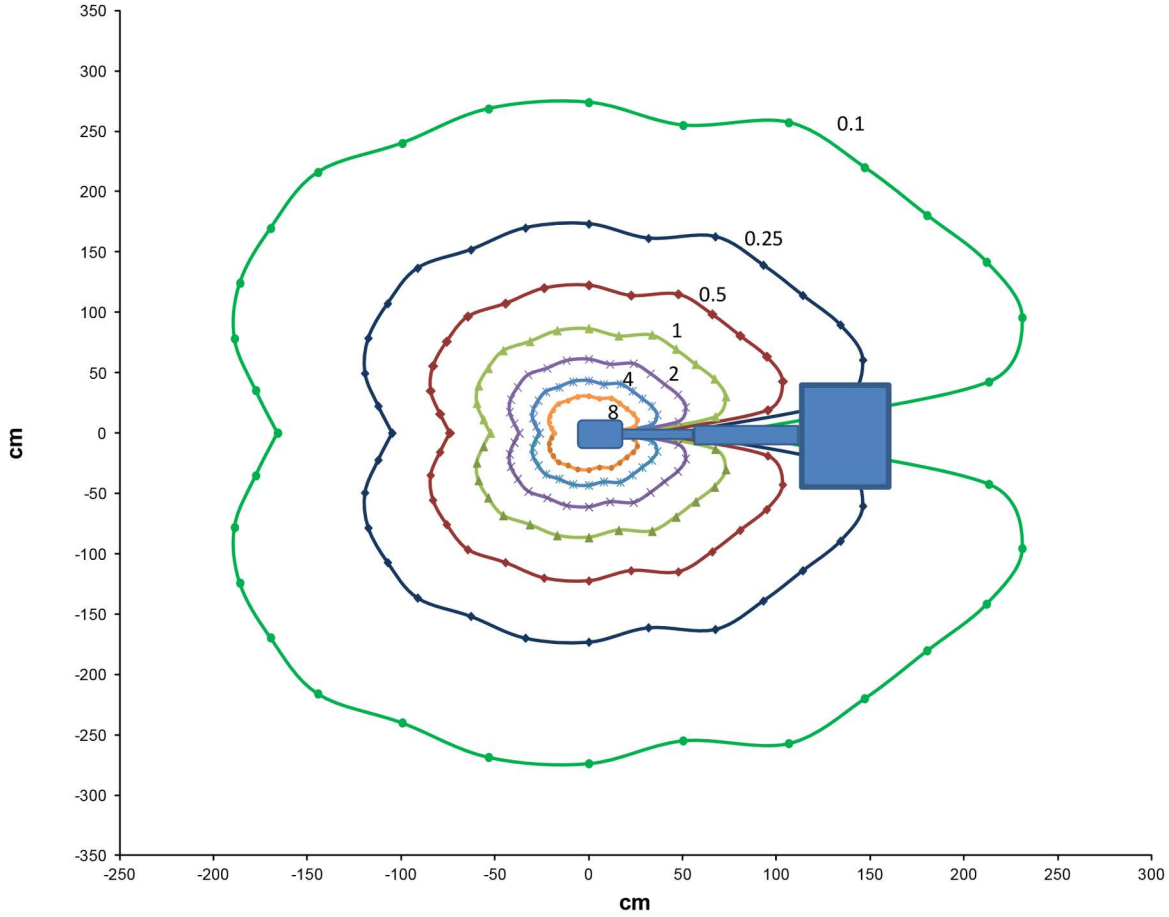
Phantom	Foot
Field	Limited
Mode	Auto IQ
Technique	kV 53
	mA 0.100

Figure 7 Contours: 0.1, 0.25, 0.5, 1, 2, 4 and 8 mR/h



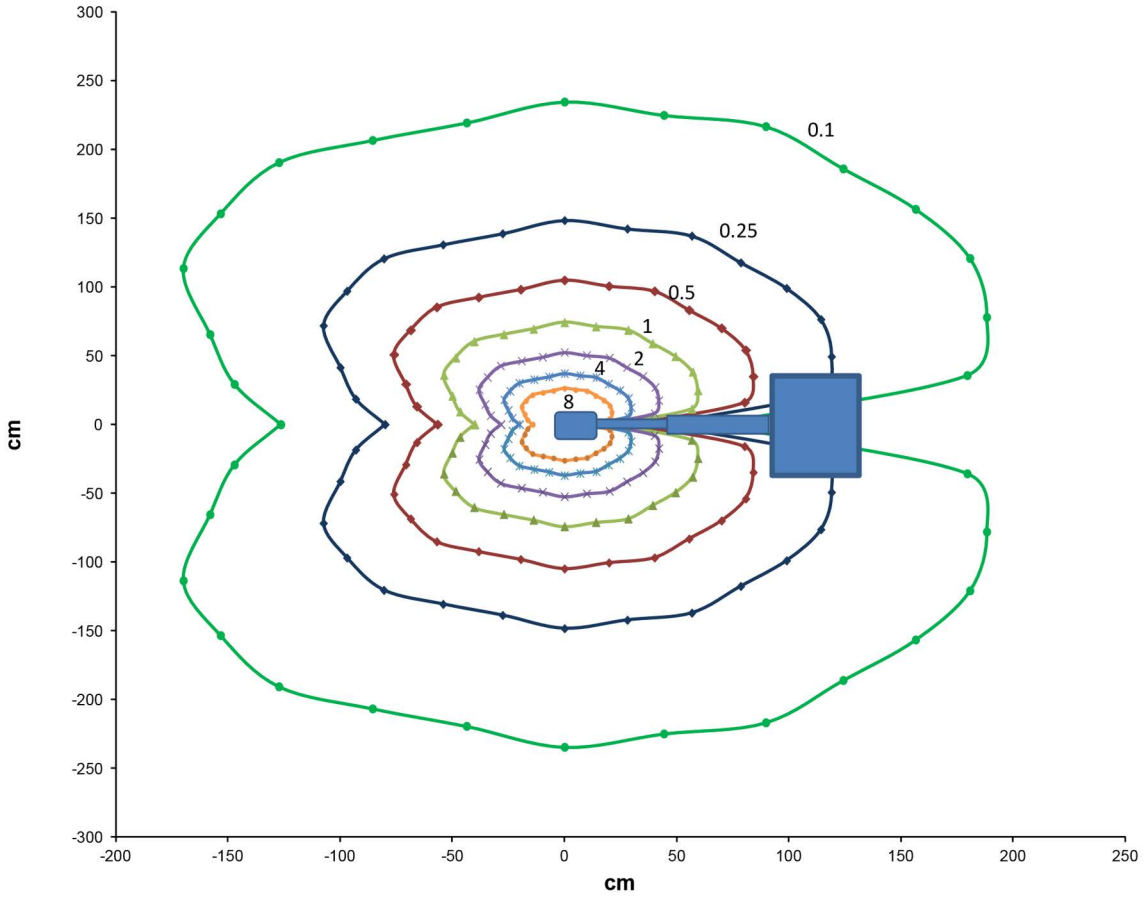
Phantom	Foot
Field	Full
Mode	Auto
Technique	kV 53
	mA 0.064

Figure 8 Contours: 0.1, 0.25, 0.5, 1, 2, 4 and 8 mR/h



Phantom	Foot
Field	Limited
Mode	Auto
Technique	kV 52
	mA 0.062

Figure 9 Contours: 0.1, 0.25, 0.5, 1, 2, 4 and 8 mR/h



5 Symbols

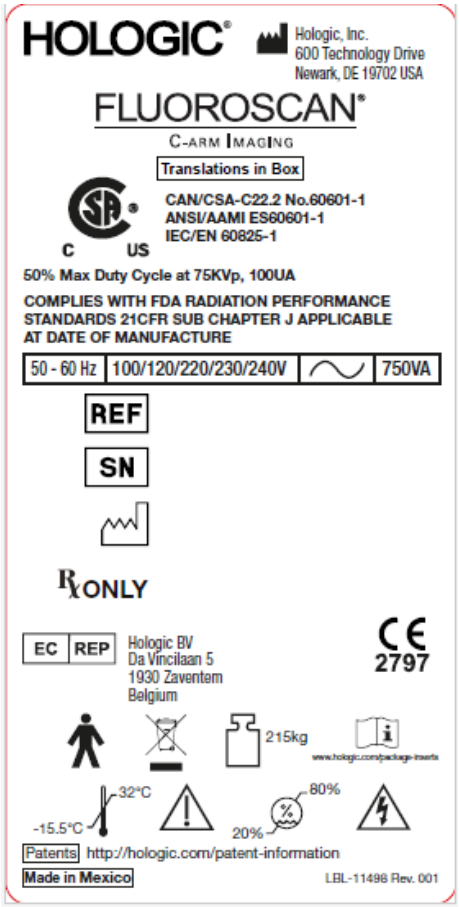
	Dangerous voltage		Attention - Read the Caution or Warning statement that follows
	Type B equipment		X-ray filtration
	Time delay fuse		Protective ground
	Functional ground		Equipotential ground
	USB connector		Electrostatic sensitive device
	WEEE dispose of electrical/ electronic equipment properly		Computer On/Standby switch
	Rear wheels free to move in all directions		Rear wheels move forward and back only
	Rear wheels locked		Manufacturer name and location
	Manufacturing date		
	Laser on switch		X-ray on switch
	Store		Print
	Increase or decrease kV/mA		Rotate image
	Cycle through the noise suppression settings		Serial number
	Part number		Mode
	MegaView™ Image		

5 InSight FD System Labels

5.1 Manufacturer Serial Number Label

The Manufacturer Serial Number Label is on the back of the base cabinet.

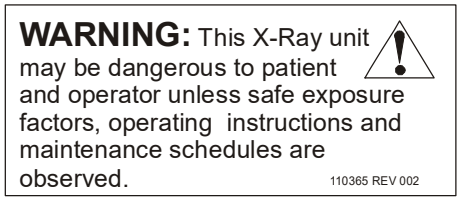
Figure 1 Manufacturer Serial Number Label



5.2 X-Ray System Warning Label

The X-Ray System Warning Label is on the front of the base cabinet below the Computer On/Standby switch.

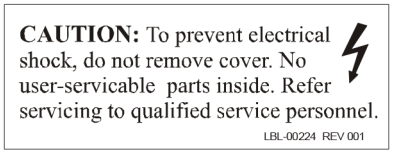
Figure 2 X-Ray System Warning Label



5.3 Electric Shock Warning Label

The Electric Shock Warning Label is located near the fasteners for panels covering high voltage components.

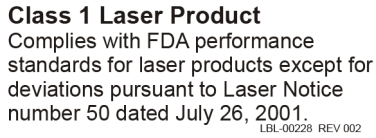
Figure 3 Electric Shock Warning Label.



5.4 Class 1 Laper Product Label

Class 1 Laser Product complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice number 50 dated July 26, 2001.

Figure 4 Class 1 Laser Product Label



5.5 Caution on Incline Label

The Caution on Incline Label is on the back of the unit, above the handle.

Figure 5 Caution on Incline Label

5.6 Transport Label

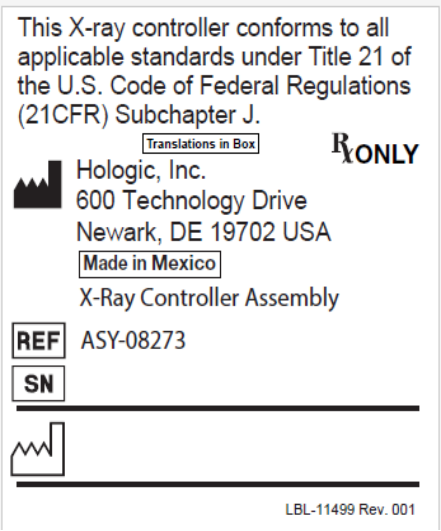
The Transport Label is on the back of the unit, above the handle.

Figure 6 Transport Label

5.7 X-Ray Controller Compliance Label

The X-Ray Controller Compliance Label is on the X-Ray Controller assembly and on the back of the base cabinet.

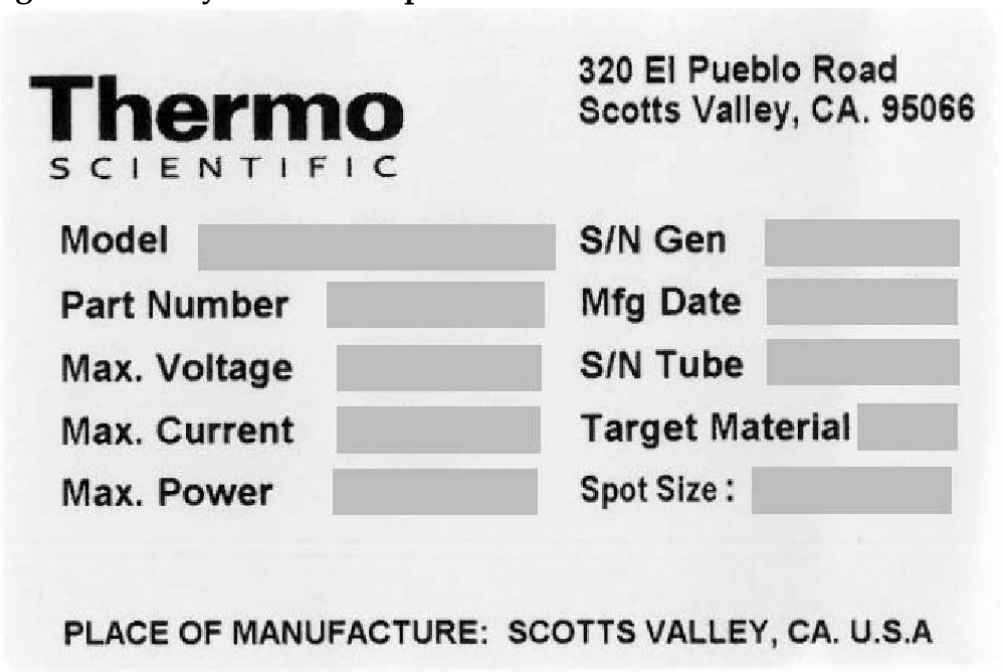
Figure 7 X-Ray Controller Compliance Label



5.8 X-Ray Source Compliance Label

The X-Ray Source Compliance Label is on the X-Ray source module and on the back of the base cabinet.

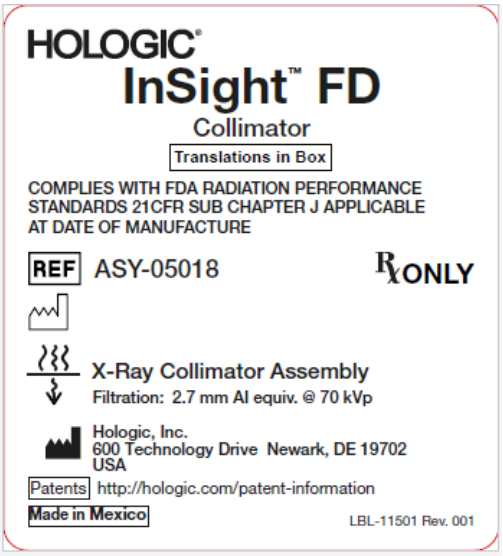
Figure 8 X-Ray Source Compliance Label



5.9 Collimator Compliance Label

The Collimator Compliance Label is on the X-Ray source module (near the collimator assembly).

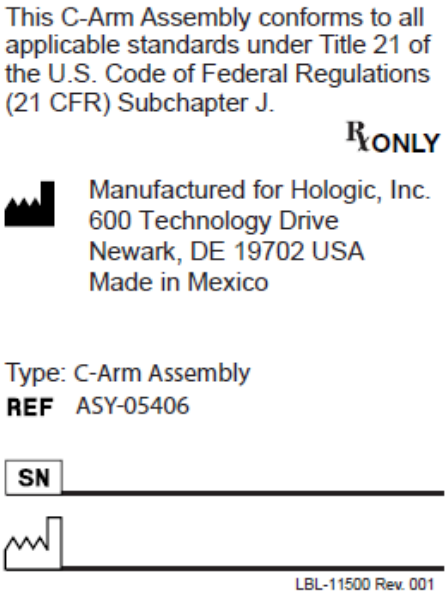
Figure 9 Collimator Compliance Label



5.10 C-Arm Compliance Label

The C-Arm Compliance Label is on the bottom of the High Voltage Power Supply cover.

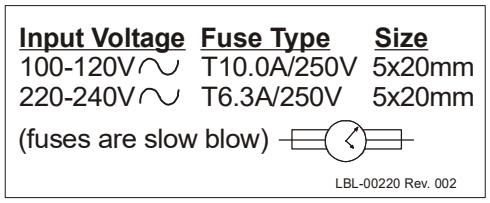
Figure 10 C-Arm Compliance Label



5.11 AC Input Power Fuse Label

The AC Input Power Fuse Label is on the back of the base cabinet near the AC power connector.

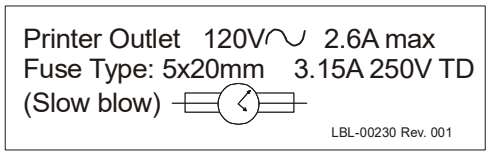
Figure 11 Input Power Fuse Label



5.12 Printer Fuse Label

The Printer Fuse Label is located at the back of the printer compartment near the printer outlet.

Figure 12 Printer Fuse Label



5.13 Explosion Risk Label

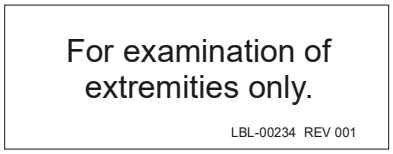
The Explosion Risk Label is located on the back of the base cabinet

Figure 13 Explosion Risk Label

5.14 Extremities Only Label

The Extremities Only Label is located on the back of the base cabinet.

Figure 14 Extremities Only Label



5.15 Field of View

Field of View is represented by raised rectangles on the underside of the High Voltage Power Supply. When the Field of View selection lever is positioned at the large rectangle full field of view is selected. When the Field of View selection lever is positioned at the small rectangle reduced field of view is selected.

Figure 15 Field of View

5.16 Computer On/Standby Label

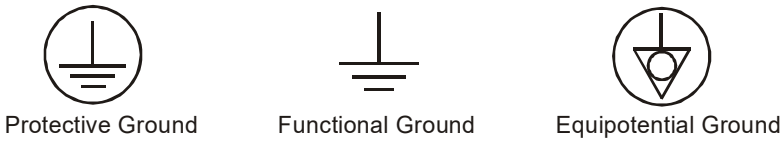
The Computer On/Standby Label is on the front of the base cabinet above the Computer On/Standby switch

Figure 16 Computer On/Standby Label

5.17 Ground Labels

Each system grounding point, depending upon type of ground, has one of the Ground Labels shown below.

Figure 17 Ground Labels



5.18 Back Panel Labels

The Ethernet and DVI labels are located in the middle of the system back panel below their respective connectors.

Figure 18 Back Panel Labels