



GE Healthcare

M517-E747A
Dec. 2015

Remote Controlled R/F System

Optima RF420

Service Manual

Site Planning

This manual is for professional service personnel.
Do NOT use this manual unless you have received proper training.

Direction 5725001-8EN
Revision 1

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Introduction

WARNING



Instruction

Perform installation, operation, and maintenance according to the instructions given in this manual.

- Safety can be achieved by an operator's individual cautions.
- Ensure safety for operators and surrounding people when performing works.
- Since repairing inside the product is dangerous, our specially trained personnel must do it.

Indications

The warning information in this manual is defined using the following conventions.

Table 1

Indication	Meaning
 DANGER	Indicates a danger that may result in serious injury to operators and surrounding people.
 WARNING	Indicates a measure provided to prevent serious physical injury and fire.
 CAUTION	Indicates a measure provided to prevent accidents causing injury.
 NOTE	Indicates information provided to improve operating efficiency or help understanding of this manual.
 Prohibition	Indicates an action that must not be performed.
 Instruction	Indicates an action that must be performed.
 Reference	Indicates the location of related reference information.

Revision History

Table 2

Revision	Date	Changes
	Nov. 2015	First edition.
1	Dec. 2015	First release.

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1 System Outline

1.1 System Configuration

Optima RF420 comprises the following equipment.

Table 1-1

Unit	Type Name	Remarks	
Remote-Controlled Diagnostic Table	ZS-5D	Non-elevating	
	ZS-5DS	Elevating	
X-ray High-voltage Generator	ZUD-L40	50 kW	
	ZUD-B40	80 kW	
3-phase Transformer	XAT-2	Optional, 200 to 400 VAC	
X-ray Tube Assembly	G292	including Heat Exchanger HE-100, Focal Spot: 0.6/1.2 mm	
High Speed Rotation Starter	SA-60	---	
Collimator	RU-300	---	
X-ray Radiography Stand	BR-120M	Optional	
Desktop Remote Console	---	---	
Proximity Console	---	Optional	
LCD Monitor Trolley	---	Single/Double	
Digital Radiography Unit	SDR-150C	Image Capture Computer	---
		LCD Monitor	19 in, Single/Double, Color/Monochrome
		Single-phase Transformer	200 to 100 VAC
		CXDI-50RF FPD (Sensor Unit)	14 in x 17 in
		Power Box PB4	---

WARNING



Prohibition

Do NOT connect equipment other than the designated equipment to the system.

1.2 Dimensions and Mass

1.2.1 ZS-5D

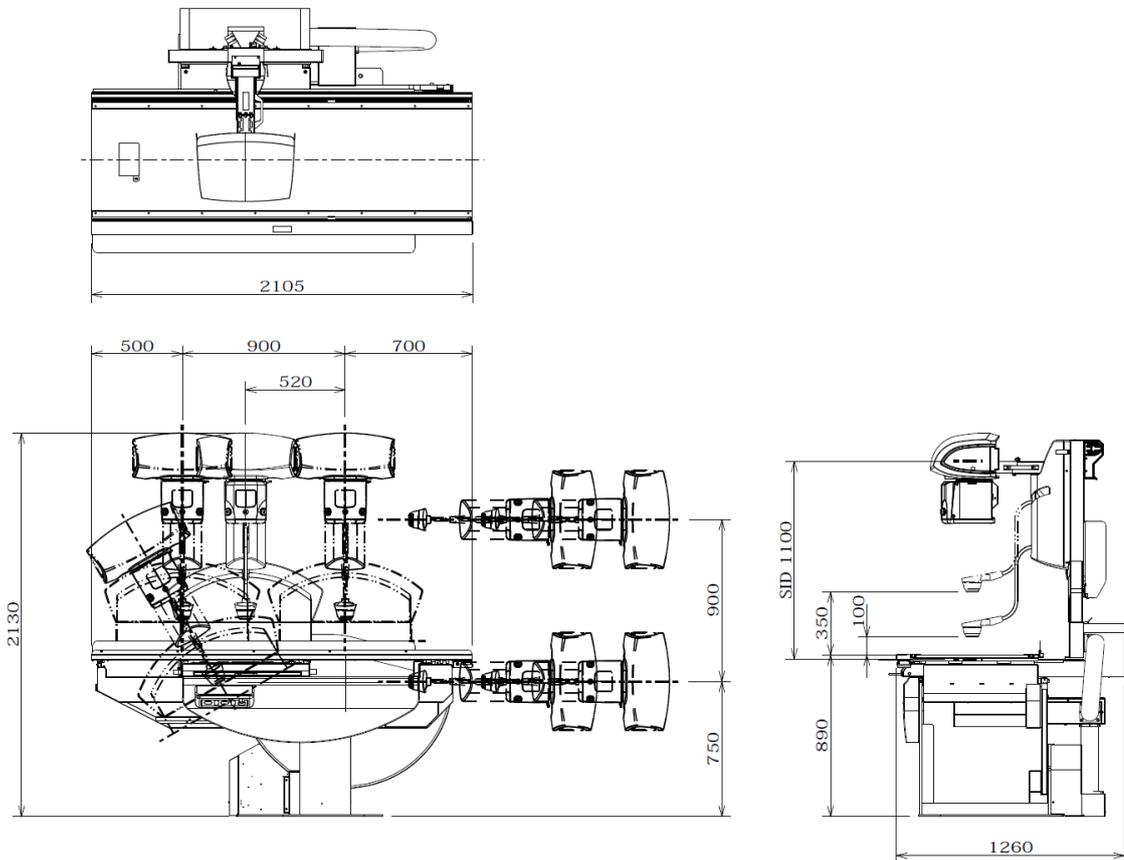


Fig. 1-1

625 kg

(Maintenance Space: Front 1 m, Side 1 m, Back 0.1 m)

1.2.2 ZS-5DS

1

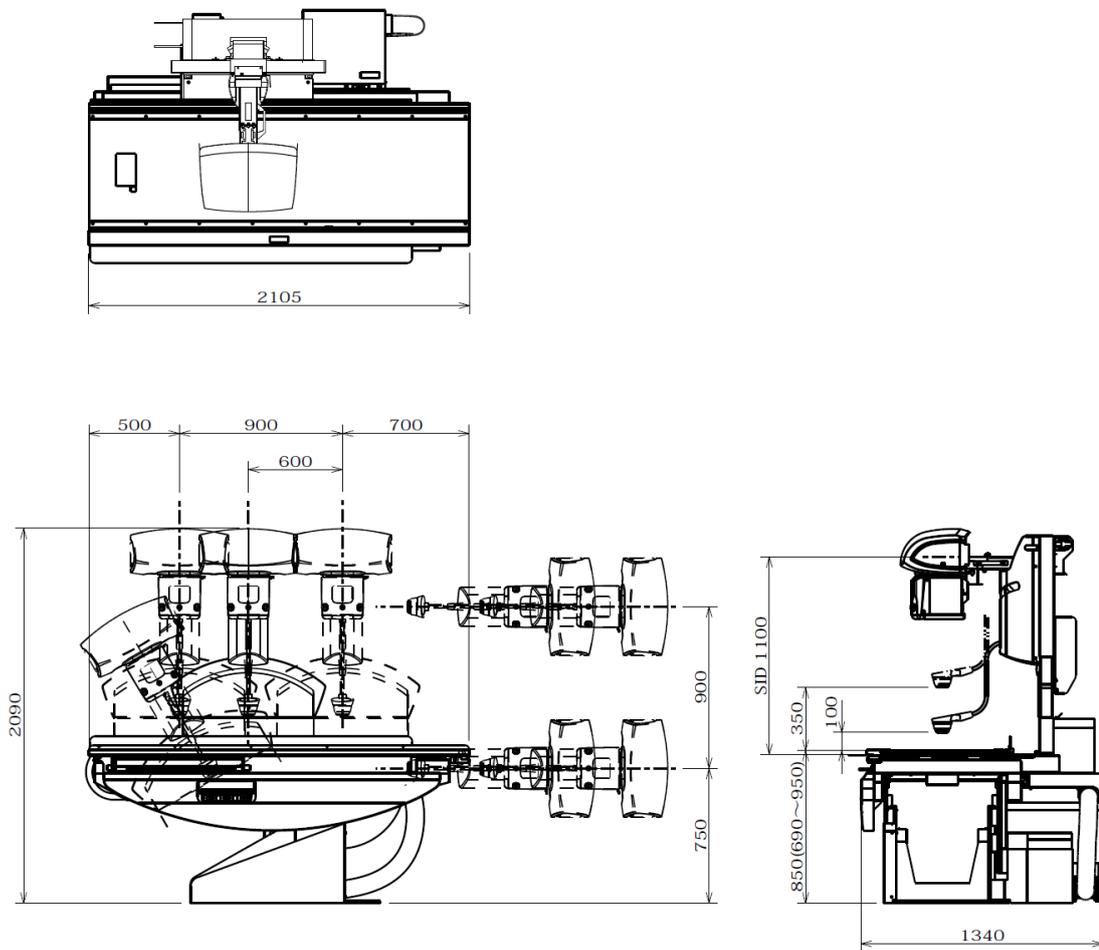


Fig. 1-2

755 kg

(Maintenance Space: Front 1 m, Side 1 m, Back 0.1 m)

1.2.3 ZUD-L40/ZUD-B40

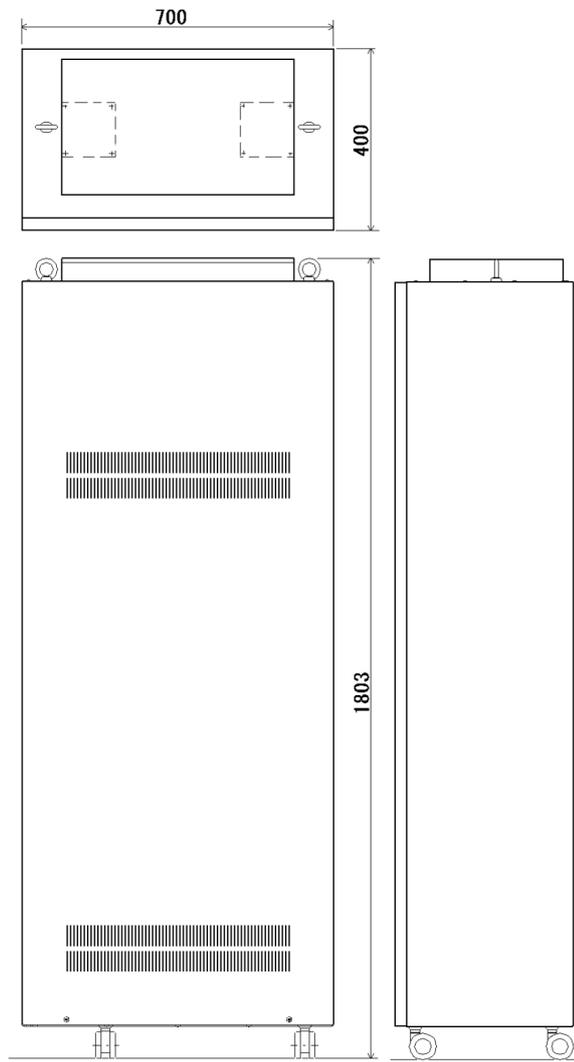


Fig. 1-3

270 kg
(Maintenance Space: Front 1 m)

1.2.4 XAT-2

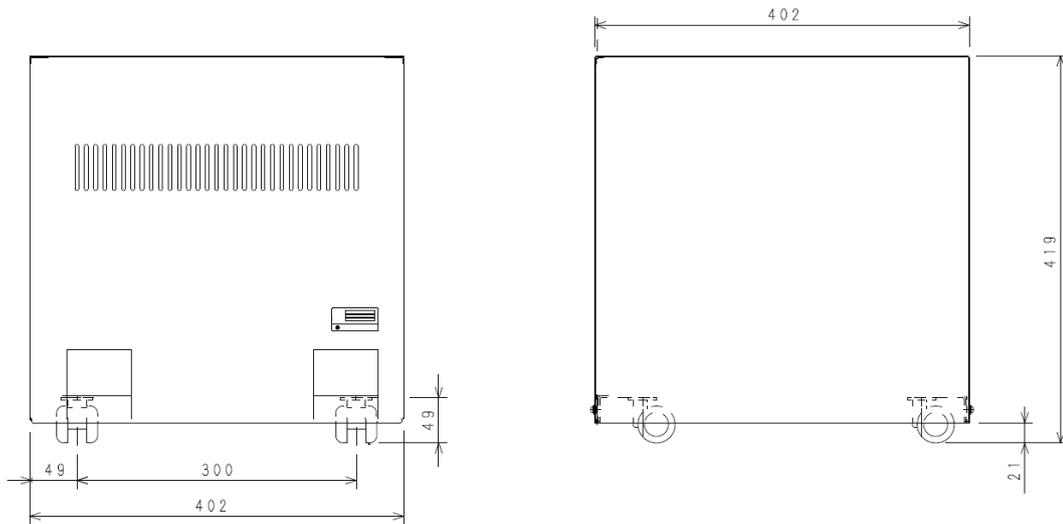


Fig. 1-4

60 kg

(Maintenance Space: Front or Side 0.5 m)

1.2.5 HE-100 & SA-60

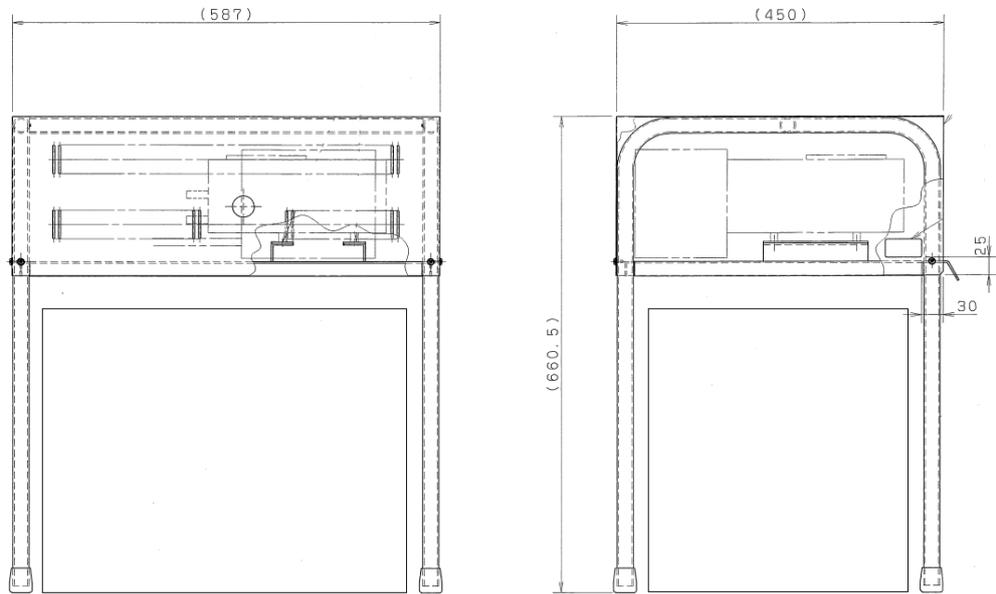


Fig. 1-5

82 kg (HE-100: 12 kg, SA-60: 56 kg, Rack: 14 kg)
(Maintenance Space: Front or Side 0.5 m)

1.2.6 BR-120M

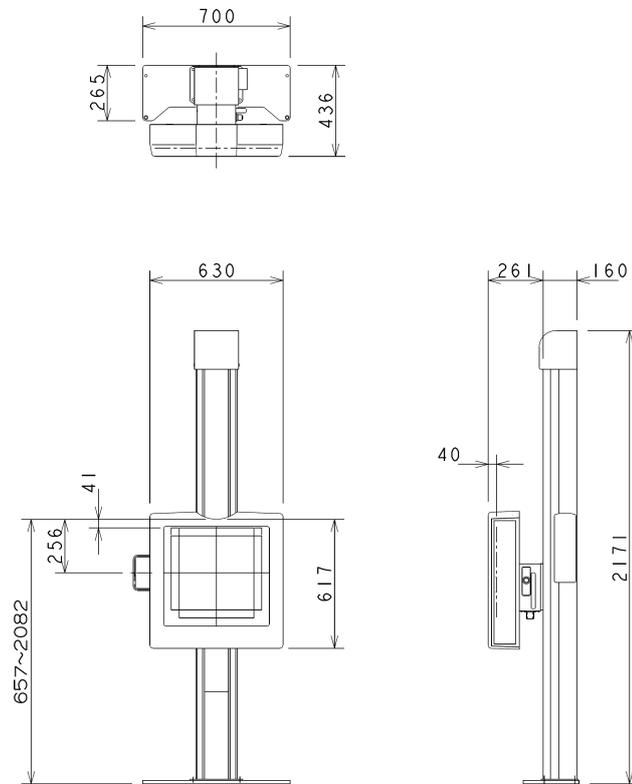


Fig. 1-6

140 kg

(Maintenance Space: Front 1 m)

1.2.7 SDR-150C

■ Image Capture Computer

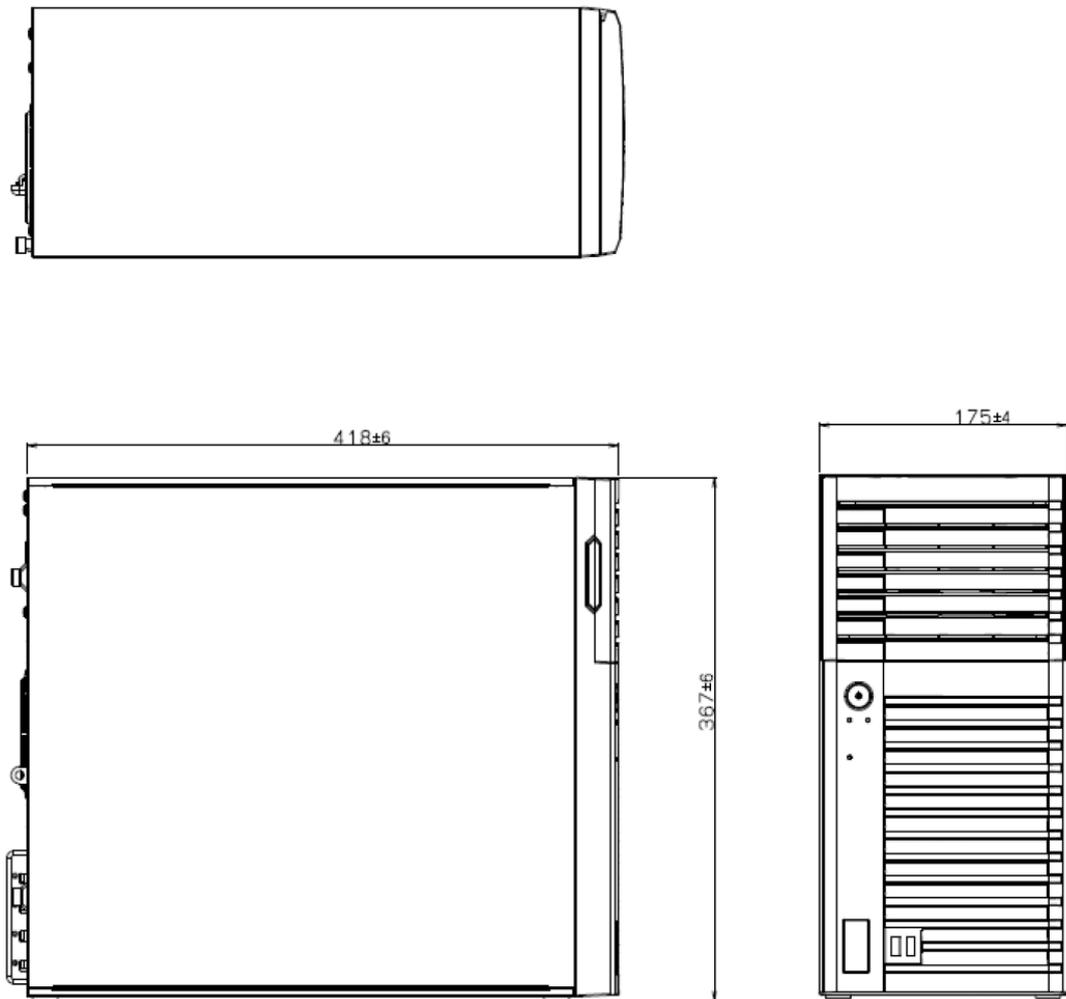


Fig. 1-7

13 kg

(Maintenance Space: Front, Side, or Back 1 m)

■ LCD Monitor

Color Monitor

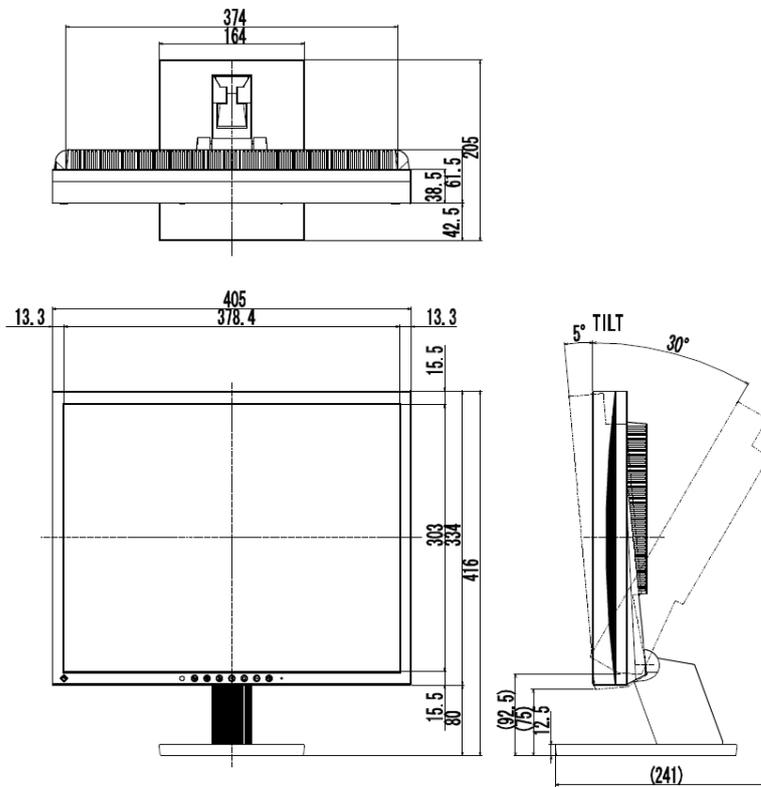


Fig. 1-8

5 kg

(Maintenance Space: Front 0.5 m)

Monochrome Monitor

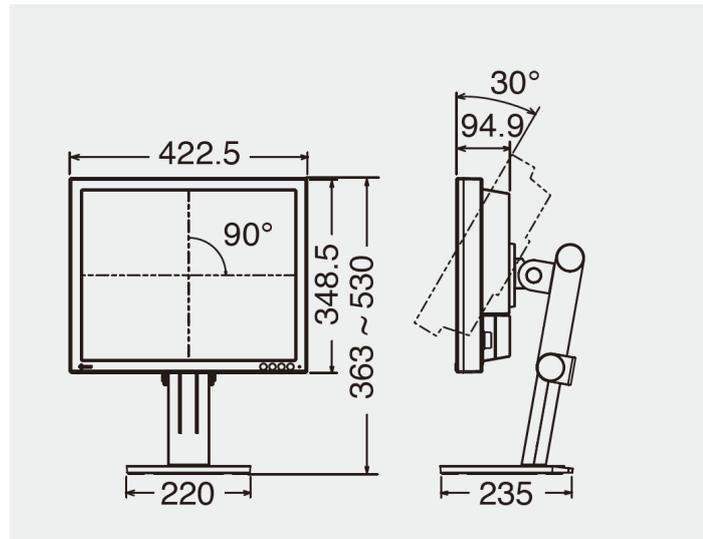


Fig. 1-9

11 kg

(Maintenance Space: Front 0.5 m)

■ Single-phase Transformer

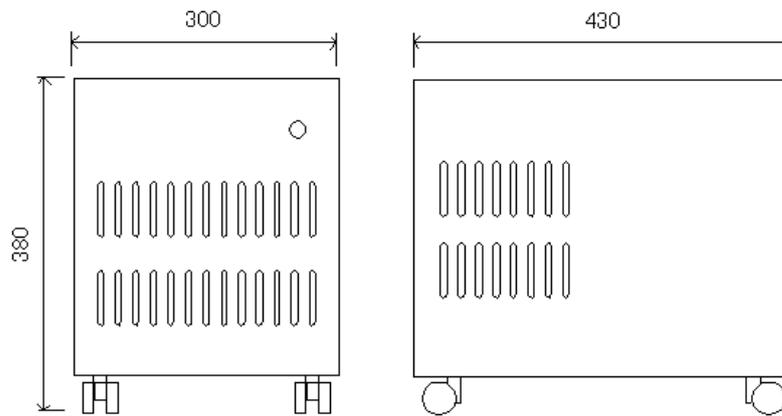


Fig. 1-10

60 kg

(Maintenance Space: Front or Side 0.5 m)

■ PB4

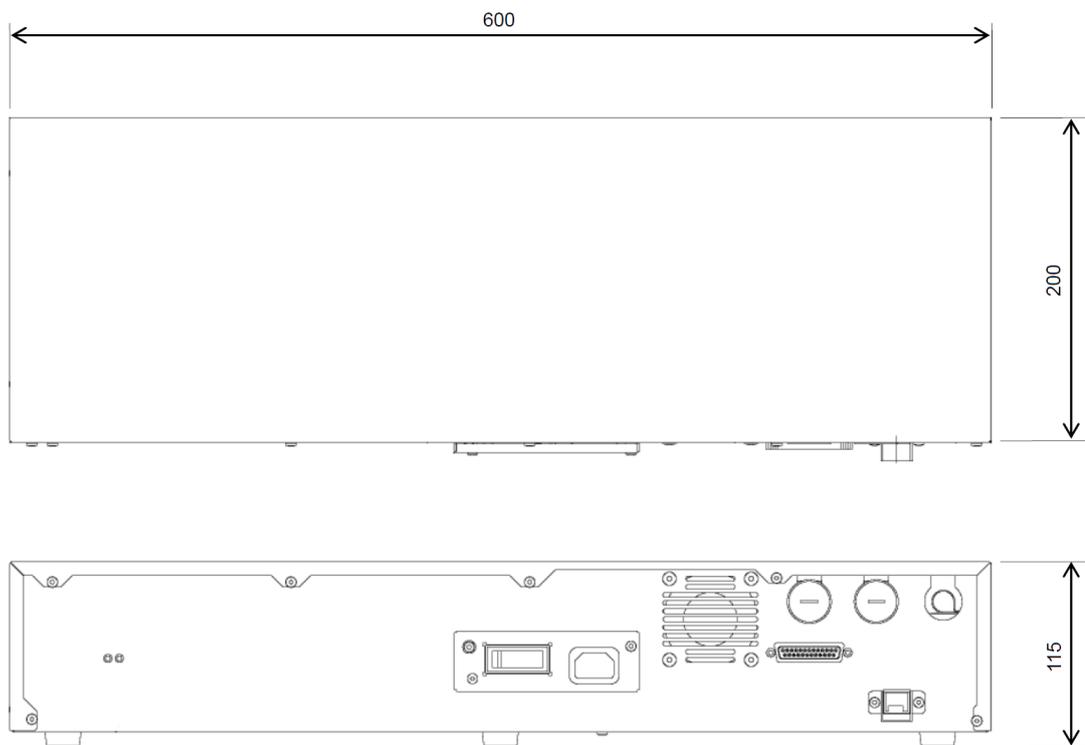


Fig. 1-11

7 kg

(Maintenance Space: Front or Side 0.5 m)

1.2.8 Accessories

■ Desktop Remote Console

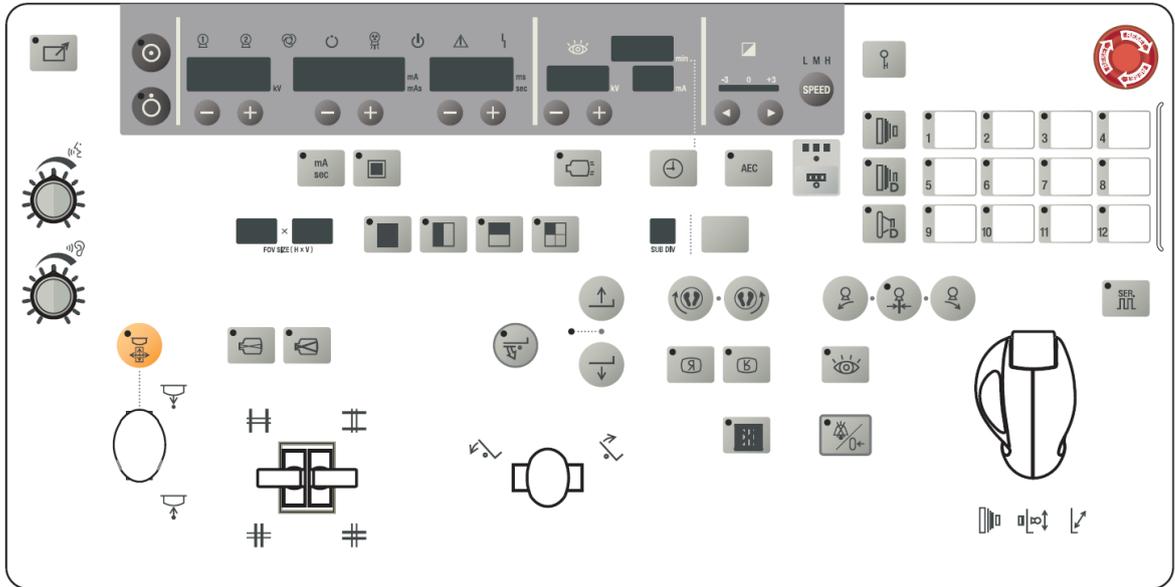


Fig. 1-12

L 314 mm x W 604 mm x H 60 mm

7 kg

(Maintenance Space: Front 0.5 m)

■ Add-on Console

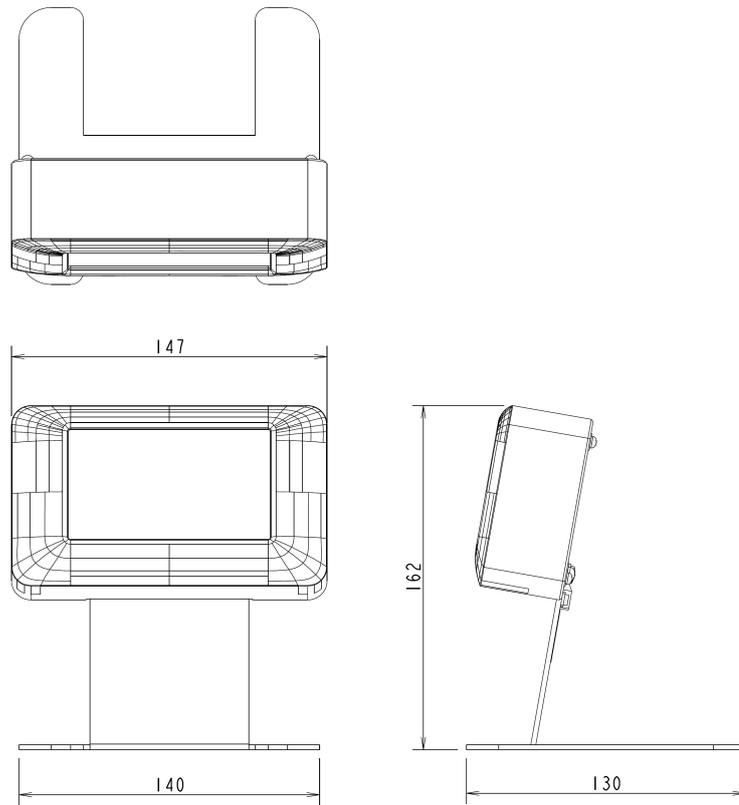


Fig. 1-13

1 kg

(Maintenance Space: Front 0.5 m)

■ Keyboard

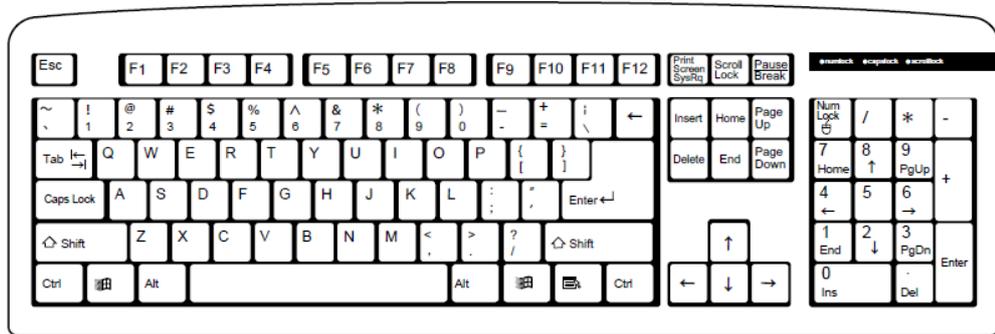


Fig. 1-14

L 150 mm x W 450 mm x H 35 mm

0.5 kg

(Maintenance Space: Front 0.5 m)

■ Operation Room Foot Switch

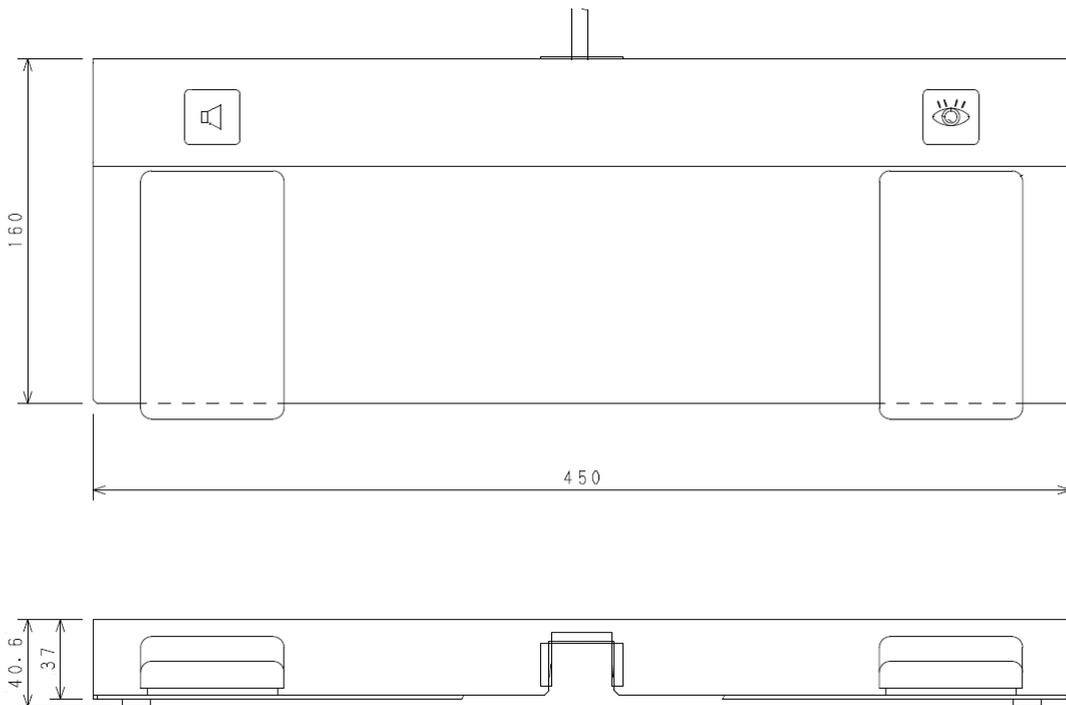


Fig. 1-15

2 kg

(Maintenance Space: Front 0.5 m)

■ LCD Monitor Trolley for Single Monitor

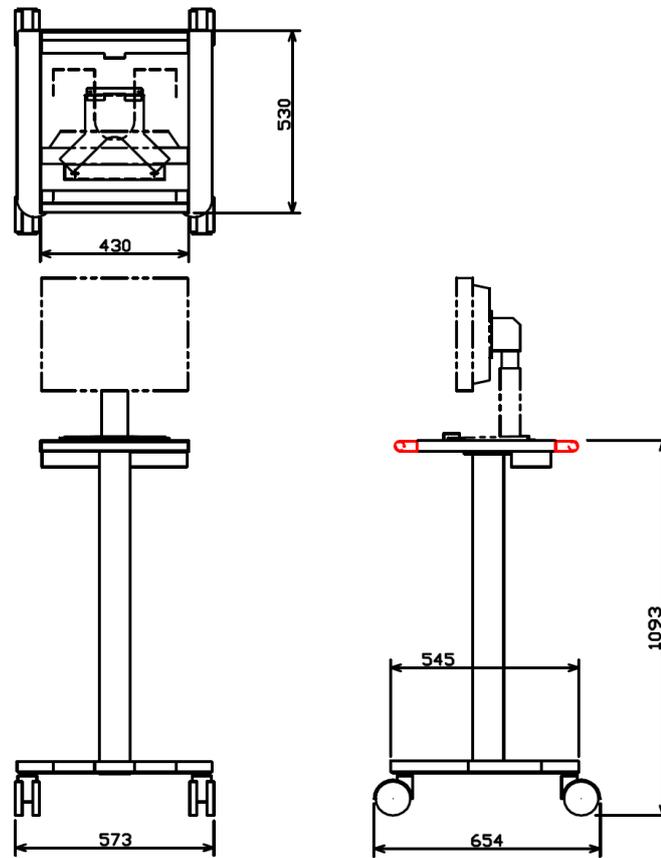


Fig. 1-16

23 kg (without Monitor)
(Maintenance Space: Front 1 m)

for Double Monitor

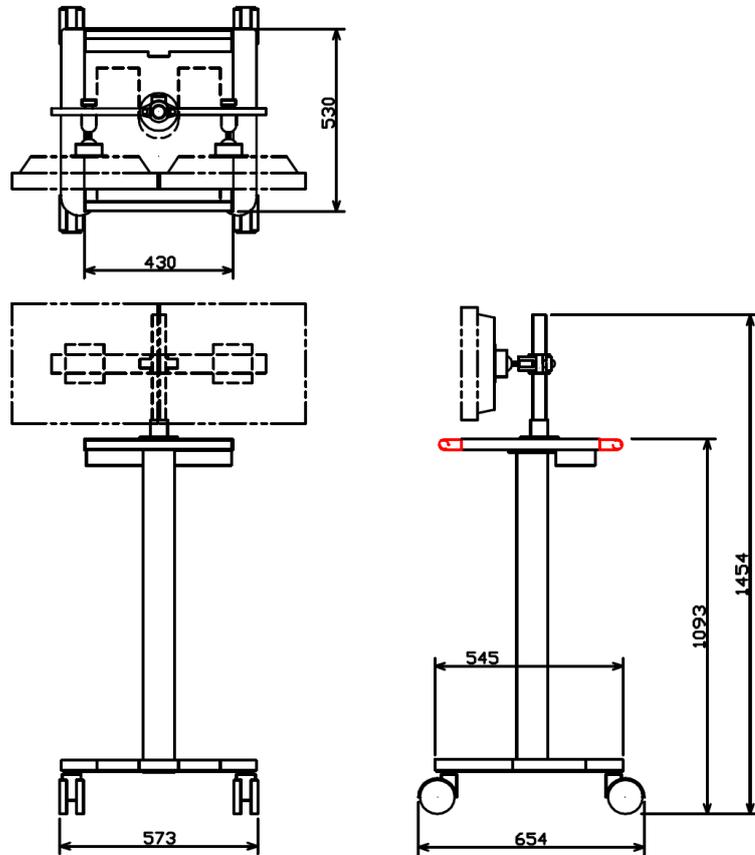


Fig. 1-17

52 kg (without Monitor)
(Maintenance Space: Front 1 m)

■ Proximity Console

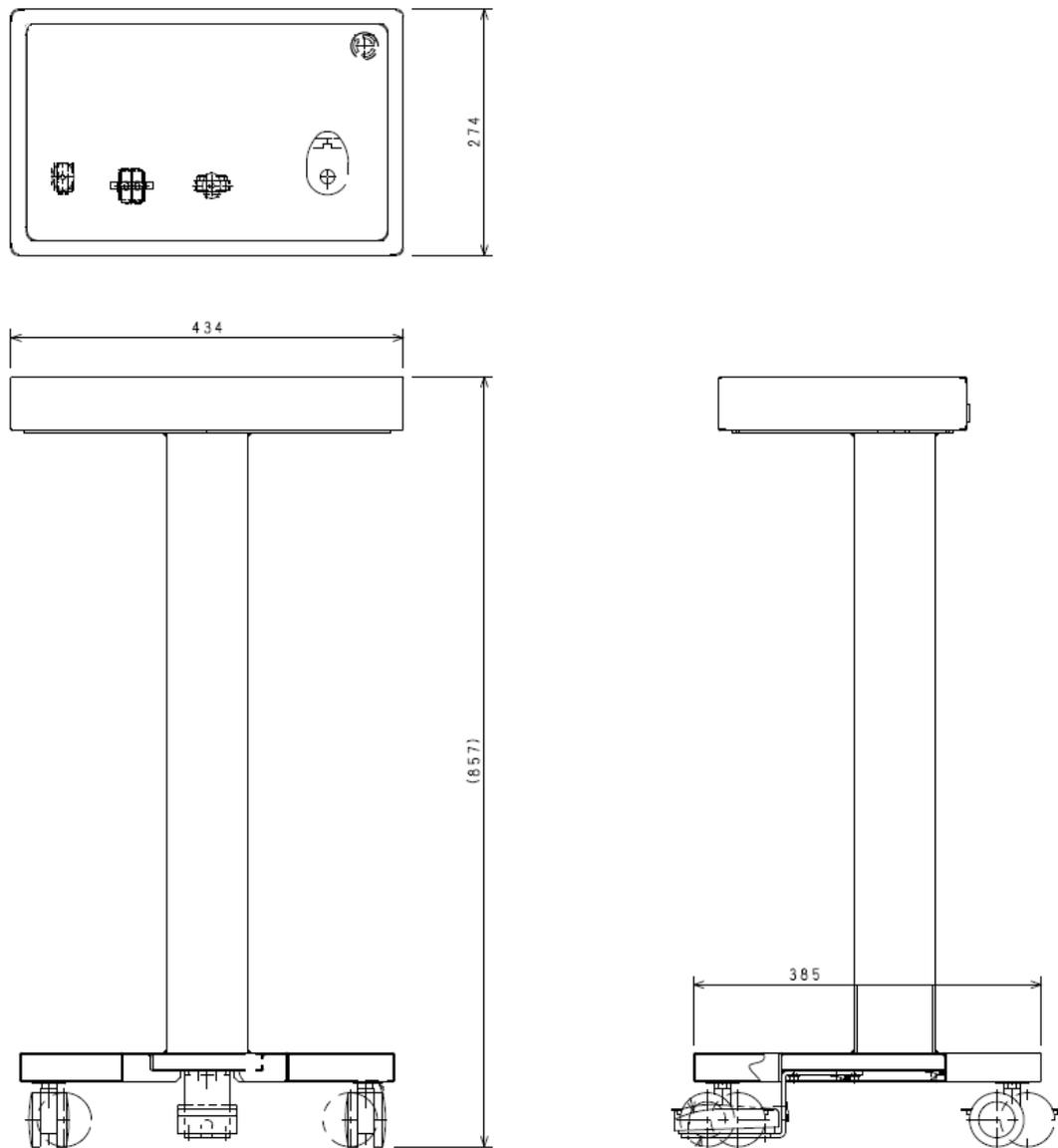


Fig. 1-18

17 kg

(Maintenance Space: Front 1 m)

■ Examination Room Foot Switch

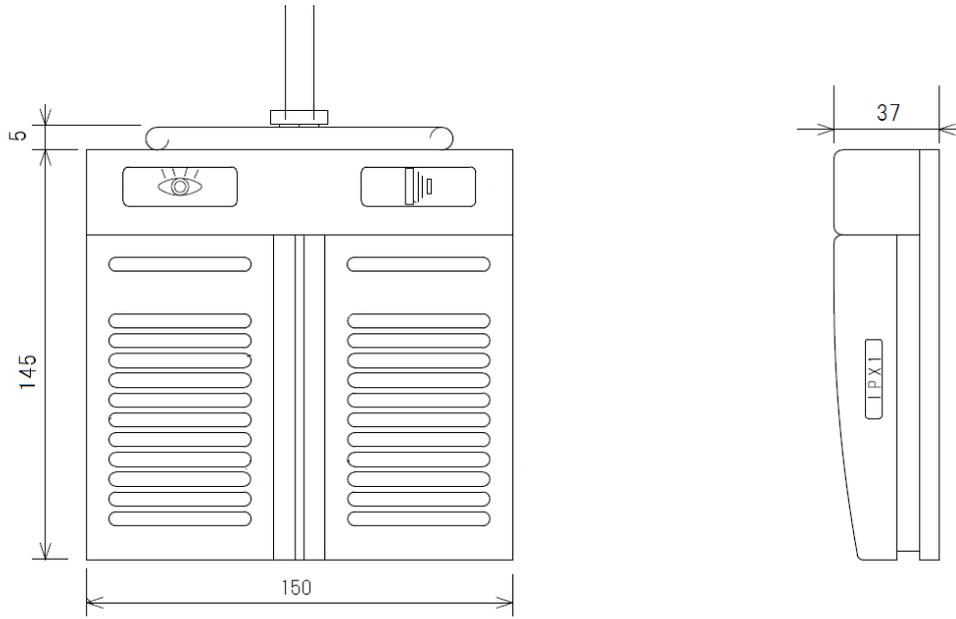


Fig. 1-19

1 kg

(Maintenance Space: Front 0.5 m)

■ Extension Table Top

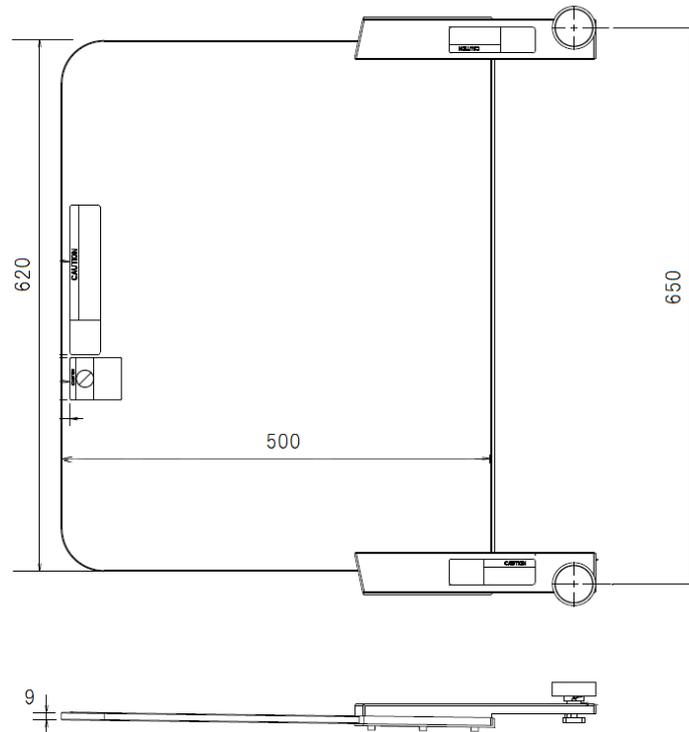


Fig. 1-20

7 kg

■ Table Top Mattress

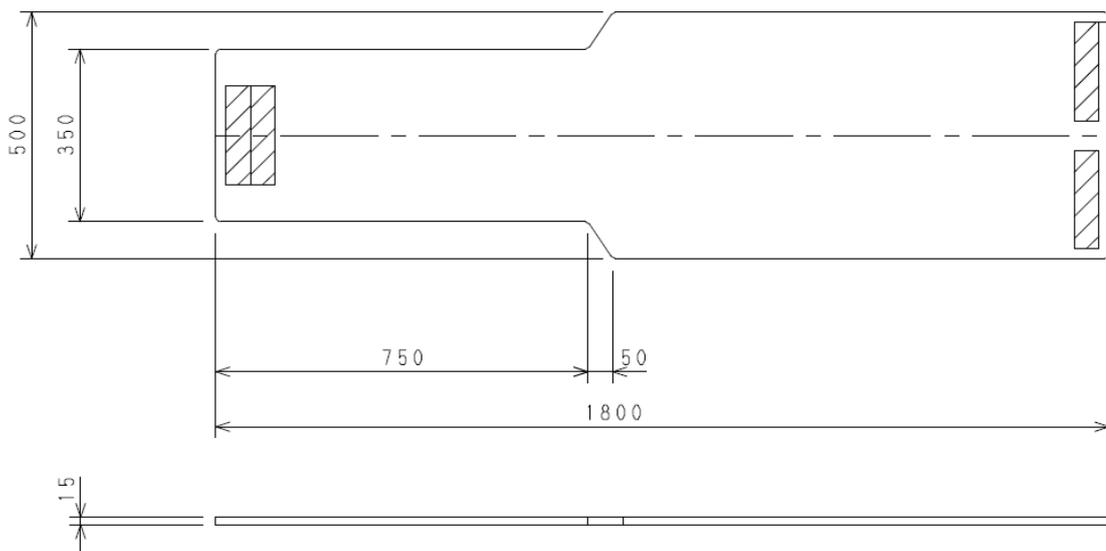


Fig. 1-21

2 kg

■ X-ray Grid Rack

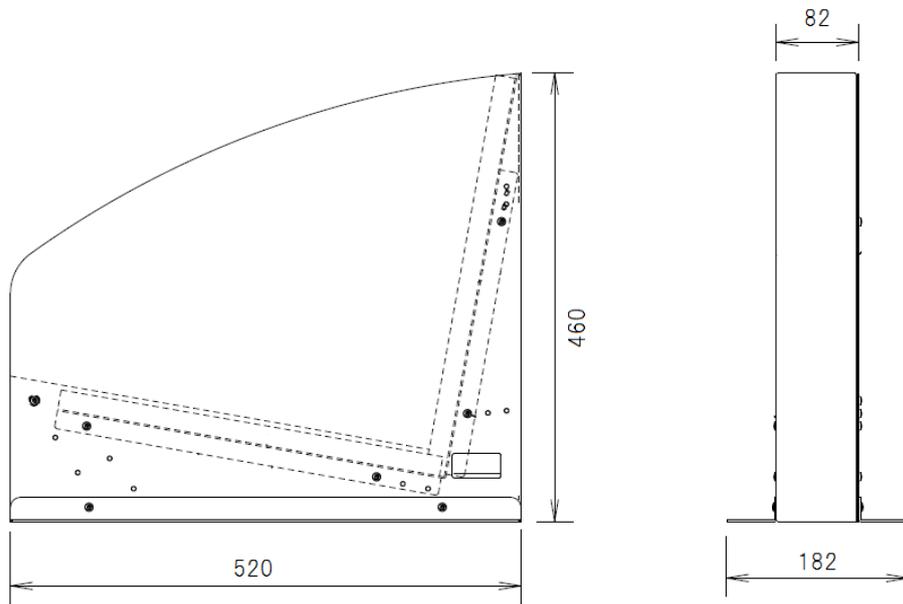


Fig. 1-22

9 kg

1.3 Dimensions and Mass (Packing)

Table 1-2

No.	GEHC Catalog No.	Main Component	Dimensions [m or m ³]				Mass [kg]	Country of Origin
			L	W	H	L x W x H		
1	S13451AA	ZS-5D, 180-degree X-ray Tube Rotation Unit or 90-degree X-ray Tube Swing Unit	2.31	1.21	1.31	3.66	580	JAPAN
	S13451AB							
	S13451AC	ZS-5DS, 180-degree X-ray Tube Rotation Unit or 90-degree X-ray Tube Swing Unit	2.31	1.51	1.11	3.87	680	
	S13451AD							
2	S13451AA	Desktop Remote Console, Column, CXDI-50RF FPD, G292, Ru-300, Foot Step, Inter Phone, Grips, Compression Cone, Shoulder Pad, Instruction Manuals, etc.	2.21	1.61	1.57	5.59	470	JAPAN
3	S13451AB	ZUD-L40, Photo Timer, High-voltage Cables	1.16	1.01	2.02	2.37	400	JAPAN
	S13451AC	ZUD-B40, Photo Timer, High-voltage Cables					410	
4	S13451AD	Image Capture Computer, Extension Board for PB4, Additional Sensor Cable	1.16	1.06	1.00	1.23	180	JAPAN
5	S13451DA	2-pc Color Monitor, Single LCD Monitor Trolley	1.21	0.81	0.85	0.83	70	JAPAN
	S13451EA							
	S13451FA							
	S13451GA							
5	S13451DB	4-pc Color Monitor, Double LCD Monitor Trolley	1.61	1.01	0.97	1.58	140	JAPAN
	S13451EB							
5	S13451FB	2-pc Monochrome Monitor, Single LCD Monitor Trolley	1.21	0.81	0.85	0.83	75	JAPAN
	S13451GB							
5	S13451DC	4-pc Monochrome Monitor, Double LCD Monitor Trolley	1.61	1.01	0.97	1.58	145	JAPAN
	S13451ED							
5	S13451FD	BR-120M (left-hand insert), FPD Tray, Photo Sensor, X-ray Grid	2.31	0.86	0.87	1.73	220	JAPAN
	S13451GD							
6	S13451DE	BR-120M (left-hand insert), FPD Tray, Photo Sensor, X-ray Grid, Additional PB4	2.31	0.86	0.87	1.73	220	JAPAN
	S13451EE							
	S13451FE							
6	S13451FE	BR-120M (right-hand insert), FPD Tray, Photo Sensor, X-ray Grid, Additional PB4	2.31	0.86	0.87	1.73	220	JAPAN
	S13451GE							
	S13451GF							

No.	GEHC Catalog No.	Main Component	Dimensions [m or m ³]				Mass [kg]	Country of Origin
			L	W	H	L x W x H		
7	S13451DS	BR-120M Hand Grip	2.21	1.61	1.57	5.59	470	JAPAN
	S13451DT	Front Handle						
	S13451DV	BR-120M Base Plate						
	S13451DG	Proximity Console						
	S13451DH	Examination Room Foot Switch						
	S13451DJ	X-ray Grid Rack						
	S13451DK	Extension Table Top						
	S13451DL	Compression Band						
	S13451DM	Table Top Mattress						
	S13451DN	HE-100 Rack						
	S13451DP	VacuDAP						
	S13451DR	XAT-2						

2

Laying Out the Room

2.1 Radiation Protection

Because X-ray equipment produces radiation, you may need to take special precautions or make special site modifications. GE Healthcare does not make recommendations regarding radiation protection. It is the purchasers' responsibility to consult a radiation physicist for advisement on radiation protection in X-ray rooms. For example, in Japan the purchasers refer to JESRA TR-0037⁻²⁰¹¹ (<http://www.keikoh-rayprot.co.jp/pdf/x-bogokouji.pdf>).

2.2 Operation Environment

Use this system in the following environmental. The installation of a dedicated air-conditioner is recommended if the building airconditioner cannot maintain the necessary environmental conditions 24 hours a day.

Table 2-1

Item	Condition
Atmosphere	No explosive or corrosive gases
Ambient Temperature	10 to 35 °C
Relative Humidity	30 to 75 % (No condensation)
Atmospheric Pressure	800 to 1060 hPa
Environmental Illuminance	150 to 500 lx
Ambient Noise Level	70 dB max.
Magnetic Interference*1	Severity level 3 A/m

*1 Reference standard is IEC 60601-1-2:2005 and test procedure standard is IEC 61000-4-8:2001.

⚠ WARNING

 **Do NOT use the equipment in an oxygen-rich environment.**
Using the equipment in an oxygen-rich environment may cause fire, which may lead to fatal or serious injuries to the patient or damage to the equipment.

⚠ CAUTION

 **Even under the prescribed conditions, do NOT change the temperature or humidity rapidly.**
Condensation may occur and cause failure. Also, rust or corrosion may occur inside the equipment.

■ Heat Dissipation (Power Consumption)

Table 2-2

Room	Equipment	Standby	In-use
Examination Room	ZS-5D/ ZS-5DS (without CXDI-50RF FPD)	50	540
	ZUD-L40/ZUD-B40	50	900
	HE-100	150	150
	BR-120M (without CXDI-50RF FPD)	1	35
Operation Room	Desktop Remote Console	35	35

Unit: W

2.3 (reference) Transportation and Storage Environment

Table 2-3

Item		Condition
Ambient Temperature	except CXDI-50RF FPD	-10 to 60 °C
	CXDI-50RF FPD	0 to 40 °C
Relative Humidity	except CXDI-50RF FPD	10 to 95 % (No condensation)
	CXDI-50RF FPD	30 to 80 % (No condensation)
Atmospheric Pressure		700 to 1,060 hPa
Ambient Environment		No explosive or corrosive gases

CAUTION



Instruction

Condensation inside the equipment may cause rust formation or corrosion.
Under low ambient temperature, freezing could occur and damage the internal circuit. Exercise care when storing the equipment in a place with sharp changes in temperature and humidity, such as a warehouse.

2.4 Power Supply

DANGER



Instruction

Be sure to use the power supply specified in the operation manual.

Using a power supply other than the one specified may cause equipment malfunction or serious accidents such as fire, smoke emission, or explosions.

WARNING



Instruction

Be sure to connect the equipment only to a (commercial) power outlet with a ground terminal.

If the outlet does not have a ground terminal, electric shock may occur.

NOTE

- When installing an earth leakage breaker with any power voltage, be sure to use an inverter-type earth leakage breaker to prevent malfunctions in the high-frequency circuits.
- Open the wiring circuit breaker or knife switch of the switchboard that the equipment is connected to before removing the equipment from the power supply.
- Be sure that the distribution board itself is securely grounded (100 Ω max.).

This system requires three power supply below.

2.4.1 Power Supply 1 (for ZUD-L40/ZUD-B40)

■ ZUD-L40

Table 2-4

Item	Detail	
Nominal Voltage	200/220/240 VAC, 3 Phase* ¹	380/400/415/440 VAC, 3 Phase
Allowable Voltage Range (at no load)	Nominal Voltage \pm 10 %	
Frequency	50/60 Hz	
Allowable Frequency Range (at no load)	Frequency \pm 0.5 Hz	
Maximum Momentary Load	80 kVA	
Power-supply Impedance	0.087 Ω max.	0.21 Ω max.
Grounding Resistance	100 Ω max.	10 Ω max.
Rated Current of Fuse or Breaker	100 A	50 A

*1 When using 3-phase 200 VAC line, XAT-2 is required.

■ ZUD-B40

Table 2-5

Item	Detail	
Nominal Voltage	200/220/240 VAC, 3 Phase* ¹	380/400/415/440 VAC, 3 Phase
Allowable Voltage Range (at no load)	Nominal Voltage \pm 10 %	
Frequency	50/60 Hz	
Allowable Frequency Range (at no load)	Frequency \pm 0.5 Hz	
Maximum Momentary Load	130 kVA	
Power-supply Impedance	0.054 Ω max.	0.13 Ω max.
Grounding Resistance	100 Ω max.	10 Ω max.
Rated Current of Fuse or Breaker	100 A	75 A

*1 When using 3-phase 200 VAC line, XAT-2 is required.

2.4.2 Power Supply 2 (for SA-60)

Table 2-6

Item	Detail
Nominal Voltage	200/208/220/230/240 VAC, Single Phase
Allowable Voltage Range (at no load)	Nominal Voltage \pm 10 %
Frequency	50/60 Hz
Allowable Frequency Range (at no load)	Frequency \pm 0.5 Hz
Electric Capacity	7.5 kVA
Grounding Resistance	100 Ω max.
Breaker	20 A ^{*1}

*1 Rush current is 300 A peak at power on.

2.4.3 Power Supply 3 (for SDR-150C)

Table 2-7

Item	Detail
Nominal Voltage	200/220/240 VAC, Single Phase
Allowable Voltage Range (at no load)	Nominal Voltage \pm 10 %
Frequency	50/60 Hz
Allowable Frequency Range (at no load)	Frequency \pm 0.5 Hz
Electric Capacity	3 kVA
Grounding Resistance	100 Ω max.
Breaker	20 A ^{*2}

*2 Rush current is 400 A peak at power on.

2.4.4 Example of Distribution Board

■ 3-phase 200 VAC line

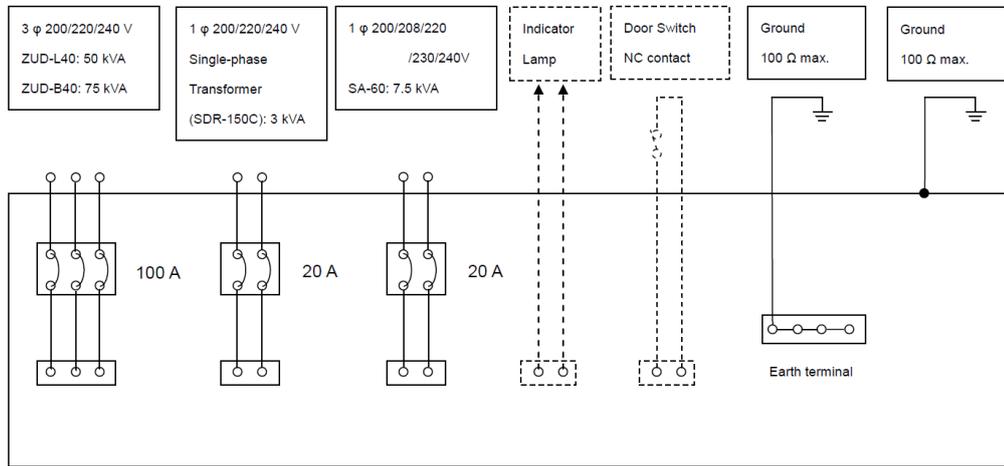


Fig. 2-1

■ 3-phase 400 VAC line

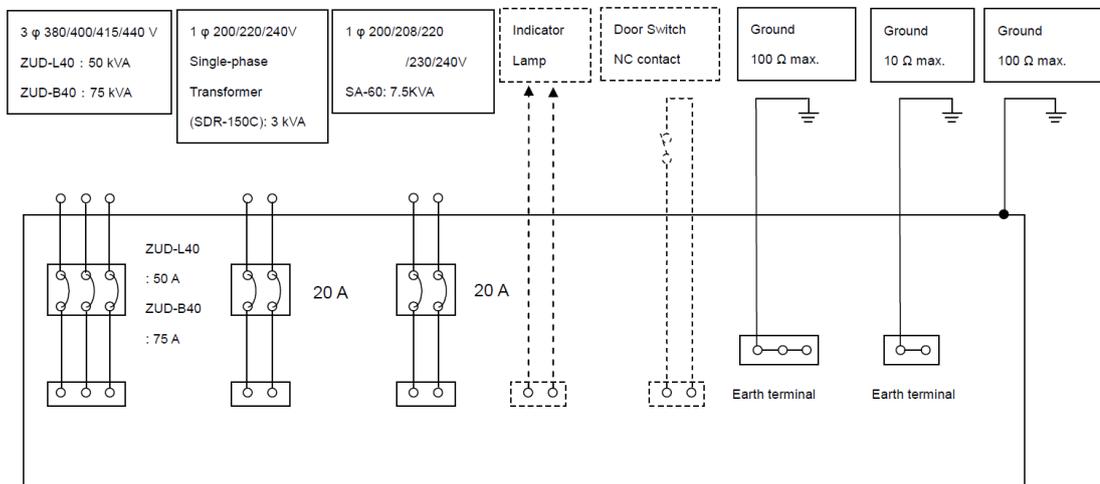
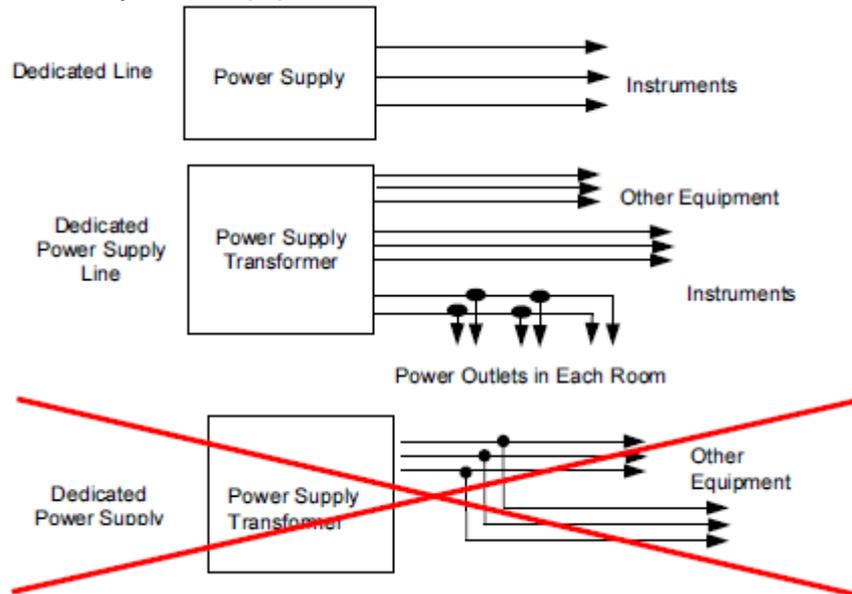


Fig. 2-2

NOTE

- Ideally, provide an independent power supply transformer. If that is not possible, provide a dedicated line from the power transformer to the instrument distribution board (This is to prevent voltage fluctuations or noise caused by other equipment).



- Use conduit from the distribution board to the pit.
- Use a ground fault interrupt breaker designed for inverters.

2.5 Pit

This system requires a utility pit which is 200 mm wide by 150 mm deep.

! CAUTION



Prohibition

Do Not provide a pit under diagnostic table or radiography stand.

2.6 Examination Room

The examination room needs to fulfill the following conditions. An unsatisfactory floor strength or incorrect installation leads to vibrations, which results in obtaining images of a lower diagnostic performance.

Table 2-8

Item		Condition	
Floor Area (Length x Width) ^{*1}		2,400 mm x 4,000 mm min. ^{*2} / 2,400 mm x 5,550 mm min. ^{*3} / 3,050 mm x 4,000 mm min. ^{*4}	
Ceiling Height		2,600 mm min.	
Strength ^{*5,*6}	Unit Load to Floor	ZS-5D	12.2 kN/m ²
		ZS-5DS	23.1 kN/m ²
		BR-120M	11.4 kN/m ²
	Wall (C 20/25 $f_{ck,cube}$)	25 N/mm ²	

*1 Also refer to "4.1 Minimum Examination Room".

*2 without option

*3 with 180-degree X-ray tube rotation unit and BR-120M

*4 with 90-degree X-ray tube swing unit and BR-120M

*5 If the strength is less than this value, a floor/wall reinforcing work is required.

*6 Also refer to "3.2 Securing the Equipment".

■ Indicator Lamps

Install "X-Rays ON" warning lamps (100 VAC) at the entrances/exits to the examination room (once facing toward the hallway and one toward the Operation room). Run the wiring to the pit and provide adequate length in the pit to connect the wiring to ZUD-L40/ZUD-B40.

Use a minimum 0.75 mm² double core wire. Provide power from a different source than for instruments. Using the power supply from other units can cause problems.

2.7 Operation Room

Primarily the following units are installed in the examination room.

- Desk
- Image Capture Computer
- LCD Monitor (Single/Double)
- Single-phase Transformer
- Desktop Remote Console
- Add-on Console
- Keyboard
- Operation Room Foot Switch

Table 2-9

Item	Condition
Floor Area (Length x Width)	about 1,500 mm x 2,000 mm ^{*1}
Ceiling Height	about 2,200 mm

*1 2,000 mm is a value except a door to the examination room.

3 Laying Out the Equipment

3.1 Carrying in

Table 3-1

Item		Condition	
		ZS-5D	ZS-5DS
Door Opening	Width x Height	1,100 mm x 1,800 mm	1,350 mm x 1,800 mm
Corridor	Width x Height	1,350 mm x 1,800 mm	1,400 mm x 1,800 mm
Elevator	Length x Width x Height* ¹	2,200 mm x 1,100 mm x 1,800 mm	2,200 mm x 1,350 mm x 1,800 mm
	Loading Capacity	700 kg	800 kg

*1 when carrying in the diagnostic table in a straight line

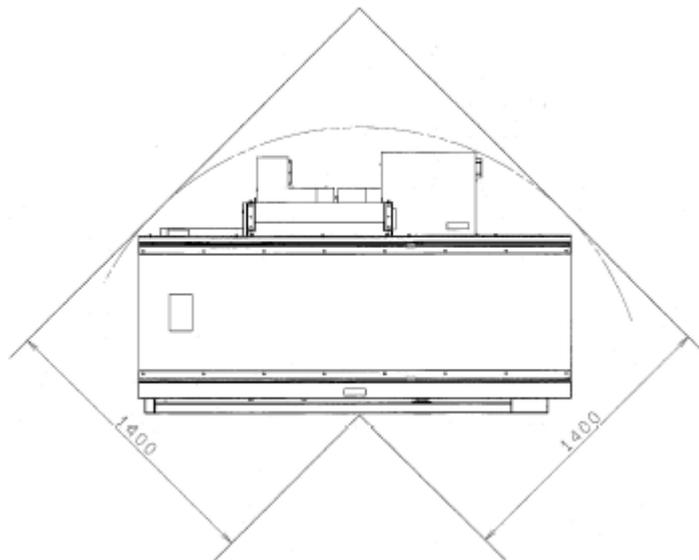


Fig. 3-1 Corridor Width (ZS-5DS)

3.2 Securing the Equipment

3.2.1 ZS-5D and BR-120M

Table 3-2

Item		Condition	
		ZS-5D	BR-120M
Floor Strength	Operation/Maintenance Load	6.13 kN (625 kgf)	1.37 kN (140 kgf)
	Actual Load*1	7.66 kN	1.72 kN
	Floor Occupation Area	0.63 m ²	0.15 m ²
	Unit Load*2	12.2 kN/m ²	11.4 kN/m ²
Base Material Thickness		180 mm min.	100 mm min.
Anchor Size		M12	M10

*1 Actual Load = Operation/Maintenance Load x 1.25. The actual load includes a vibration factor of the equipment.

*2 If the strength is less than this value, a floor reinforcing work is required.

CAUTION



Prohibition

Do Not provide a pit under diagnostic table or radiography stand.

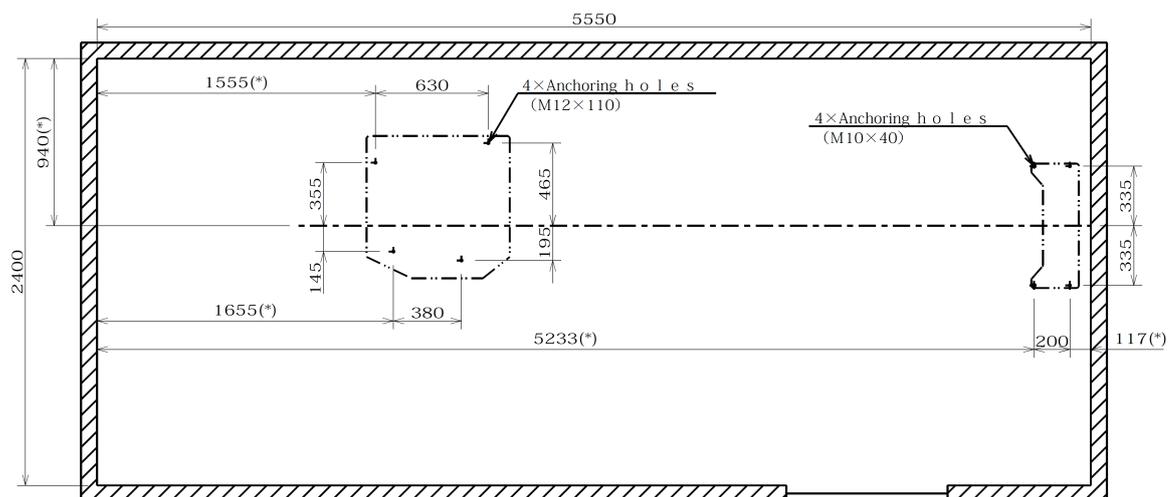


Fig. 3-2 180-degree X-ray tube rotation unit

3 Laying Out the Equipment

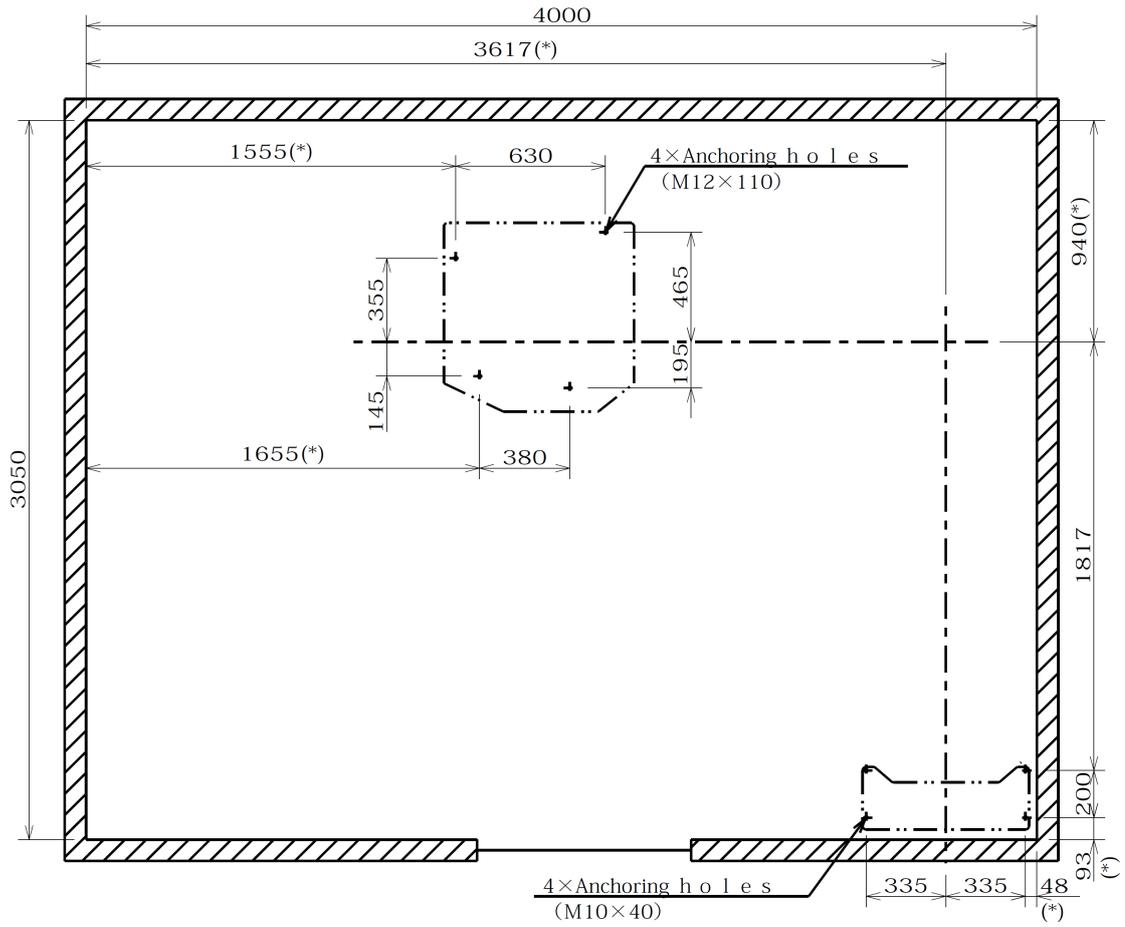


Fig. 3-3 90-degree X-ray tube swing unit

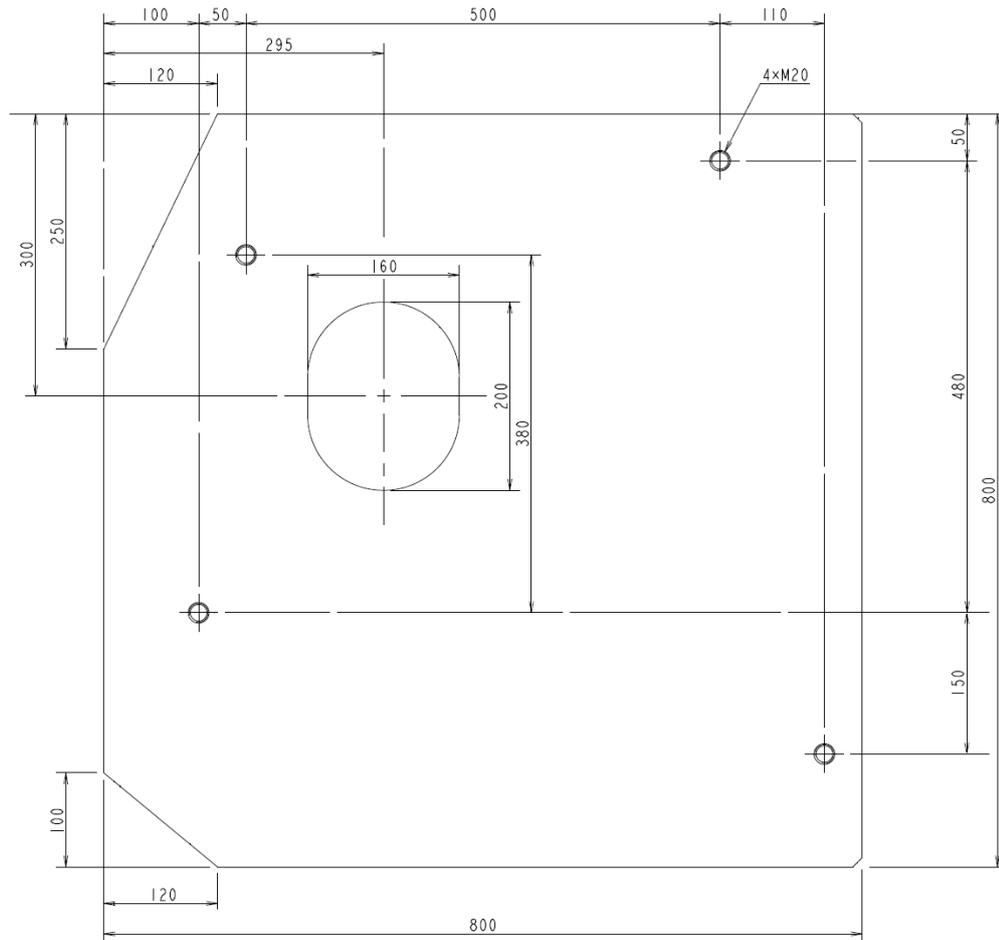


Fig. 3-4

■ Seismic Anchorage Calculation for ZS-5D

Table 3-3

Item	Detail	
	X-axis	Z-axis
Hight of the Center of Gravity	618.4 mm	
Tensile Strength of an Anchor	17,400 N	
Shear Strength of an Anchor	12,400 N	
Standard Seismic Force	Horizontal	3,675 N
	Vertical	1,838 N
Calculated Tensile Force for an Anchor	1,720 N	2,295 N
Calculated Shear Force for an Anchor	919 N	919 N
Margin of Safety Ratio	0.015	0.023
Pass or Fail	Pass	Pass

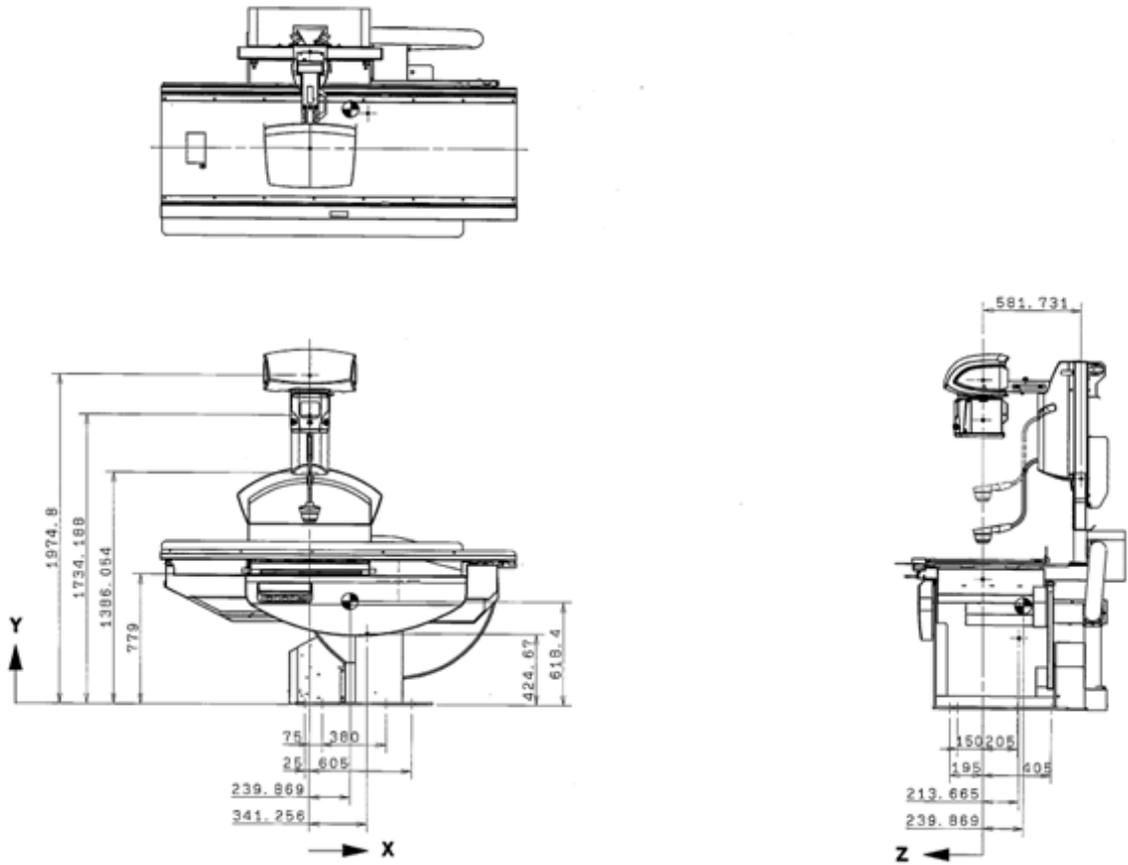


Fig. 3-5

3.2.2 ZS-5DS and BR-120M

Table 3-4

Item		Condition	
		ZS-5DS	BR-120M
Floor Strength	Operation/Maintenance Load	7.40 kN (755 kgf)	1.37 kN (140 kgf)
	Actual Load*1	9.26 kN	1.72 kN
	Floor Occupation Area	0.40 m ²	0.15 m ²
	Unit Load*2	23.1 kN/m ²	11.4 kN/m ²
Base Material Thickness		180 mm min.	100 mm min.
Anchor Size		M12	M10

*1 Actual Load = Operation/Maintenance Load x 1.25. The actual load includes a vibration factor of the equipment.

*2 If the strength is less than this value, a floor reinforcing work is required.

⚠ CAUTION



Prohibition

Do Not provide a pit under diagnostic table or radiography stand.

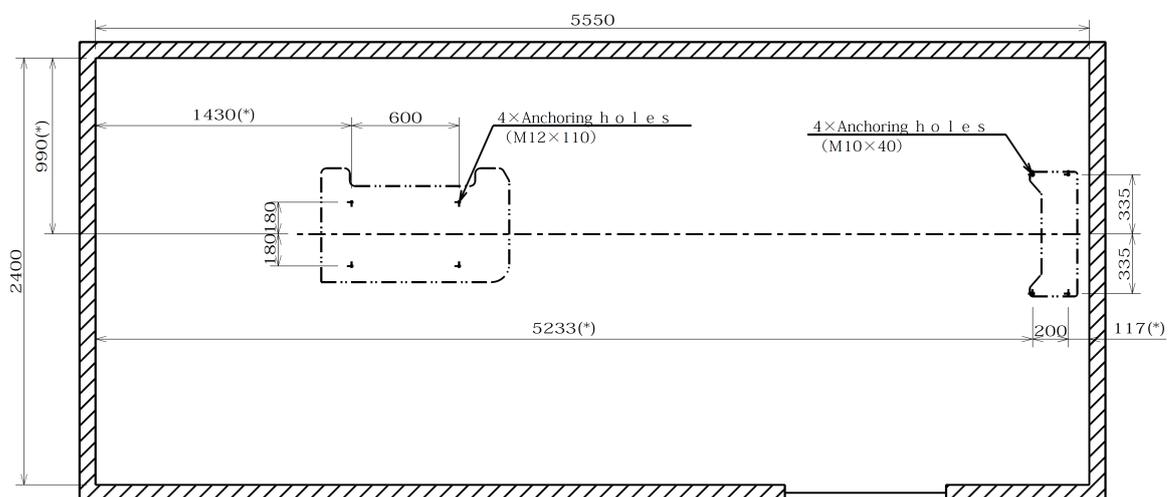


Fig. 3-6 180-degree X-ray tube rotation unit

3 Laying Out the Equipment

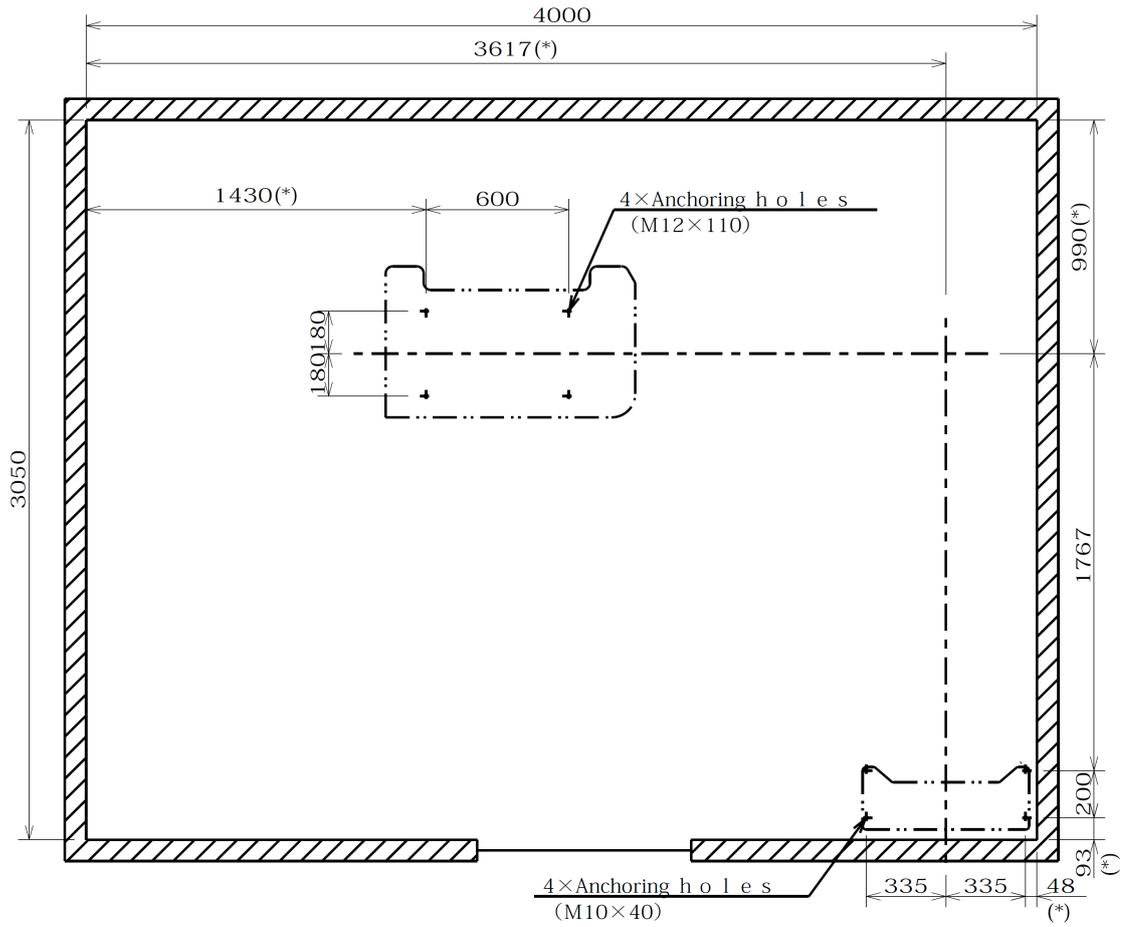


Fig. 3-7 90-degree X-ray tube swing unit

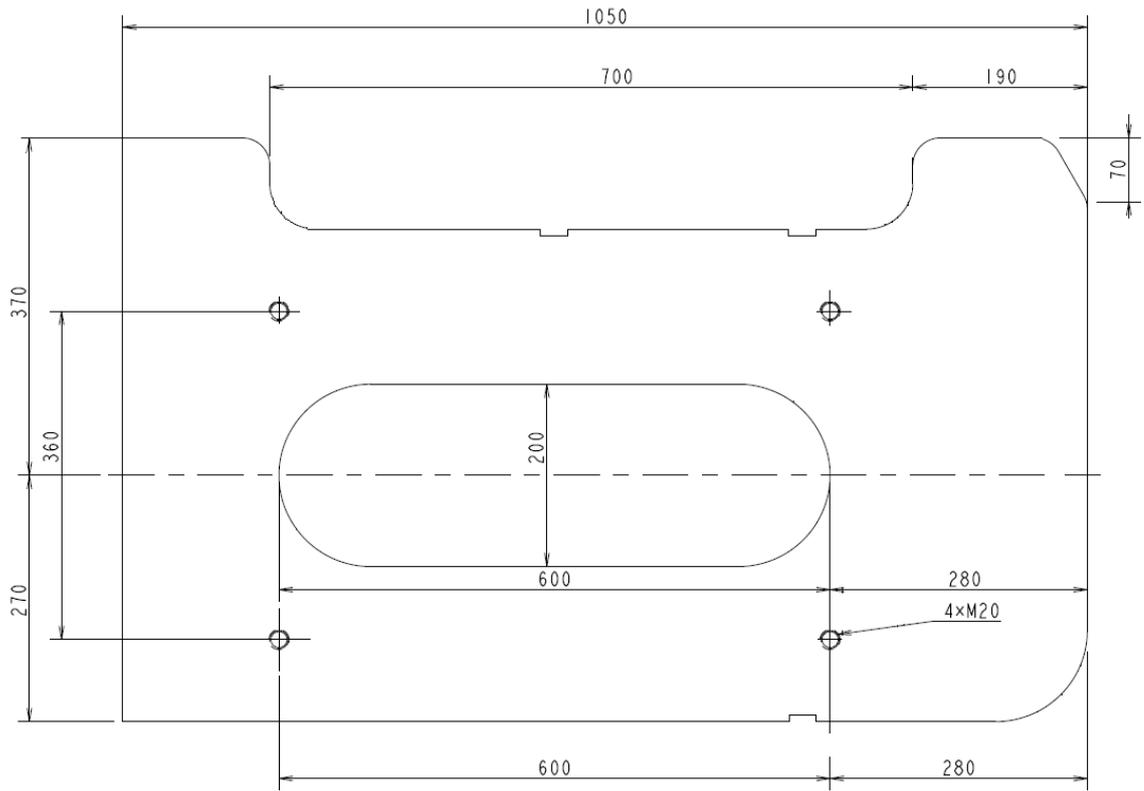


Fig. 3-8

■ Seismic Anchorage Calculation for ZS-5DS

Table 3-5

Item	Detail	
	X-axis	Z-axis
Hight of the Center of Gravity	743.4 mm	
Tensile Strength of an Anchor	17,400 N	
Shear Strength of an Anchor	12,400 N	
Standard Seismic Force	Horizontal	4,439 N
	Vertical	2,220 N
Calculated Tensile Force for an Anchor	2,448 N	2,448 N
Calculated Shear Force for an Anchor	1,110 N	1,110 N
Margin of Safety Ratio	0.028	0.028
Pass or Fail	Pass	Pass

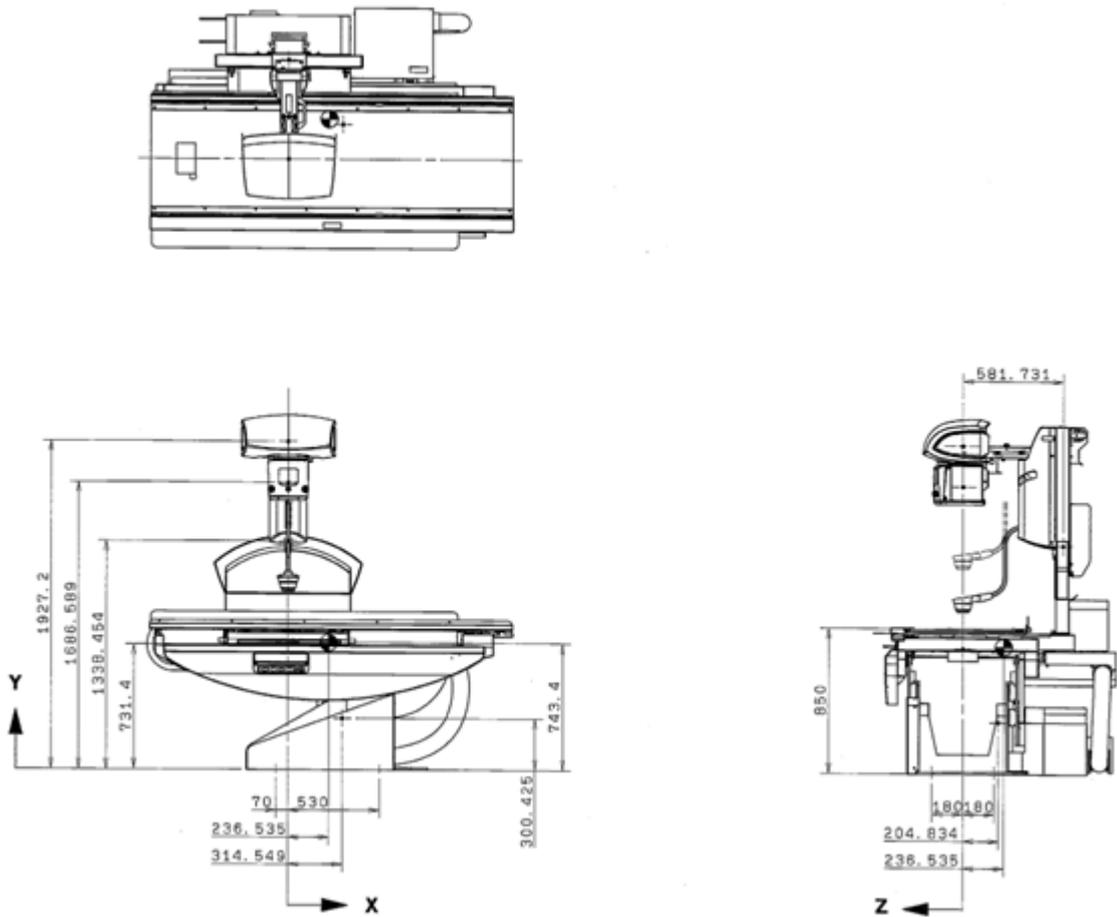


Fig. 3-9

3.2.3 ZUD-L40/ZUD-B40

Table 3-6

Item	Condition
Base Material* ¹ Thickness	120 mm min.
Anchor Size	M10

*1 Use Non cracked concrete C 20/25 $f_{ck,cube} = 25 \text{ N/mm}^2$.

■ Seismic Anchorage Calculation

Table 3-7

Item	Detail	
	X-axis	Z-axis
Hight of the Center of Gravity	665 mm	
Tensile Strength of an Anchor	11,760 N	6,920 N
Shear Strength of an Anchor	7,920 N	4,440 N
Standard Seismic Force	Horizontal	1,588 N
	Vertical	794 N
Calculated Tensile Force for an Anchor	794 N	794 N
Calculated Shear Force for an Anchor	794 N	794 N
Margin of Safety Ratio	0.015	0.045
Pass or Fail	Pass	Pass

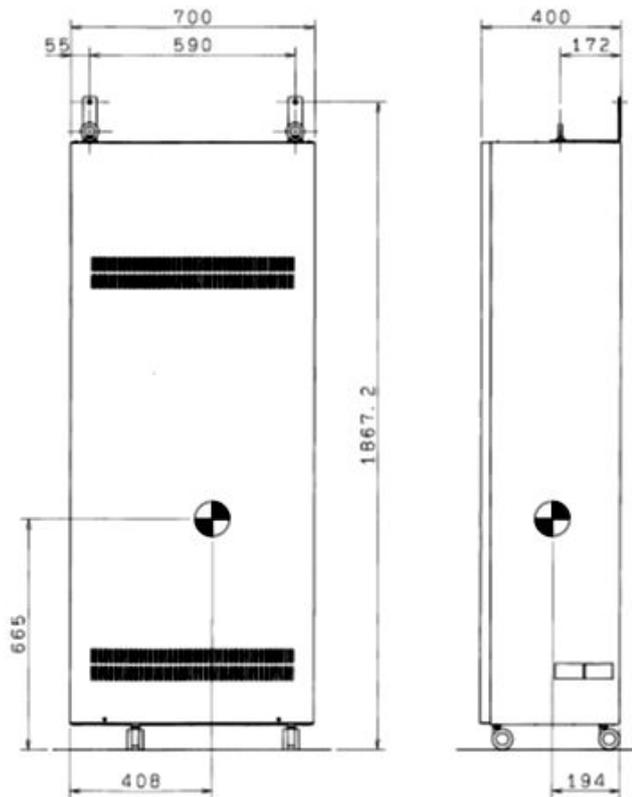


Fig. 3-10

3.3 Maximum Cables Length between Each Equipment

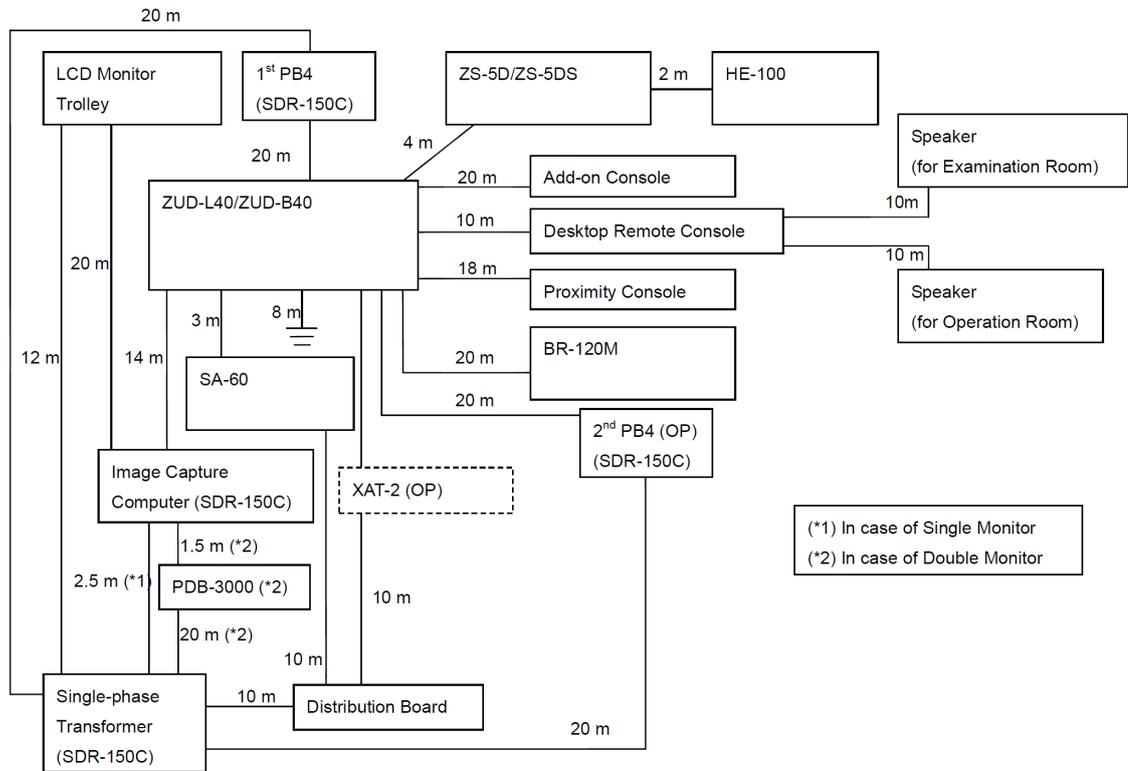


Fig. 3-11

4 Example of Installation

4.1 Minimum Examination Room

Table 4-1

Case	Option	Floor Area (Length x Width)	Ref
I	without option	2,400 mm x 4,000 mm	P.45
II	with 180-degree X-ray tube rotation unit and BR-120M	2,400 mm x 5,550 mm	P.46
III	with 90-degree X-ray tube swing unit and BR-120M	3,050 mm x 4,000 mm	P.47

4.1.1 Case I (without option)

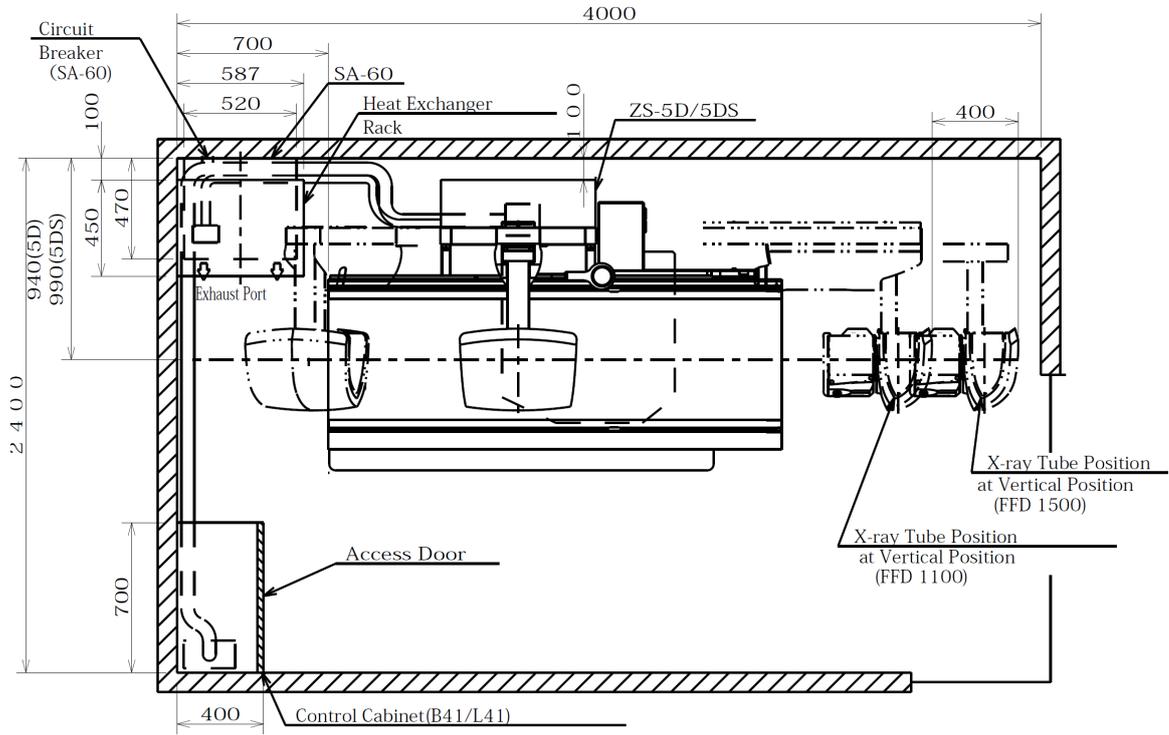


Fig. 4-1

! WARNING



Instruction

Leave at least 100 mm between the rear of the diagnostic table and the wall.



NOTE • SID 1,500 mm is used in calibration.

4.1.2 Case II (with 180-degree X-ray tube rotation unit and BR-120M)

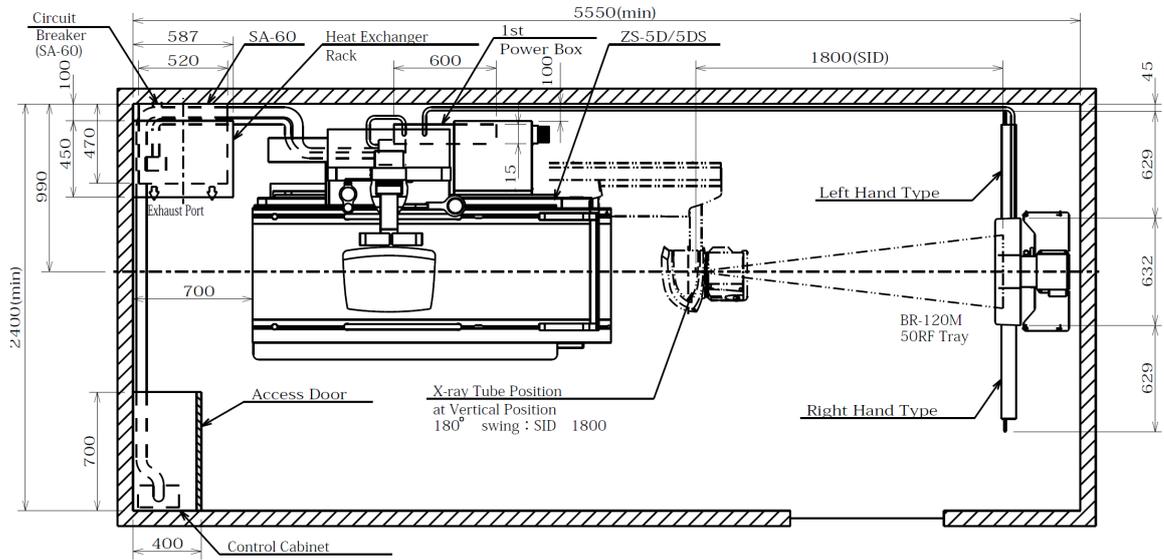


Fig. 4-2

WARNING



Instruction

Leave at least 100 mm between the rear of the diagnostic table and the wall.

4.1.3 Case III (with 90-degree X-ray tube swing unit and BR-120M)

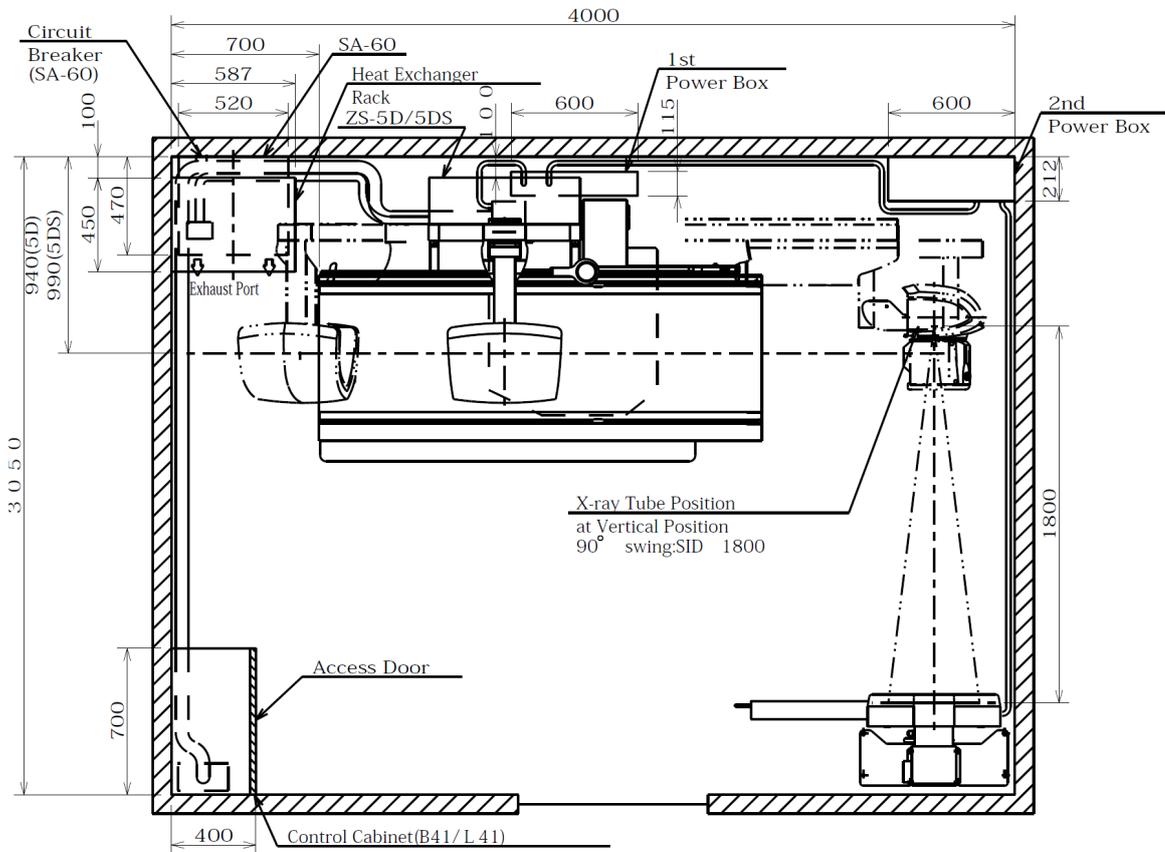


Fig. 4-3

! WARNING



Instruction

Leave at least 100 mm between the rear of the diagnostic table and the wall.

4.2 Operation Room

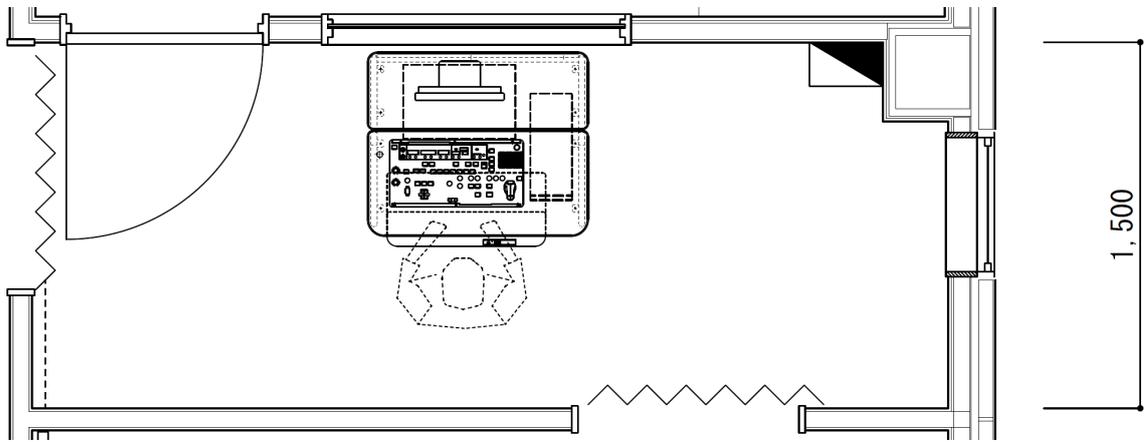


Fig. 4-4

5

Installation Schedule

5.1 Standard Installation Schedule

Table 5-1 shows a typical schedule, starting at delivery of instruments to when the customer starts using the system.

Table 5-1

Item	Days					
		1	2	3	4	5
0. Initial Survey Inspection and Consultation	■					
1. Delivery of Equipment		■				
2. Installation			■	■		
3. Adjustment				■	■	■
4. Explanation of System Operation						■

5.2 Site Readiness Checklist

The following is a summary list of points to consider for each room or important topic when planning the installation. Use it as a checklist.

Table 5-2

1. Examination Room		
Description	Y/N	Ref
Is there adequate access space for delivering equipment?		3.1
Has access path for delivering equipment been confirmed? (In particular, stairway dimensions and elevator weight limits if site is not on first floor.)		3.1
Is floor/wall strength adequate?		2.6 3.2
Will floor material allow securing the diagnostic table to the floor with anchor bolts?		3.2
Is there adequate space around the diagnostic table? (for transporting patients on gurneys, for storage of pharmaceuticals and apparatus and so on)		2.6 4.1
Are there any lighting fixtures or other obstructions on the ceiling that could interfere with the diagnostic table movement range?		2.6
Is space allowed for IV rails, shelves, oxygen, and routing vacuum lines or other medical lines?		---
Are X-ray protection measures adequate?		2.1
Do temperature and humidity satisfy specified conditions?		2.2
Are indicator lamps and wiring OK?		2.6
Is the door open/close confirmation switch OK?		---
2. Operation Room		
Description	Y/N	Ref
Is there adequate space around the image capture computer and desktop remote console?		2.7
Is patient observation window of adequate size and height?		---
Is the door open/close confirmation switch OK?		---
Is distribution board installed in appropriate location? (Does height or location of other equipment make it difficult to operate?)		---
Is wiring installed between distribution board and pit?		---

3. Issues Applicable to All Rooms

Description	Y/N	Ref
Is the pit size and conduit routing OK?		2.5
Is adequate HVAC system provided?		2.2
Is distance between each equipment OK?		3.3

4. Power Supply Issues

Description	Y/N	Ref
Does power supply satisfy specified requirements for type, voltage, and frequency?		2.4
Is wiring leading to distribution board of adequate gauge?		2.4.1
Do circuit breakers have adequate capacity?		2.4.1 2.4.2 2.4.3
Is an independent power supply transformer provided? Is a dedicated supply line provided? (Is any other equipment or HVAC system connected to the same line?)		2.4.4
Are instruments grounded via dedicated grounding wires, which have a ground resistance not exceeding 10 Ω or 100 Ω ?		2.4
Are grounding wires adequately thick?		---

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