

 SHIMADZU

PRODUCT DATA

Remote-Controlled R/F system

FLEXAVISION

F4 package



GENERAL

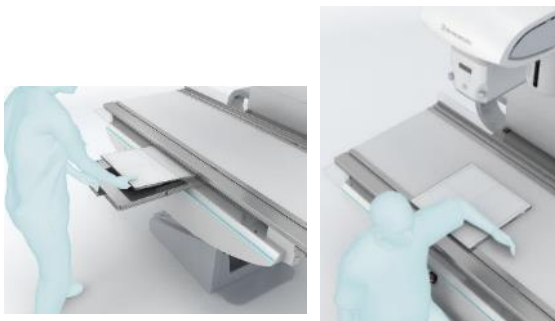
FLEXAVISION F4 package is equipped with a portable 17"x17" wireless FPD to fits all your needs.

FLEXAVISION F4 package provides further evolution of its flexibility in fluoroscopic examination, with extensive possibilities in general radiography using a large field of view, wireless FPD.

FEATURES

- (1) Flexibility to configure an examination room tailored to your needs;
FLEXAVISION F4 provides further evolution of its flexibility to meet your needs. By using the portable FPD and combining a ceiling-mounted X-ray tube, and a bucky stand, and a 2nd FPD*, it can also serve as a general radiography room, improving the operation rate of the system/room.

Pattern 1 – “Single-panel solution with table top exam”;
The lightweight, portable, 17x17 inch main FPD provides flexibility from fluoroscopy being inside the table to wireless radiography outside the table*.



Pattern 2 – “Single -panel solution with bucky stand”;
Just by combining bucky stand, chest radiography can be performed easily and effectively.
By rotating the X-ray tube 180 degree* or swinging out 37/ 90 degree*, a bucky stand can be arranged flexibly according to the layout of your room. You can use the main portable FPD or a second FPD, as needed.



Pattern 3 - “Single or dual panel solution with 2nd X-ray tube support”;
By combining a ceiling-mounted X-ray tube support, clinical performance of the room can be expanded from R/F examinations to a wide range of general radiography.



- (2) A Wide Range of Exams with a Large field FPD;
An FPD with a large 17 × 17-inch field of view allows the observation of a large area, especially for large patients. This increases examination efficiency and reduces the burden on patients and healthcare workers. Once the portable FPD is removed from the table, general radiography can be performed by wireless, this provides more efficient utilization of the examination room.

Oblique projection;
Oblique projection by tilting the X-ray tube at a maximum 30° allows for effective GI, orthopedics, and other examinations.



Chest radiography;
Chest radiography is possible with the table vertical and X-ray tube unit extended to 1.5 m SID.

Stretcher patient;
90 degrees X-ray tube rotation* allows studies to be performed on a stretcher patient.



- (3) The Compact Design Maximizes Your Working Space;
The main unit has a compact design with a single control cabinet despite its large field of view FPD. Even if examination equipment is arranged around F4 table, the compact design of F4 allows the room to be used widely and effectively, enabling smooth entry of wheelchairs and stretchers.
- (4) High Quality Digital Imaging;
FLEXAVISION F4 with high quality FPD provides clear images with little delay even at low frame rates. High-Resolution fluoroscopy is available, allowing clear and detailed observation of the region of interest.

FEATURES (cont.)

- (5) Low Dose Solution
Removable Grid;
A grid can be mount or removed to suit radiography examination. The grid can easily be removed in pediatric, obstetrics, and gynecological examinations that require to keep radiation dose to the patient a minimum.



BH Filters Switch to Suit the Examination;
Three beam hardening (BH) filters are provided as standard to efficiently remove unnecessary soft X-rays that do not contribute to image quality. To reduce exposure dose by selecting an optimal BH filter suitable for the examination by a simple operation.

Pulsed Fluoroscopy;
As a standard feature, five selectable pulsed fluoroscopy rates (up to 15fps) suitable for examination are used to reduce patient dose while maintaining high image quality.

Dose Management;
The following features are available as standard;

- Virtual Collimation
- Real-time display of calculated dose values
- CSV file output of dose information
- DICOM MPPS
- DICOM RDSR

 DAP meter is also available as optional item.

- (6) DSA *;
DSA application and roadmap are available.
- (7) High-performance X-ray Tube;
An X-ray tube with a heat capacity of 600kHU and a dual focal size of 0.6/1.2mm ensures stress-free examinations. The switching time only in 0.9 seconds from fluoroscopy to radiography allows take radiography quickly at the timing an operator wants.
- (8) Solution for Patient and Healthcare Worker Safety;
Wide Coverage of imaging chain without moving the patient;
 - The longitudinal sliding range of the imaging system with large tabletop provides wide coverage without moving the patient. It contributes to keep patient safety during examination.

Elevating Tabletop for patient and healthcare worker safety;

- The tabletop descends to the easy-ride position where patient's load lessens. Adjust the tabletop up/down for comfortable operation for healthcare worker.

*: Option

CONFIGURATION
STANDARD CONFIGURATION

- (1) Diagnostic Table
Elevating table type or Non-elevation table type
- (2) X-ray Tube Unit
600kHU (with high speed rotation starter SA-42)
- (3) Flat Panel Detector (FPD)
Field of view: max. 17 × 17 inch (415 mm × 425 mm)
Battery for wireless use.
- (4) X-ray high-voltage generator
50kW type or 80kW type
- (5) Console
Build in type or desktop type
- (6) X-ray beam collimator
The X-ray beam collimator controls the exposure field automatically to suit fluoroscopy/radiography.
 - Virtual collimator
 - Beam hardening filter (Cu 0.1 mm, 0.2 mm, or 0.3 mm, Automatic/Manual selection)
- (7) Accessories
 - Foot rest
 - Shoulder rest
 - Hand grips
 - Grip bars
 - Barium cup holder
 - Compression cone
 - Scatter removal grid
- (8) Monitor
 - Acquisition / Reference
 - 19" LCD
- (9) DICOM network
 - DICOM storage
 - DICOM print
 - DICOM MWM
 - DICOM MPPS
 - DICOM media storage
 - DICOM RDSR

OPTIONAL ITEM

- Rolling step (*1)
 - Maximum allowable load UP kit (*1)
 - X-ray tube 90/180 deg. rotation unit (*2)
 - X-ray tube 37/90 deg. swing-out unit (*2)
 - CFRP tabletop
 - Compression band
 - Mattress
 - Auxiliary tabletop
 - Drain bag
 - Leg supports
 - Endoscope support arm
 - Elbow rest
 - Grid rack
 - Local console
 - Footswitch in examination room for fluoroscopy
 - 2 monitor option
- Monitor cart
 - Monitor expanded option for monitor suspension
 - Auto-transformer, XAT-2
 - Area dose value display
 - Dose Area Product (DAP) meter VACUDAP
 - DSA
 - Lateral cassette holder
 - Radiography console option
 - F4 FPD wired connection kit (10MT / 25MT)
 - F4 FPD wireless connection kit
 - 2nd FPD wired connection kit (CXDI-410C, -710C, -810C, -702C, -402C)
 - 2nd FPD wireless connection kit (CXDI-410C, -710C, -810C, -702C, -402C)
 - Battery pack
 - Battery charger
 - Wireless Radiography Option

(*1), (*2); Either one option can be selected.

SPECIFICATIONS (X-ray Diagnostic Table)

Item		Description	
Configuration of Diagnostic Table		Over tube table system	
Tabletop	Dimension	792 mm × 2,100 mm (W × L) (Between grooves : 650 mm)	
	Maximum allowable load	200 kg (*250 kg for some specifications; option)	
	Lateral movement	Travel	220 mm (motor-driven)
		Speed	30 mm/sec 50 Hz 36 mm/sec 60 Hz
	Tilting	Angle	- 30° (Trendelenburg) to + 90° (upright)
		Speed	Soft start/stop feature 6°/sec at maximum (5°/sec if the option with a maximum allowable load of 150 kg is set.)
	Vertical movement	Distance between tabletop and floor	5D (Non-elevating table): 890 mm 5DS (Elevating table): 690 mm to 950 mm (Soft start/stop)
Attenuation equivalent for table		1.25 mm Al Eq. (standard tabletop) 0.59 mm Al Eq. (optional CFRP tabletop)	
Imaging unit	Longitudinal movement	Travel	Max. 900 mm (Motor-driven) *May be limited according to tilting angle, tabletop height, oblique angle, and other factors.
		Speed	Soft start/stop feature 50 mm/sec (* For systems without oblique projection function, a speed of 80 mm/sec is also possible.)
	X-ray focus – FPD X-ray conversion face distance (SID)		1100 mm With the tabletop at vertical position, SID can be set to 1500 by manually drawing out X-ray tube unit.
	Distance between X-ray beam axis and floor (vertical position)		750 mm to 1650 mm
	Oblique angle		Patient's head direction: 30° to foot direction: 30°
	X-ray tube head rotation (option)		90°/ 180°
	X-ray tube head swing-out (option)		37°/ 90°
X-ray exposure field	Method of adjusting exposure field		Adjusted with automatic collimator.
	Exposure field at general radiography		Operate knobs on collimator front panel for setting, checking the light irradiation field.
	BH filter		3 types (Cu 0.1mm, Cu 0.2mm or Cu 0.3mm) The X-ray filter is automatically selected accordance with the set APR. It is also possible to select it manually.
X-ray grid	Type		48.2 cm × 45.2 cm (Removable)
	X-ray grid ratio		r10
	X-ray grid density		N 40 cm ⁻¹
	Focusing distance		f ₀ 120 cm
	Intermediate material		Aluminum
Compression cone	Compressive strength		80 N max. (approx. 8.2 kgf max.)
	Compression position adjustment		Compression position is adjustable by moving imaging unit or tabletop. For compression cone head, there are Flat and Protrusive types. Choose the type according to the patient's body thickness.
	Distance between compression cone head and tabletop		100 mm to 340 mm

SPECIFICATIONS (Digital Radiography Unit)

Item	Detail		
Memory Storage Device	CPU	3.1 GHz quad core	
	Memory	16 GB min.	
	OS	Windows10 or later	
	Input	Mouse, keyboard	
	SSD capacity	512 GB or more	
	No. of saved images	60,000 frames max. (12x12 inch: Radiographic images)	
Image Input	Matrix	2656 × 2592 matrix max.	
	Density resolution	12 bits/4096 graduation	
Image Output	Display monitor	19-inch LCD monitor	
	Display Matrix	1280 pixels × 1024 pixels	
	Graduation	256 tones	
Fluoroscopy *	Pulse fluoroscopy	15 / 12.5 / 7.5 / 5 / 3 / 2 fps	
	Fluoroscopy saved images	950 frames max.	
Radiography *	SPOT acquisition	F/R time **	0.9 seconds max.
		R/F time **	1.5 seconds max.
		R/R time **	1.7 seconds max.
		Preview time	1.0 seconds max.
			(Matrix) 2592 × 2656 matrix, 12bit (View feild : 17 × 17 inch) 2208 × 2208 matrix, 12bit (View feild : 14 × 14 inch) 1920 × 1920 matrix, 12bit (View feild : 12 × 12 inch) 1440 × 1440 matrix, 12bit (View feild : 9 × 9 inch) 960 × 960 matrix, 12bit (View feild : 6 × 6 inch)
			(Max. acquisition duration) RF protocols: 0.2 second Others: 3.0 second
	SERIAL acquisition	Max. rate	15 fps
		Max. acquisition duration	15 fps (Binning size 2 × 2): 14 msec 7.5 fps (Binning size 2 × 2): 80 msec 5, 3 fps (Binning size 2 × 2): 100 msec 3 fps (Binning size 1 × 1): 200 msec 2, 1 fps (Binning size 2 × 2): 180 msec
		Sequence radiography	5, 2.5, 1, 0.5 fps (Binning size 2 × 2): 100 msec
		(Matrix) 2592 × 2656 matrix, 12bit (View feild : 17 × 17 inch) 2208 × 2208 matrix, 12bit (View feild : 14 × 14 inch) 1920 × 1920 matrix, 12bit (View feild : 12 × 12 inch) 1440 × 1440 matrix, 12bit (View feild : 9 × 9 inch) 960 × 960 matrix, 12bit (View feild : 6 × 6 inch)	
DSA (Option)	Max. rate	15 fps	
	Max. acquisition duration	15 fps (Binning size 2 × 2): 14 msec 7.5 fps (Binning size 2 × 2): 80 msec 5, 3 fps (Binning size 2 × 2): 100 msec 3 fps (Binning size 1 × 1): 200 msec 2, 1 fps (Binning size 2 × 2): 180 msec	
	Sequence radiography	5, 2.5, 1, 0.5 fps (Binning size 2 × 2): 100 msec	

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		(Matrix) 2592 × 2656 matrix, 12bit (View feild : 17 × 17 inch) 2208 × 2208 matrix, 12bit (View feild : 14 × 14 inch) 1920 × 1920 matrix, 12bit (View feild : 12 × 12 inch) 1440 × 1440 matrix, 12bit (View feild : 9 × 9 inch) 960 × 960 matrix, 12bit (View feild : 6 × 6 inch)
Image Processing	Graduation processing	Brightness/ contrast
		Black and white inversion
		AWC (Auto White balance Control)
	Gamma	9 types of fluoroscopy, 4 types of radiography
	H/V Inversion	Direction Inversion Vertical/Horizontal 90-degree rotation to right / left
	Noise reduction	Recursive filter, multi-frequency processing
	Edge reinforcement	20 levels
	Zoom	Max. 2× magnification
	Multi display	9-ON-1 format
	Annotation	"L" and "R" indications, and freely-selectable text
DSA (Option)	Re-mask, re-registration, roadmap fluoroscopy	
Measurement Processing	Distance measurement	Distance measurement on the image is possible.
	Angle measurement	Angle measurement on the image is possible.
DICOM	DICOM Print	Prints images
	DICOM Storage	Sends images
	DICOM Media Storage	CD-R, DVD-R, DVD+R
	DICOM MWM	Receives examination information from the server.
	DICOM MPPS	Sends study results to server
	DICOM RDSR	Stores radiation dose and related information

*: in FLEXAVISION F4 package main FPD, Wired
**: Values measured with an area dosimeter attached

SPECIFICATIONS (Flat Panel Detector; cont.)

Item		Description
Censor unit *	Dimension	460 mm × 460 mm × 15.5 mm (W × H × D)
	Weight	3.5 kg
	Pixel pitch	0.16 mm
	Pixel binning mode	1×1, 2×2
	R/F field of view	17inch × 17inch (415 mm × 425 mm)
		14inch × 14inch (353 mm × 353 mm)
		12inch × 12inch (307 mm × 307 mm)
		9inch × 9inch (230 mm × 230 mm)
		6inch × 6inch (154 mm × 154 mm)
	Scintillator	Csl
Gradation	16 bits	
MTF	0.3 (2 LP/mm)	
DQE	0.65 (0 LP/mm)	

* FLEXAVISION F4 package main FPD

Power Supply Facilities (Digital Radiography Unit)

Item	Detail
System	Single-phase
Frequency	50/60 Hz
Rated voltage	200/220/240 V
Capacity	3kVA or more
Grounding Resistance	less than 100 Ω

The X-ray diagnostic table and X-ray high-voltage generator require the other power supply than digital radiography unit.

SPECIFICATIONS (X-ray high-voltage high-frequency generator)

(1) ZUD-L4*D(S) (50 kW)

Item	Detail		
Generator System	Max. 50 kHz inverter Max. 50 kW output		
Short-time Rating	150 kV	320 mA (three-phase)	
	125 kV	400 mA (three-phase)	
	100 kV	500 mA (three-phase)	
	80 kV	630 mA (three-phase)	
Long-time Rating	125 kV	4 mA	
Number of Connectable X-ray Tubes	2 tubes (Second-tube option is required.)		
Setting Range	Radiography	Tube voltage	40 kV to 150 kV
		Tube current	10 mA to 630 mA
		mAs	0.5 mAs to 800 mAs
		Time	0.001 sec to 10 sec
	Fluoroscopy	Tube voltage	50 kV to 125 kV
		Tube current	0.3 mA to 4.0 mA
	Time	Continuous fluoroscopy time	10 min
Nominal Min. Exposure Time (at AEC radiography) AEC: Automatic Exposure Control	R/F technique		3 msec
	FPD Portable Radiography with AF-B1		7 msec
	FPD Portable Radiography with AF-B1 (Prolonged Exposure)		17 msec

*Output of X-ray high-voltage generator is limited depending on the combined X-ray tube unit ratings.

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Item	Detail		
System	(Three-phase)	Three-phase	
Frequency	50/60 Hz		
Rated Voltage	(200/220/240 V)	380/400/415/440 V	
Maximum Momentary Load	(50 kVA or more)	50 kVA	
Power-supply Impedance	(0.087 Ω max.)	0.21 Ω max.	
Grounding Resistance	less than 100 Ω	less than 10 Ω	
Knife-switch with Fuse or Molded-case Circuit	Frame Capacity	100 A or more	50 A or more
	Rating Breaking Current	(100 A max.)	50 A max.

*Be sure to use an inverter-type earth leakage breaker, which is to prevent malfunctions in the high-frequency circuits, if using an earth leakage breaker.

When using three-phase power voltage of 200 V, Automatic Transformer XAT-2 (option) is required.

② Cable Length and Cross-sectional Area to Match the Transformer Capacity

Transformer Capacity	Length	Electric Cable Length and <Nominal Cross-sectional Area> (mm ²)									
		10,	20,	30,	40,	50,	60,	70,	80,	90,	100 m
50 kVA (three-phase, 200 V)		8,	14,	14,	22,	38,	38,	38,	60,	60,	60
50 kVA (three-phase, 400 V)		5.5,	5.5,	5.5,	5.5,	8,	8,	8,	14,	14,	14

(2) ZUD-B40D(S) (80 kW)

Item	Detail		
System	Max. 50 kHz inverter Max. 80 kW output		
Short-time Rating	150 kV 125 kV 100 kV 80 kV	500 mA (three-phase) 630 mA (three-phase) 800 mA (three-phase) 1,000 mA (three-phase)	
Long-time Rating	125 kV	4 mA	
Number of Connectable X-ray Tubes	2 tubes (Second-tube option is required.)		
Setting Range	Radiography	Tube voltage	40 kV to 150 kV
		Tube current	10 mA to 1,000 mA
		mAs	0.5 mAs to 800 mAs
		Time	0.001 sec to 10 sec
	Fluoroscopy	Tube voltage	50 kV to 125 kV
		Tube current	0.3 mA to 4.0 mA
	Time	Continuous fluoroscopy time	10 min
Nominal Min. Exposure Time (at AEC radiography) AEC: Automatic Exposure Control	R/F technique		3 msec
	FPD Portable Radiography with AF-B1		7 msec
	FPD Portable Radiography with AF-B1 (Prolonged Exposure)		17 msec

*Output of X-ray high-voltage generator is limited depending on the combined X-ray tube unit ratings.

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Item	Detail		
System	Three-phase		
Frequency	50/60 Hz		
Rated Voltage	200/220/240 V	380/400/415/440 V	
Maximum Momentary Load	75 kVA or more		
Power-supply Impedance	0.054 Ω max.	0.13 Ω max.	
Grounding Resistance	less than 100 Ω	less than 10 Ω	
Knife-switch with Fuse or Molded-case Circuit	Frame Capacity	100 A or more	75 A or more
	Rating Breaking Current	100 A max.	75 A max.

*Be sure to use an inverter-type earth leakage breaker, which is to prevent malfunctions in the high-frequency circuits, if using an earth leakage breaker.

When using three-phase power voltage of 200 V, Automatic Transformer XAT-2 (option) is required.

② Cable Length and Cross-sectional Area to Match the Transformer Capacity

Transformer Capacity	Length	Electric Cable Length and <Nominal Cross-sectional Area> (mm ²)										
		10,	20,	30,	40,	50,	60,	70,	80,	90,	100 m	
75 kVA (200 V)		14,	22,	38,	38,	60,	60,	60,	100,	100,	100	
75 kVA (400 V)		5.5,	8,	14,	22,	22,	22,	38,	38,	38,	38	

Load condition when combined with the X-ray tube unit

(1) ZUD-L (3-phase 200V): 50 kW

Item	X-ray tube unit
	600kHU (Focal spot 0.6/1.2 mm)
Normal X-ray tube voltage and max. tube current that can flow at nominal x-ray tube voltage	125 kV, 3.0 mA
	150 kV, 320 mA
Max. tube current and max. tube voltage to achieve max. tube current	93 kV, 4.0 mA
	80 kV, 630 mA
Tube voltage and tube current combination for max. electrical output	125 kV, 3.0 mA
	80 kV, 630 mA
Nominal electric power	50 kW (100 kV, 500 mA, 0.1 sec)

(2) ZUD-B: 80 kW

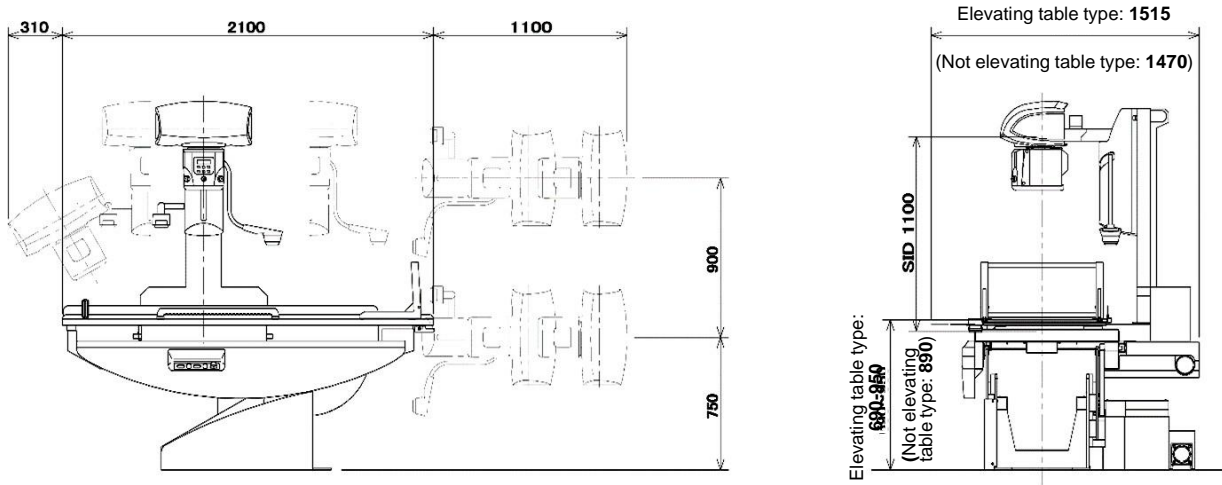
Item	X-ray tube unit
	600kHU (Focal spot 0.6/1.2mm)
Normal X-ray tube voltage and max. tube current that can flow at nominal x-ray tube voltage	125 kV, 3.0 mA
	150 kV, 500 mA
Max. tube current and max. tube voltage to achieve max. tube current	93 kV, 4.0 mA
	88 kV, 900 mA
Tube voltage and tube current combination for max. electrical output	125 kV, 3.0 mA
	100 kV, 800 mA
Nominal electric power	80 kW (100 kV, 800 mA, 0.1 sec)

Upper: Long-time rating

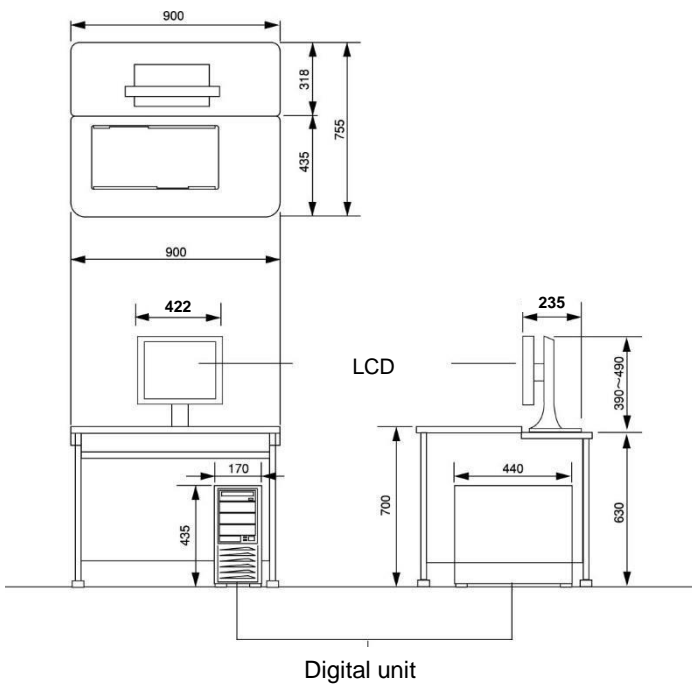
Lower: Short-time rating

DIMENSIONS

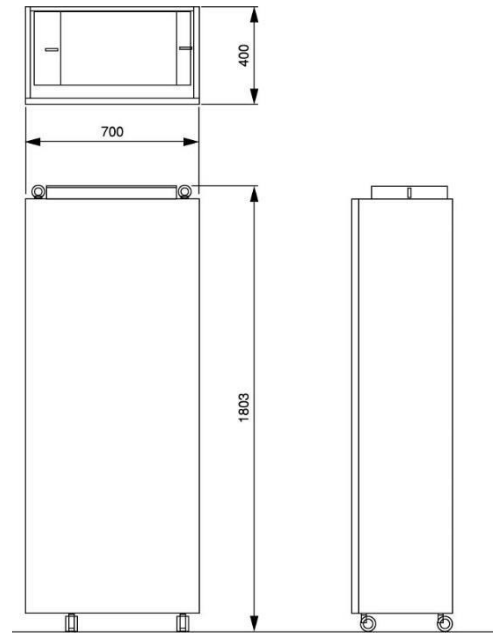
Table body



Control box



Control cabinet



OPERATING CONDITIONS

Requisite conditions must be satisfied for the full performance of the system.

(1) Environmental Condition

Item	Condition
Temperature	+ 10 °C to + 35 °C
Relative humidity	30 % to 75 % (no dew condensation)
Atmospheric pressure	800 hPa to 1060 hPa (800 mbar to 1060 mbar)
Atmosphere	No explosive or corrosive gasses

(2) Examination Room

The system installation 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.

To relocate the system, contact Shimadzu Service Representative.

Item	Condition	
	ZSU-5D	ZSU-5DS
Dimensions of Examination Room	W x D: approx. 350 cm x 230 cm or more	
Ceiling Height for Installation	245 cm or more, 260 cm or more recommended	
Door Opening for Installation*1 ≈	W x H: approx. 90 cm x 180 cm or more	
Floor Strength	Actual Load*2 ≈	7350 N (750 kgf) / 8942.5 N (912.5 kgf)
	Operation/Maintenance Load ≈	600 kg / 730 kg
	Floor Area ≈	0.63 m ² / 0.40 m ²
	Unit Load *3 =	0.75 t/0.63 m ² ≈ 1.19 t/m ² / 0.9125 t/0.4 m ² ≈ 2.28 t/m ²

*1 : More than 90 cm width is required for the entrance of the installation room.

*2 : Actual load = 1.25 x operation/maintenance load. The actual load includes a vibration factor of the equipment.

*3 : If the floor strength is this value or less, a floor reinforcing work is required.

LABEL Description: REMOTE-CONTROLLED R/F SYSTEM FLEXAVISION

Founded in 1875, Shimadzu corporation, a leader in the development of advanced technologies, has a distinguished history of innovation built on the foundation of contributing to society through science and technology. We maintain a global network of sales, service, technical support and applications centers on six continents, and have established long-term relationships with a host of highly trained distributors located in over 100 countries. For information about Shimadzu, and to contact your local office, please visit our Web site at www.shimadzu.com



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Shimadzu Corporation Medical Systems Division has been certified by TÜV Rheinland as a manufacturer of medical systems in compliance with ISO9001:2015 Quality Management Systems and ISO13485:2016 Medical Devices Quality Management Systems.

Remarks:

- Every value in this document is a standard value, and it may vary a little from the actual at each site.
- The appearances and specifications are subject to change for reasons of improvement without notice
- Items and components in the photos may include optional items. Please confirm with your sales representative for details.
- Certain configurations may not be available pending regulatory clearance.
- Contact your sales representative for information on specific configurations.
- Before operating this system, you should first thoroughly review the Instruction Manual.