

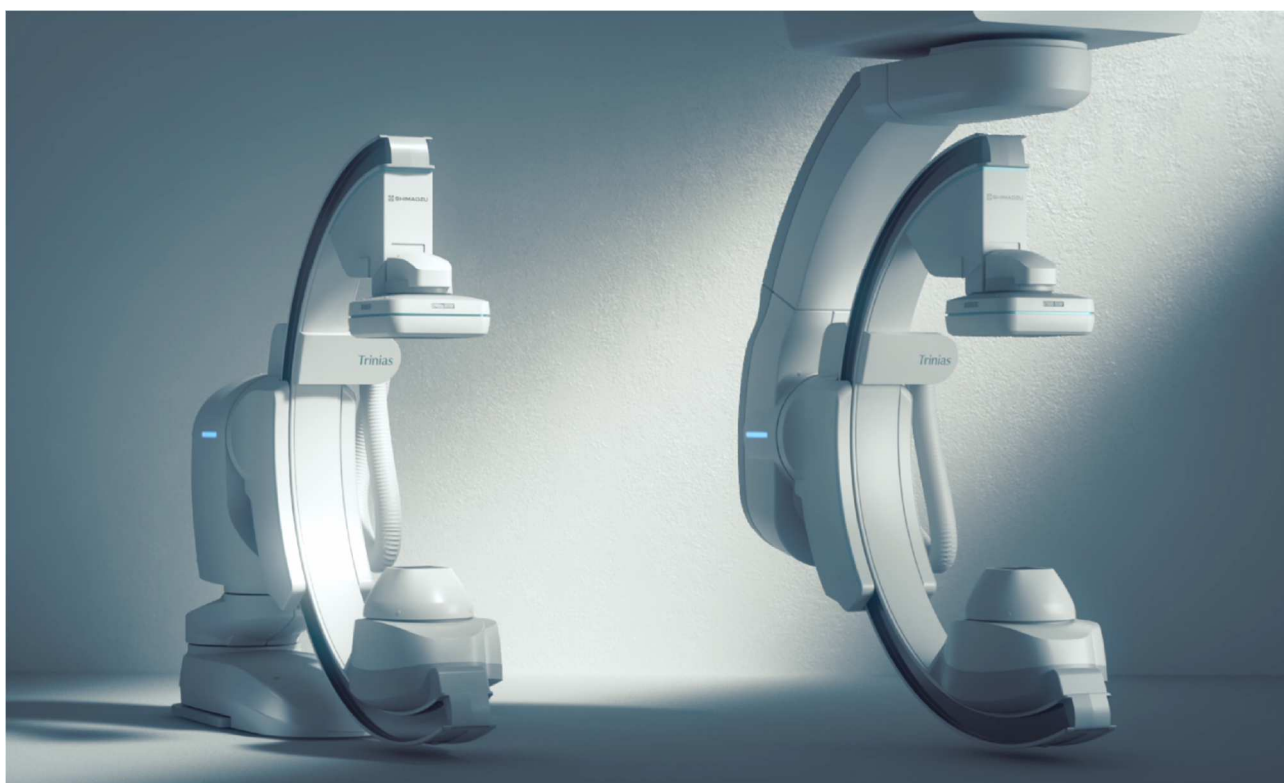


PRODUCT DATA

Digital Angiography System

Trinias

C16s/C12s/F12s



Outline

Trinias™ is a digital angiography system equipped with an FPD (flat panel detector) that supports crossover interventional treatment in the head, heart, abdomen, and extremities. SCORE Opera, a newly developed AI-based image processing engine, improves the device visibility, especially in low-dose range, and supports even less invasive interventions.

**System configuration:****1. Types of C-arm**

- 1.1 Ceiling-mounted C-arm (MH-500)
- 1.2 Floor-mounted C-arm (MH-600)

2. Types of Patient Table

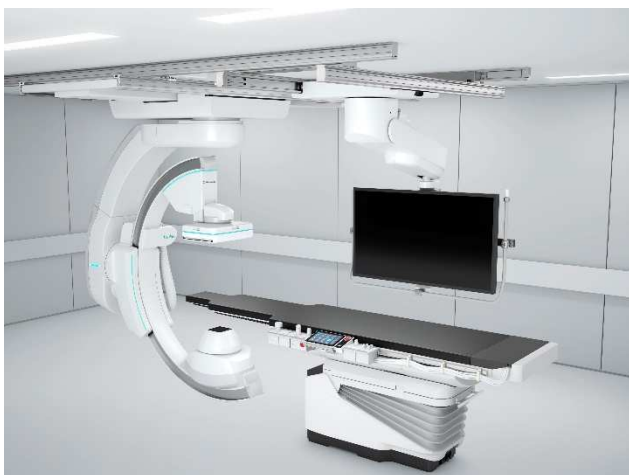
- 2.1 Standard Table (KS-70)
- 2.2 Multifunctional Table (KS-100: SMART Table)

3. Control Modules (User Interface)**4. Digital System**

- 4.1 Digital Radiography System (DAR-9500f)
- 4.2 SCORE Workstation*

5. Monitors/ Monitor Suspensions (MTA-100 series)**6. X-Ray High-Voltage Generator (D150GC-40)****7. X-Ray Tube (E79039X)****8. Collimator (F-100)****9. 3D applications (SCORE 3D Workstation*)****10. User Friendly Functions****11. System Installation Environment****12. System Dimensional Drawing**

The * mark in the text is an optional item.



Trinias C16s



Trinias F12s

1 Types of C-arm

A C-arm system that achieves excellent quietness, reproducibility, and high-speed performance. The new hard design that reduces the exposure of the cable not only keeps it clean, but also gives the subject a sense of security. In addition, not only the ceiling-mounted C-arm but also the floor-mounted C-arm can be freely moved in the longitudinal and lateral directions, and easy access to the whole body is realized without moving the table or the subject during the procedure.



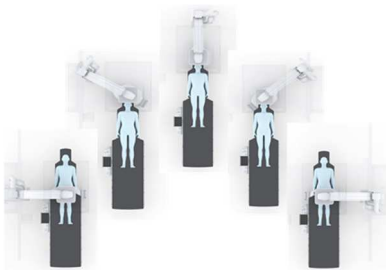
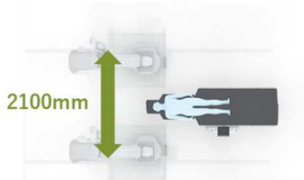
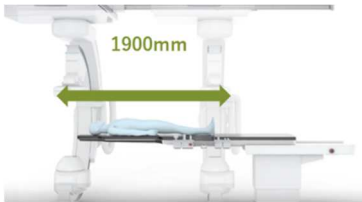
MH-500
(Ceiling-mounted C-arm)



MH-600
(Floor-mounted C-arm)

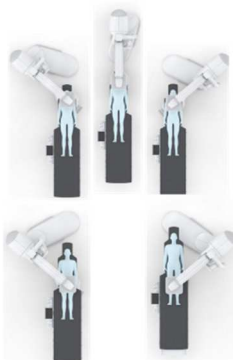
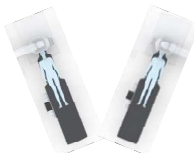
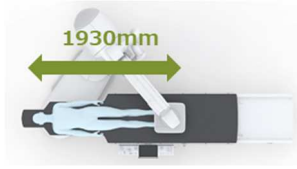
1.1 Ceiling-mounted C-arm (MH-500)

Configurations and Specifications (Variable speed is applied to all movements)

Positioning	5 Positions - Home Position : 0° - L-Multi Position : + 50° - L-Side Position : + 90° - R-Multi Position : - 50° - R-Side Position : - 90° - Pivot Speed : 90°/4 sec 1 Position(Femoral Artery Puncture Position) - Femoral Approach mode: +40° - Pivot Speed :90deg/4sec	 5 positions
C-arm Rotation	-Rotation (at Head-end) LAO 120°/RAO120°(Max. 25deg/sec)	
C-arm Angulation	-Angulation (at Head-end) CRA 50°/CAU 45°(Max.25deg/sec) Note) CRA 45°/CAU 45° (with 12x16 inch FPD)	
Longitudinal movement	2900 mm (Max. 200mm/sec)	
Transvers movement	- Home Position: ±800 mm (Max. 200mm/sec) - L-Side Position: ±450 mm (Max. 200mm/sec) - R-Side Position: ±450 mm (Max. 200mm/sec)	
Fluoroscopy/ radiography range	- Longitudinal Cover Range: 1900 mm or more - Lateral Cover Range: 2100 mm or more Note) The value is the minimum value that combines the distance traveled by the C-arm and patient table with the field of view of the FPD(the smallest).	
	 Lateral Cover Range	 Longitudinal Cover Range
C-arm memory (DirectMemory)	Max. 5,040patterns (angle, SID, table height)	
Safety mechanism	Collision sensor (FPD, collimator) Software control Automatic speed control Warning sound Automatic leave function (FPD)	

1.2 Floor-mounted C-arm (MH-600)

Configurations and Specifications (Variable speed is applied to all movements)

Positioning	5 Positions	
	- Home Position : 0°	
	- L-Multi Position : +49°	
	- L-Peri Position : +49°+ (60cm to the foot direction)	
	- R-Multi Position : -49°	
- R-Peri Position : -49°+ (60cm to the foot direction)		
	Pivot Speed : Max. 90°/4 sec	
	1 Position (Femoral Artery Puncture Position)	
	- Femoral Approach Mode : +40°	
	Pivot Speed: 90°/4 sec	
	2 Position (C-arm CT Side-Acquisition)	
	- L-Rotation Position: + 90°	
	(C-arm +68°, Table -22°)	
	- R-Rotation Position: - 90°	
	(C-arm -68°, Table +22°)	
		5 Positions
		2 Positions
C-arm Rotation	-Rotation(at Head-end) LAO 120°/RAO120° (Max. 25deg/sec)	
C-arm Angulation	-Angulation (at Head-end) CRA 50°/CAU 45° (Max.25deg/sec) Note) CRA 45°/CAU 45° (with 12x16 inch FPD)	
Longitudinal movement	- Home Position: 50mm (100mm/sec) - L/R-Multi Position: 650mm (100mm/sec)	
Transvers movement	- Home Position: ±600mm (100mm/sec) - L/R-Multi/Peri Position: 480mm (100mm/sec)	
Fluoroscopy/ radiography range	- Longitudinal Cover Range: 1930 mm or more - Lateral Cover Range: 1700 mm or more Note) The value is the minimum value that combines the distance traveled by the C-arm and patient table with the field of view of the FPD (the smallest).	
		
	Lateral Cover Range	Longitudinal Cover Range
C-arm memory (DirectMemory)	Max. 5,040patterns (angle, SID, table height)	
Safety mechanism	Collision sensor (FPD, collimator) Software control Automatic speed control Warning sound Automatic leave function (FPD)	

Configurations and Specifications (common for both C-arm types)

SID	900 to 1200 mm (100mm/sec)
FPD dimensions (Min./Max.)	C12s/F12s : 337 x 348 /401x412 mm C16s : 370 x 470 /420x518 mm
FPD back/forward movement	4 buttons (FPD) C-arm Control module F
C-arm Inner diameter	945mm
ISO-center height	1100 mm (canter of rotation)
Grid (Removable)	Ratio: 13:1 Density: 70 lines/cm Inter Spacer: Fiber (Non-metal)

Optional Accessories (C-arm)

Protect Shield Adapter (to MTA series) *	Attachment for installing a protect shield on the ceiling Attachment for protective shield produced by MAVIG. It is available to be installed on the moving rail of monitor suspension.
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Protect Shield Adapter

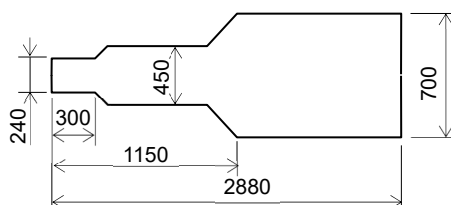
2. Patient Tables

2.1 Standard Patient Table (KS-70)

It supports catheter treatment with a robust and simple design. With a load capacity of 227 kg (+ 100 kg), it is equipped with a memory foam mattress and a wide range of accessories, so patients can receive treatment with peace of mind.

Configurations and Specifications (Variable speed is applied to all movements)

Table top Dimensions



Unit : mm



Standard Patient Table
(KS-70)

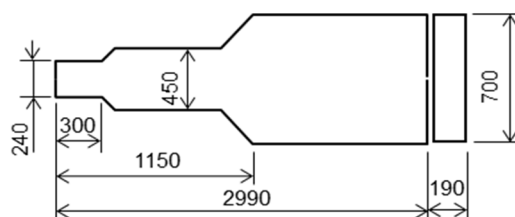
Longitudinal movement	1350mm(Manual)
Transverse movement	±150mm(Manual)
Horizontal movement	790 to 1150mm (360mm) Speed: 13.2mm/sec (50Hz), 15.8mm/sec (60Hz)
Pivot Angle	+ 90° to - 180° (270°)
Load Capacity	227kg + 100kg (for CPR, at CPR position)
Material	CFRP (Carbon fiber reinforced plastic)
Inherent filtration	0.8mm Al equivalent (800 mm from end of table)
Table Dimension	450 x 2880mm

2.2 Multifunctional Patient Table (KS-100: SMART Table)

The SMART Table, an electric multifunctional table with tilt and rolling functions, can be positioned according to complex procedures for whole body. It also supports interlocking with images and can be automatically positioned according to the area of interest of the image.

Configurations and Specifications (Variable speed is applied to all movements)

Table top Dimensions



Unit : mm



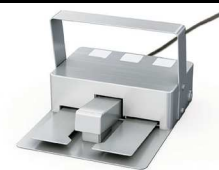
Multifunctional Patient Table
(KS-100 : SMART Table)

Longitudinal movement	1350mm (Manual /Electric) (70mm/sec)
Transverse movement	±200mm (Manual /Electric) (70mm/秒)
Tilting Angle	+17°/-20° (Head-up/Head-down) (2.5deg/sec)
Rolling Angle	+16°/-16° (Left/Right) (3deg/sec)
Horizontal movement	790-1070mm (280mm) (40mm/sec)
Pivot Angle	+ 120° - -180° (300°)
Load Capacity	250kg + 100kg (for CRP, No restriction for table top position with recommended base plate)
Material	CFRP (Carbon fiber reinforced plastic)
Inherent filtration	1.2mm Al equivalent (800 mm from end of table)
Table Dimension	450 x 3180mm (Including cable storage box)

Standard Accessories (Patient Table)

**Footswitch
(Examination/
Control Room)**
Foot switch that realizes simple operation with a simple structure

It is a standard foot switch. By using rust-resistant stainless steel and maintaining strength and a certain amount of weight, you can easily operate it with your toes.



Footswitch (Examination Room)



Footswitch (Control Room)

**Acrylic
Arm Support**
Pretension item for arm falling

It is a protective plate to prevent patient's arms and hands falling from the tabletop. It is used by inserting it between the table top and the mattress.



Acrylic Arm Supports

Carbon arm rest
Application of carbon material with high rigidity and low X-ray absorption

Despite being a lightweight arm rest suitable for fluoroscopy and radiography of the arm, it is a strong and easy-to-use arm rest. It is used by inserting it between the tabletop and the mattress. It can be used on either the left or right side.



Carbon arm rest

Tabletop mattress
Uses low-resilience material to reduce the burden on patients

The mattress is made of 55mm thick low-resilience material, and is designed not to burden the patient even during long-term intervention. It has the same shape as the top plate and does not have steps.



Tabletop mattress

**Patient fixing belt (for
KS-100)**
For the patient safety at the time of tilting / rolling

This belt to fix the patient and the tabletop. There are 2m type and 3m type belts, and 2 belts are attached as standard to KS-100.



Patient fixing belt

**Shoulder support
(for KS-100)**
Prevents patient slippage when tilting head down.

Prevents the patients from slipping off when the tabletop is tilted. It can be easily attached to the patient table with a clamp type.



Shoulder support

Optional Accessories (Patient Table)

**Arm Stand
(Right/Left)***

For radial approach that can be fixed to the table

By fixing and attaching the main arm support when approaching the catheter from the upper arm / wrist, it is available to place the patient's arm or devices. Comes with the same size mattress. (The left and right cannot be interchanged.)



Arm Stand, Left



Arm Stand, Right

**Drip Stand
(2 or 4 hangers
type)***

A stand for hanging IV drip

The height can be easily adjusted by using stainless steel that does not rust easily. It is fixed to the table rail and selectable from 2 hangers type or 4 hangers type.



Drip Stand (2 hangers type)

Grip Handle*

Supporting the patient's arm-raising posture

It is an auxiliary item to hold when raising arms as needed for examinations. The examination can be performed in a comfortable posture for the patient. It is a clamp type and can be easily fixed to the table.



Grip Handle

Foot Side Rail*

Control modules can be set on the foot side of the table.

The location of the control module can be changed according to the standing position of the treatment team members. Since there is a limit to the number of units that can be installed, please consult with the service regarding the layout.



Foot Side Rail

Slide Rail *

Convenient for putting patients on and off the table

Since the rail slides, the table side control module can be retracted all at once.



Slide Rail

**Extension-Table
(only for
KS-100) *****Useful when using long devices**

It is useful for securing space such as placing a device palette.

Note) Cannot be installed with Foot side rails.



Extension Table (KS-100 only)

Head Rest***The patient is comfortably fixed with the headrest**

It fixes the patient's head at the time of Neuro-Intervention. This item is included in the standard configuration of SCORE 3D*.



Head Rest

Wireless footswitch***It is cableless and can be placed anywhere.**

In addition to X-ray exposure control, it is also available to assign functions such as table operations (up/down, Release of electromagnetic lock for table top horizontal movement). Cableless also helps maintain the cleanliness of the floor.



Wireless footswitch

3 User Interface

The table side control modules have been re-designed with a human-centered design. You can operate the system at will even from the top of the surgical cloth, including button size, button response, stick size and operation feeling. As a unified operation feeling. In addition, the control module is designed in the smallest unit for each function category and can be freely and easily layout according to the medical team composition for treatment.



Table Side Control Modules

Standard Control Modules (User Interface):

Note) Additional module setup is available. Please refer to the user interface configuration list.

C-arm Control Module	C-arm control lever, FPD up / down dial, Longitudinal/Transvers travel lever, set key, center return, field of view switching, parking, stop switch, release switch		C-arm Control Module
Collimator Control Module	Irradiation area control lever (single-acting aperture) : 4 directions (H and V leaf) Center position movement lever Compensation filter control lever: left and right Virtual collimator, Compensation filter		Collimator Control Module
SMART Touch (SET key module)	LCD touch panel:10.1 inch (Electrostatic) Main Functions: -Switch of Fluoroscopy/Radiography conditions -C-arm Angulation memory (DirectMemory) -SMRT Display(optional) : Layout change -Application On/Off, Exposure on/off -Fluoroscopy Alert off, Stopwatch -Dose Conductor, Set key -Stop Switch -FPD Rotation (0°/90°: for C16s) -Touch PAD, etc		SMART Touch (SET key module)
SMART Dial Module	Play, Pause, frame-by-frame selecting, ROI operation, Adjustment of contrast of map, Switching Live/Reference monitor, Reference image registration, Assignable function keys (Reference image filter or Reference mode)		SMART Dial Module
Table Control Module	Tabletop horizontal movement, Table height movement, Table rotation. * Can be used with the grip switch option. * Up to 2 sets can be installed in one system. The second set is optional.		Table Control Module
SMART Table Control Module (KS-100)	Tilting, Rolling Tabletop horizontal movement(Manual/Electric) Positioning memory		SMART Table Control Module

Optional User Interface

Grip Switch*

A grip type switch for panning the patient table.

While holding the grip, release the top plate electromagnetic lock with your thumb and perform table panning. It can be installed as an additional option to be used with the standard table control module.



Grip Switch

Wireless Mouse with Mouse Table*

Table side mouse operation for Main Digital or 3D workstation.



Wireless Mouse

Two-way Intercom*

Microphone x2(Examination/Control room),
Speaker x2(Examination/Control room)

Console Cart *

All Table Side Control Modules can be mounted

A tableside control module including SMART Touch makes it easy to operate from outside the clean area. A foot switch for fluoroscopy is also functioned.



Console Cart

User Interface / Configuration List

	Exam. Room 1st	Exam. Room 2nd	Console Cart (Exam. Room)	Cont. Room
C-arm Control Module	Standard	Optional	Optional	Optional
Table Control Module	Standard	Optional	NA	NA
SMART Table Control Module	Standard	Optional	NA	NA
Collimator Control Module	Standard	Optional	Optional	Optional
SMART Touch (SETkey modeule)	Standard	Optional	Optional	Optional
SMART Dial Module	Standard	Optional	Optional	NA
Grip Switch	Optional	NA	NA	NA
2nd Mouse with Mouse Table	Optional	NA	NA	NA

Note) Up to 3 same modules can be installed.



Optional User Interface (for Control room)

4. Digital System

4.1 Digital Radiography System (DAR-9500f)

A digital imaging device for X-ray angiography. By image processing digital images acquired by FPD (flat panel detector), it provides optimal visibility for interventional treatment. In addition, it is equipped with the latest application technology and software that are useful for intervention treatment.

Configurations and Specifications		
FPD	X-ray conversion: Indirect conversion	
Flat Panel Detector	Materials: Scintillator/ CsI, Photodiode/a-Si(Amorphous silicon)	
	Pixel pitch: 194 um	
	Spatial frequency: 2.6 lp/mm	
	DQE: 77 %	
	Acquisition speed: Max. 30 fps	
	A/D range: 16 bit	
	Transfer method: Optical fiber	
	Cooling system: Liquid cooling	
	Attenuation equivalent front panel: Max. 0.4mm Al equivalent	
	Calibration: Automatic	
Total/Effective pixels	• C12s/F12s (12x12)	• C16s (16 x 12)
	1536 x 1536/1516 x 1516	2048 x 1536/2028 x 1516
Effective FOVs (Side length/diagonal)	5 sizes	6 sizes
	- 12inch (294 / 416 mm) 10inch (248 / 351 mm) 8inch (198 / 281 mm) - 6inch (149 / 211 mm) 4.5inch (112 / 158 mm)	16 x 12 inch (393 x 294 / 509 mm) 12 inch (294 / 416 mm) 10 inch (248 / 351 mm) 8 inch (198 / 281 mm) - 6 inch (149 / 211 mm) 4.5 inch (112 / 158 mm) Note) FPD rotation available.
Fluoroscopy Functions	Matrix:1024 x 1024, 12 bit Pulse rate: 30, 15, 10, 7.5, 6, 5, 3.75, 3, 2, 1 pps Road map: SCORE MAP *(DSA-MAP, FluoroMAP, BlankMAP, TraceMAP, Sketch-function) Maximum Number of Protocols: 144 Zoom function: Max.2.5x Fluoroscopy Recording Frame numbers (Types): Max.1023 frames (Loop, Direct), 1 frame (LIH)	
Radiography functions	Acquisition mode: DA, DSA, stage DSA, One-Shot, SCORE RSM*, SCORE 3D-DA*, SCORE 3D-DSA*, SCORE CT*, SCORE CT-HR* Matrix: 1024 x 1024, 12 bit (16 bit: SCORE CT/CT-HR) / 512 x 512, 12 bit Acquisition rate Stage DSA: 6, 4, 3, 2, 1 fps (max. 5 stages) SCORE RSM: 15, 7.5, 5, 3.75, 3, 1fps SCORE 3D-DA /SCORE 3D-DSA: 30fps SCORE CT /SCORE CT-HR: 30fps Maximum Number of Protocols: 144 Radiography conditions: Set automatically based on fluoroscopy conditions.	
AI Filter	SCORE Opera: By using the AI filter generated by Deep Learning technology, it is possible to separate device components even from images with high noise levels at low doses. It provides highly visible images for devices with reduced noise levels.	

Configurations and Specifications	
Digital Processing	Noise reduction, automatic brightness adjustment, edge enhancement, negative/positive inversion, gamma correction, zoom (max. 2.5x) and panning, Flex-APS, pixel shift, remask, Peak hold, Auto cropping, Guidance, comment and annotation input,
Character display	Fixed format (patient information, etc.), free format (annotation, etc.)
Parallel processing	Always available (including during fluoroscopy and radiography) (limited to data for the same patient during examinations)
Exam./Cont. Room Independent display	Available (Display setting: Team mode) Working process in Control room dose not display on the Reference monitor in Examination room.
Biological waveform input	2 channels
Analysis	QCA(QVA), LVA, and distance measurement
Calibration (Pixel→Actual length)	Automatic: Automatic calculation from geometric information (assuming target object is in isocenter) Manual : Calibration object or grid
Angle synchronization	Image <=> C-arm bi-directional
Imaging Operation and functions	Procedure selection, Dynamic image play/stop, image selection, fluoroscopy/radiography conditions selection, comment selection, reference image registration, fluoroscopy recording, stopwatch, target monitor switching, split display and focus switching, reference mode switching, Angle synchronization, multi-display, photo file storage, Layout change for SMART Display*, DICOM background transfer, SCORE Applications*
Dose management	-Dose area product display (cumulative) -Air kerma rate and cumulative air kerma (calculated value at interventional reference point) -Dose report function (DICOM RDSR / MPPS), RDSR summary is automatically generated as SC image after closing examination as image information. -Dose conductor (SMART Touch): Adjusting fluoroscopy visibility with one button. -Protocol Tab (SMART Touch): Switch Fluoroscopy pulse rate and Dose level.
Computer configuration	OS: Windows 10, 64 bit CPU: Intel Xeon E3-1275v5(3.6GHz 4-core 8threads) or more RAM: 16 GB or more Storage: 2.5 TB or more
DICOM*	Storage, Storage Commitment, Query/Retrieve (Q/R), Print, Modality Work List (MWM), Modality Performed Procedure Step (MPPS), Media Storage, Radiation Dose Structured Report (RDSR)
Startup time	Approx. 90sec
Shut down time	Approx. 25sec
Image Storage Capacity	100,000 frames (1024 x 1024, 12bit)
DICOM Media archive*	Automatic writing after examination is available, Simple image viewer is included with image data - CD-R(650) MB 512×512pixel (8 bit) : 4,800frames 1024×1024pixels (12 bit) : 600frames - DVD-R(4.7 GB) 512 × 512pixels (8 bit) : 30,000 frames 1024 × 1024pixels (12 bit) : 4,000 frames

Note) DICOM media archives is included as standard with 4.2 SCORE WS (optional).

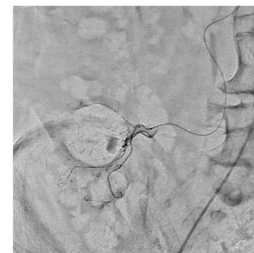
Applications (DAR-9500f)

SCORE RSM*

A unique DSA that pursues real-time performance, which is strong against movement and does not require mask acquisition phase, which Shimadzu's high-speed digital image processing technology has achieved.



Normal DSA



SCORE RSM

SCORE MAP*

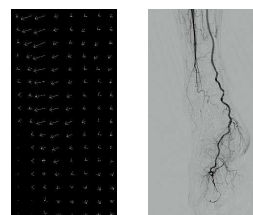
Versatile road map functions are available, that you can select according to the target region of intervention and type of the procedure. Switching to normal fluoroscopy and with bone or bone-free display also be done simple operation.



SCORE MAP

Flex-APS*

A unique auto pixel shift application that pursues real-time performance that automatically corrects misregistration artifacts caused by body movement during DSA acquisition.



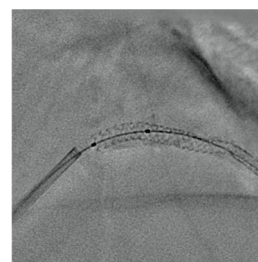
Flex-APS

PCI View*

An arbitrary map of dynamic image or still image, which are easily grasp the vessel structure, will be displayed on the live monitor when fluoroscopy is OFF. PCI can be performed without moving the line of sight.

SCORE StentView*

Stent information is acquired in real time on heart beat images, and it is fixedly displayed while improving its visibility to support more accurate device placement. It is suitable for real-time grasp of device position relationships and position adjustment during exposure.



SCORE StentView

SCORE StentShot*

Noise on the image is reduced by successive addition processing and Stent's visibility is further improved. The shape of Stent is visualized.



SCORE StentShot

Applications (DAR-9500f)

SCORE Chase* An application that takes a contrast tracking while freely panning the patient table to the longitudinal and lateral directions and automatically creates a Stitched Image after acquisition. It is an effective application for grasping the entire lower limb blood vessel running.



SCORE Chase (Virtual FOV)

4.2 SCORE Workstation (Optional)

In addition to the same image viewing as the main digital system, various intervention support application software can be installed.

Configurations and Specifications	
Functions	Dynamic image play/stop, image selection DICOM Background transfer
Computer configuration	OS: Windows 10, 64 bit CPU: Intel Xeon E3-1275v5(3.6GHz 4-core 8threads) or more RAM: 16GB or more Storage: 2.5 TB or more
Transfer method	High Speed Transfer (HST) for Real-time back up Data
Media Archive	CD-R, DVD-R
Monitor	Exam. Room : 19inchLCD or 58inchLCD* Cont.Room : 19inchLCD or 31inchLCD*
DICOM*	Storage, Storage Commitment, Query/Retrieve (Q/R), Print, Modality Work List (MWM), Modality Performed Procedure Step (MPPS), Media Storage, Radiation Dose Structured Report (RDSR)

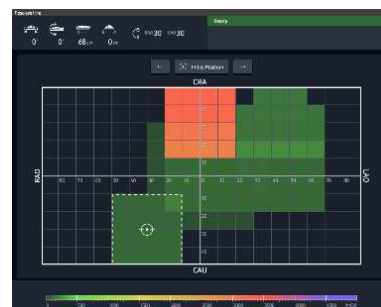


Applications ※for SCORE Workstation

Dose-eye Live*

Dose map function that displays the peak entrance surface dose in real time during the procedure. The accumulate entrance surface dose is displayed in a color map which indicates hotspot during the procedure. At the same time, the irradiation range at the current geometry position is also displayed, so intuitive C-arm angle selection that avoids the hot spot area is available.

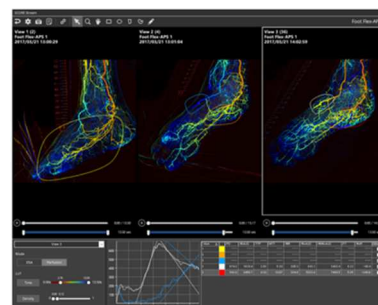
It is useful for managing the peak entrance surface dose, which could not be grasped only by the total dose display.



Real-time Dose MAP

SCORE Stream*

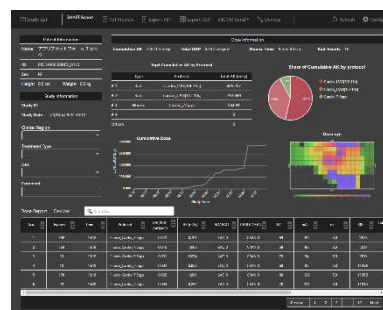
By performing blood flow analysis from the DSA image, it is possible to analyze the perfusion map and perfusion information in any ROI. It is available to compare the blood flow status in the area of interest before and after procedure.



Perfusion Analysis

SMART Report*

In addition to the dose summary information, the ratio to the total dose for each imaging/ acquisition protocol used in the examination, the maximum dose map, and the total dose simulation when using the recommended protocol are summarized in a report. It is a function that leads to the efforts of further dose reduction.



Dose Report

SMART Record*

Recording all Live monitors during examination. It is available to output a video file that cuts the time when X-rays are not exposed. It can be used not only for recording the entire examination, but also for study sessions in the hospital.



SMART Record

5. Monitors/Monitor Suspensions (MTA-100 series)

In addition to the longitudinal and transverse movement, it has a rotating mechanism with a wide range of movement, allowing it to be laid out freely regardless of the procedure. Intuitive and nimble operation is available due to the perfect counter balance.

5.1 Standard Monitor

Configurations and Specifications	
Standard monitor (Exam./Cont.)	Main Configurations : 19inchLCD x 2 (Exam. Room) 19inchLCD x 2 (Cont. Room, with Stand) • Specifications Type : 19inchLCD Resolution: 1280 x 1024 Brightness: 700 cd/m2 Signal interface: DVI-D



Standard 19inch LCD (Cont. Room)

5.2 Integrated monitor SMART Display

5.2.1 SMART Display for Examination Room

Configurations and Specifications	
Integrated monitor SMART Display (Exam. Room)	Main Configurations: 58inchLCD(with Protection glass), 19inchLCD (for backup), Video Manager Unit(VMU), Cables for 2nd live window in examination room (for live image display during MAP) Note) If the SMART Display for the control room is not selected, 19inch LCD x 2 (for the control room, with stand) are configured. • Specifications Type : 58inch LCD Resolution: 3840 x 2160 Brightness: 500 cd/m² Simultaneous display: 8ch Signal interface: Display Port



58inch SMART Display (Exam. Room)

5.2.2 SMART Display for Control Room

Configurations and Specifications	
Integrated monitor SMART Display (Cont. Room)	Main Configurations: 31inch LCD, Monitor Stand, SMART Display out put license, Cables for 2nd live window in control room (for live image display during MAP) • Specifications Type : 31inch LCD Resolution: 4096 x 2160 Brightness: 450 cd/m² Maximum number of connections : 2 monitors Simultaneous display: 8ch Signal interface: Display Port



31inch SMART Display (Cont, Room)

5.2.3 Video Manager Unit (VMU)

Configurations and Specifications

Video Manager Unit (VMU)	- Specifications -Input Channels: 19ch (Inc. Trinias systems) -Input Terminals: DVI-D x 13, GigE x 2 (receptable 3ch for each) -Input Performance: WUXGA, Full HD, UXGA, SXGA+, SXGA, WXGA+, XGA+, HD, XGA, SVGA, VGA (60 Hz) -Simultaneous display: 8ch (for 4K), 6ch(for Full-HD) -Output Performance: 4K, Full HD -Output Terminals: Display port (for 4K) x 1 (Max +2*) DVI (for Full-HD) x 1* -Operation interfaces - Number of PC connection: 8 (Exc. Trinias systems) - Number of mouse/keyboard connection : 5set (Exc. Trinias systems) -Main function -Layout management (setup/ registration/ change), Trimming, Integrated mouse/ Keyboard operation for connected medical devices.
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5.3 Optional monitor for standard 19inch LCD Configurations

Configurations and Specifications

2nd Live monitor for Exam. /Cont. Room*	3 images of MAP (overlay Live and roadmap), reference and 2nd Live image can be displayed at the same time during SCORE MAP. Note) In the case of 19inch LCD systems, up to 2 sets can be installed, one for the examination room and one for the control room. If the SMART Display for the control room is not selected, a 19inch LCD (for the control room, with stand) is available to be configured.
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2nd Live Monitor (Cont. Room)

5.4 Monitor Suspension

Configurations and Specifications

Monitor Suspension (MTA-100 series)	Number of monitors mountable on monitor support 19 inch LCD: 4/6 monitors Vertical: 1560 – 1890mm (Ceiling height at 2845mm) Rotation: Suspension Frame 320°, Carriage 340° <with Ceiling mounted C-arm MH-500> Longitudinal move Range: max. 3600mm Lateral mover Range: max.3800mm <with Floor mounted C-arm MH-600> Longitudinal move Range: max. 3500mm Lateral move Range: max.3800mm
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MTA-100
(19inch LCD 6 sets)



MTA-100
(SMART Display for Exam. room)

Note) The move range is limited by the position of the C-arm and the installation position of peripheral devices.

6 X-Ray High-Voltage Generator (D150GC-40)

Designed specifically for angiography systems, the D150GC-40 enables 50kHz high frequency inverter control. It provides stable high-quality images with less ripple on waveforms.

Configurations and Specifications	
Control method	50 kHz inverter
Rated output	100kW (100kV, 1000mA) (IEC 60601-2-7, 1998)
Setting Range (Radiography)	Tube voltage:40-150kV Tube Current:10-1250mA mAs: 0.5 -800 mAs Time:0.001 – 10 秒
Setting Range (Fluoroscopy)	Tube voltage: 50 -125kV Tube Current: 0.3 -38mA
Maximum tube current conditions (Maximum tube voltage, Long-time/Short-time rating)	Main power 400V system Short-time rating : 80kV 1250mA Long-time rating : 100kV 38mA Main power 200V system Short-time rating : 80kV 1000mA Long-time rating : 100kV 38mA
Maximum electrical output A combination of tube voltage and tube current	Main power 400V system Short-time rating : 80kV 1250mA, 100kV 1000mA, 125 kV 800mA Long-time rating : 100kV 38mA, 125kV 30.4mA Main power 200V system Short-time rating : 80kV 1000mA, 100kV 800mA, 125 kV 630 mA, 100 kV 800 mA, 80 kV 1000 mA Long-time rating : 100kV 38mA, 125kV 30.4mA
Minimum tube current time	0.5mAs
Long-time rating (Fluoroscopic rating)	3800W: 125kV –30.4 mA 100kV –38 mA
Cumulative fluoroscopy time	Display on LCD monitor
Self-diagnostic function	Display on LCD monitor
Backup filament function	Switches automatically
Wave tail cutoff	Grid switch control

7 X-Ray Tube (E79039X)

Configurations and Specifications	
Tube voltage	40 to 125 kV (during fluoroscopy/radiography)
Nominal focal spot size	Small focus:0.6 mm Large focus:1.0 mm
Input power (0.1s), Nominal anode input power (0.1 s)	Small focus:43 kW Large focus:80kW
Nominal radiographic anode input power	Small focus:43 kW Large focus:80kW
Max. tube current	Small focus: 480 mA Large focus: 800 mA
Thermal characteristics	Anode heat capacity(eq) : 2600 kHU eff Anode cooling rate : 4500 W (6300 HU/sec = 378 kHU/min) Tube unit heat capacity : 2679 kHU
Max. continuous X-ray tube input	60-min: 2200 W (3100 HU/sec)
Anode target	Material: Rhenium-tungsten Diameter: 140 mm Angle: 11° rpm: 9000 rpm or more
Anode bearing	Liquid metal bearing
Inherent filtration	1.5 mm Al equivalent (75 kV tube voltage)
Cooling system	Hybrid-Cooling (Primary: Oil, Secondary: Water)
Weight	Main unit : Approx. 38kg Heat exchanger : Approx. 30kg

8 Collimator (F-100)

The newly developed collimator F-100 can electrically operate the aperture of the irradiation field in the horizontal and vertical directions. Virtual collimation and compensation filter are functioned, which enable to display virtual collimation range and compensation filter position without X-ray exposure. In addition, offset collimation that collimates only the area of interest, not the central area of the screen, is available by making full use of the single-action aperture.

Configurations and Specifications	
Operation	Collimator Control Module
Irradiation Field	Rectangle
Leaf	H leaf (Horizontal), V leaf (Vertical)
Single-acting aperture	Available, Center position movement
Virtual Collimation	Available
Multi Beam-Hardening (MBH) filters / (Inherent filtration)	12types
	1. 1.0 mm Al (1.0 mm Aleq.)
	2. 1.0 mm Al + 0.1mm Cu (4.0 mm Aleq.)
	3. 1.0 mm Al + 0.2mm Cu (6.4 mm Aleq.)
	4. 1.0 mm Al + 0.3mm Cu (8.9 mm Aleq.)
	5. 1.0 mm Al + 0.4mm Cu (11.1 mm Aleq.)
	6. 1.0 mm Al + 0.5mm Cu (13.0 mm Aleq.)
	7. 1.0 mm Al + 0.6mm Cu (15.0 mm Aleq.)
	8. 1.0 mm Al + 0.7mm Cu (16.9 mm Aleq.)
	9. 1.0 mm Al + 0.8mm Cu (19.8 mm Aleq.)
	10. 1.0 mm Al + 0.9mm Cu (21.7 mm Aleq.)
	11. 1.0 mm Al + 1.0mm Cu (24.0 mm Aleq.)
	12. 1.0 mm Al + 1.1mm Cu (25.5 mm Aleq.)
Multi Beam-Hardening (MBH) Filter rotation speed	90°/0.3sec 180°/0.5sec
Compensation Filter Number/Material/Thickness	2 filters/Cu/ Max. 2 mm
Virtual compensation filter	Available
Leakage dose	54mR/h (125kVp, 30.4mA) or less

Inherent filtration of other main components	
Beam-Hardening filters	Refer the above sheet
X-ray tube	1.5 mm Aleq. (at 75 kV)
Area Dosimeter	0.2 mm Aleq. (at 75 kV)

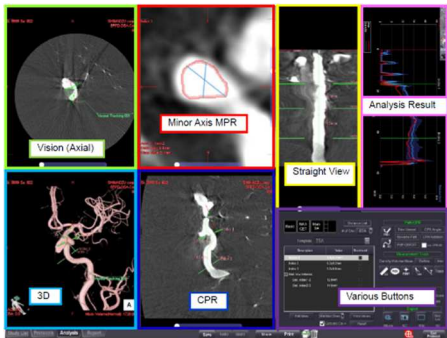
Note) Total amount will be changed in combination with type of patient Table

9 SCORE 3D Workstation (Optional)

From pre-treatment planning to post-treatment follow-up in the catheterization room becomes available. In addition, as image guidance during treatment, it provides a safe and secure treatment environment as image guidance with more information than 2D images, such as capturing 3D images from other modalities and a roadmap function that superimposes 3D images and perspective images.

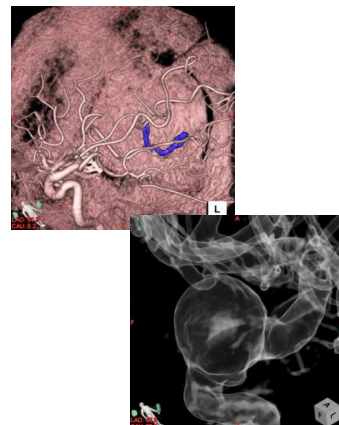


Configurations and Specifications

SCORE 3D*	Generates vascular Volume Rendering image from rotating DA / DSA acquisition	
SCORE CT*	Generates C-arm CT image from rotating DA acquisition	
SCORE Navi*	3D load mapping that overlays 3D and fluoroscopy images	
Multimodality Q/R*	Retrieve MDCT/MRI images with DICOM Q/R and display on 3 workstations	
Functions	Display mode: VR ,MPR, CPR, MIP ,VE ,See-through, Multi data fusion, Multi data comparison Displayable number of slices: Max. 2048 slices Analysis Functions: Distance, Angle, Volume, Vessel Angle synchronization: Image ⇔ C-arm bi-directional Media Archive: DVD-R DICOM: DICOM Storage, DICOM QR, DICOM Print	
Computer configuration	OS : Windows 10, 64bit CPU : Xeon 2.6GHz (8core) or more RAM : 16 GB or more Storage :1.5TB or more Media Archive: DVD-R (DICOM format)	
Monitor	Type :21inch LCD Resolution: 1600 x 1200 or more Brightness: Max. 300 cd/m2	

3D Angiography (SCORE 3D*)

Acquisition	Mode: SCORE 3D-DA / 3D-DSA
	Position and Rotation Range: -Home Position LAO 120°/RAO 90° (60deg/s or 40 deg/s)
	Matrix/Rate: 1024 x 1024, 12 bit, 30 fps
	Number of frames: approx. 100 frames (60 deg/s) approx. 150 frames (40 deg/s)
Rendering	FOV(inch):16 x 12(C16s)/12/10/ 8 inch
	Voxel: 512 ³ ·256 ³
	Display matrix: 512, 256
	Size: Φ250 mm x H190 mm (at FOV 16 x 12 inch) Φ190 mm x H190 mm (at FOV 12 inch)
	Time: min 15sec (After complete the acquisition)



C-arm CT(SCORE CT*)

SCORE CT mode

Acquisition	Mode: SCORE CT
	Position and Rotation Range: -Home Position LAO 120° to RAO 90° (20 deg/s or 10deg/s)
	-L/R-Side Position (MH-500)
	-L/R-Rotation Position (MH-600) LAO 90° to RAO 90° (20 deg/s)
	Matrix/Rate:1024 x 1024, 16 bit/30fps
	Number of frames: approx. 630 frames (10 deg/s) approx. 315 frames (20 deg/s)
Rendering	FOV(inch):16x12(C16s)/12 inch
	Voxel: 512 ³ ·256 ³
	Display matrix:512, 256
	Size: Φ250 mm x H190 mm (at FOV 16 x 12 inch) Φ190 mm x H190 mm (at FOV 12 inch)
	Time: min 30sec (After complete the acquisition)



SCORE CT-HR mode

Acquisition	Mode: SCORE CT-HR
	Position and Rotation Range: Home Position, LAO 120° to RAO 90° (10 deg/s)
	Matrix/Rate:1024 x 1024, 16 bit/30 fps
	Number of frames: approx. 630 frames
Rendering	FOV(inch): 8x8inch
	Voxel :512 ³ ·256 ³
	Display matrix:512, 256
	Size :Φ60 mm x H60 mm
	Time : min 30sec (After complete the acquisition)



3D Roadmap (SCORE Navi*)

Functions

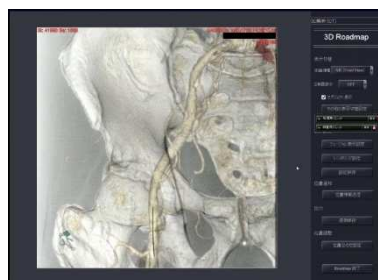
Overlay with fluoroscopy: VR, MIP
Synchronization Functions: C-arm, FOV size, SID
Patient Table (Horizontal floating, Vertical)
Position correction function: Translation, rotation, scaling
Magnification of fluoroscopy image: x2, x4



Multimodality Q/R*

Functions

Retrievable: CT/MRI
Displayable Slices Number: Max 2,048 slices
Angle registration :2 angle from Fluoroscopy image
Automatic Function: Segmentations (Brain, bronchi, lungs, heart, pulmonary arteries and veins, aorta, large intestine, air region, coronary arteries), Remove Bone.
Analysis function: Contour enhancement, Virtual Stent, Extender, Remover, Grow Structure.



10 User Friendly Functions

SMILE Dose-eye `awareness of dose reduction`

Multi Beam-Hardening (MBH) filters

Efficiently eliminates unnecessary soft X-rays by utilizing 12 set of filter combinations.

Pulsed Fluoroscopy

10 speed of pulse rates according to the application

Virtual Collimation / Filtering

Enables collimation / Filtering without fluoroscopy

Available to operate asymmetrically and the center shifting

Fluoroscopy Video Recording

High-quality fluoroscopy: substitute for DA

Area Dosimeter

Displays the actual dosage (DICOM RDSR)

Cumulative Dose threshold function

Alert function to notify the arrival of threshold

SMILE Recovery `A safe design`

High-Speed Start-up

90 seconds: From turning on the system power to enabling X-ray exposure.

High-Speed Transfer: HTS

Reliable data backup

Backup Filament

Continue procedure even if filament problem

11 System Installation Environment

Main Power

For 3-phase 400V:

Main Power: 3-phase 380/400/415/440/480V
(50/60 Hz), 75 kVA min.

Digital: Single-phase 200/220/230/240 V
(50/60 Hz), 8 kVA min.
(12 kVA min. with option)

For 3-phase 200V:

Mandatory to use Step-up Trans

Installation Environment

Temperature and Humidity

Examination room : 10-35 °C, 30-75 %

Control room : 10-35 °C, 15-75 %

Mechanical room : 10-30 °C, 15-75 %

Note)

30-75% when combining with SMART table KS-100

Heat Generation

Examination room:

1000W while powered ON and 0 W when OFF

Control room:

300W while powered ON and 23W when OFF

Machine room:

6199W while powered ON and 814W when OFF

Installation Space

Examination Room

C12s/C16s

Recommended space : 6500(W) x 7200(L) mm

Minimum space : 5500(W) x 6600(L) mm

Height : 2850mm

F12s

Recommended space : 6000(W) x 6500(L) mm

Minimum space : 4200(W) x 5500(L) mm

Height : 2600mm or more

Machine room

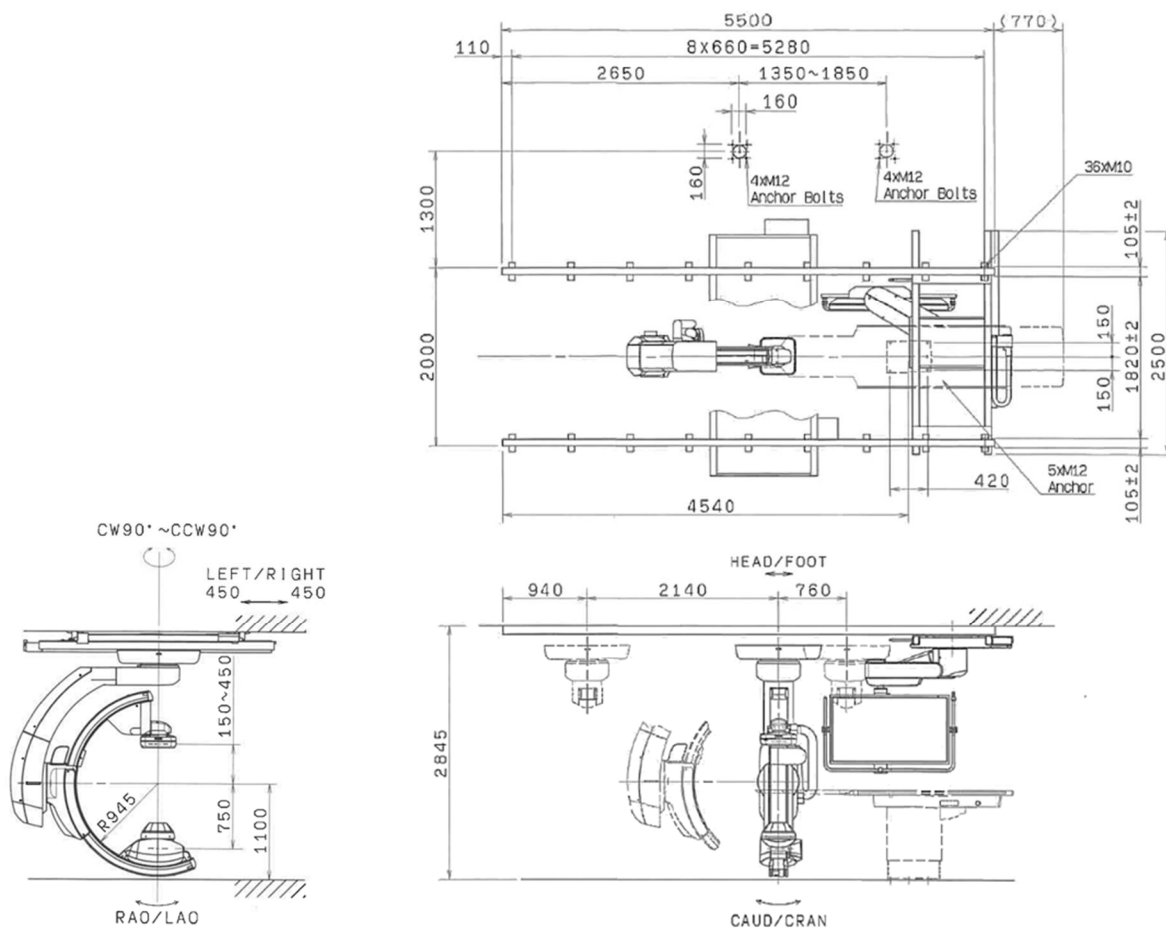
Minimum space : 1100 x 2500 mm or more

Height : 2000mm or more

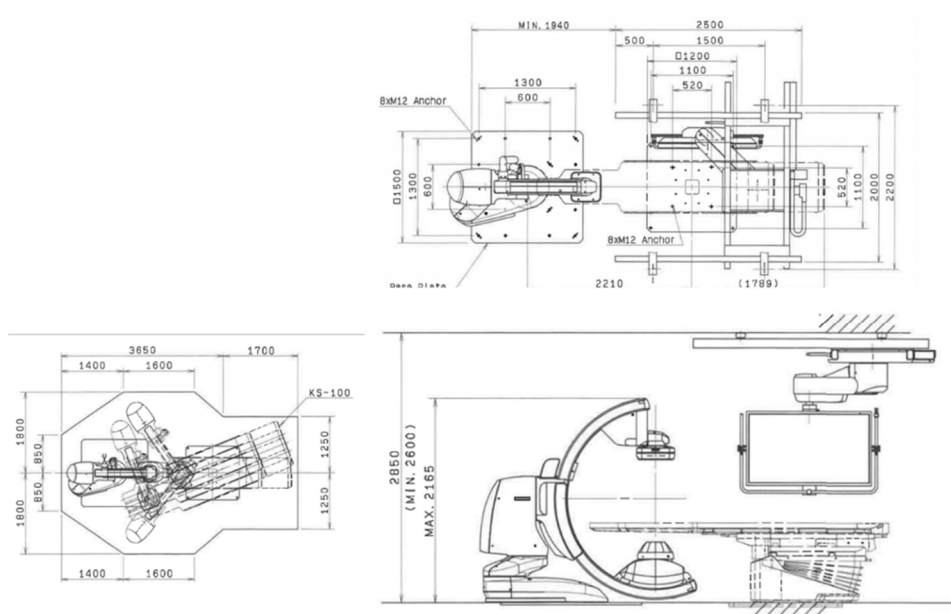
12 System Dimensional Drawing

Ceiling-mounted C-arm MH-500 (C12: KS-70 type)

Note) Other than FPD size, every size is the same with C16 system.



Floor-mounted C-arm MH-600 (F12:KS-100 type)



Note)

SCORE stands for Shimadzu Challenge Of RevolutionSMART stands for Shimadzu Makes Advanced Remarkable TechnologySMILE stands for Shimadzu Makes Innovation in Life for Everyone

Label Description: Digital Angiography System Trinias

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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.

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- Contact your sales representative for information on specific configurations.
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