



Toshiba Aquilion TSX-101A/I Series Site Planning Manual

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No. 2A201-519EN*A
TOSHIBA
SITE PLANNING MANUAL
FOR
TOSHIBA SCANNER
MODEL TSX-101A
(2A201-519EN*A)

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Aquilion

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Related Manuals for Toshiba Aquilion TSX-101A/I Series

[Scanner Toshiba GA-1330 Operator's Manual](#)

(31 pages)

[Scanner Toshiba JOURNEE scan PA3712D-1ETC Specifications](#)

Portable scanner (2 pages)

[Scanner Toshiba GA-1330 Service Manual](#)

(38 pages)

Summary of Contents for Toshiba Aquilion TSX-101A/I Series

[Page 1](#) No. 2A201-519EN*A SITE PLANNING MANUAL TOSHIBA SCANNER MODEL TSX-101A (2A201-519EN*A) © TOSHIBA MEDICAL SYSTEMS CORPORATION 2005-2006 ALL RIGHTS RESERVED...

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[Page 3](#) No. 2A201-519EN*A REVISION RECORD REASON PAGE REV. DATE SER. DOC. (MM/YY) /AUTHOR CHANGED PRODUCT. INI. 07/'05 Mr. Shinno ----- KD-WPX 03/'06 Addition of grounding for 72-kW P. 37 system transformer Mr. Mizuno...

[Page 4: Safety Precautions](#)

No. 2A201-519EN*A Safety Precautions Meaning of Signal Words DANGER WARNING CAUTION In this manual, the signal words , and are used to indicate safety and other important instructions. The signal words and their meanings are defined as follows. Please understand their meanings clearly before reading this manual. Signal word Meaning Indicates an imminently hazardous situation which, if not avoided, will...

[Page 5](#) 1. An independent power supply must be provided for this system at the cubicle output stage. Otherwise, this system may adversely affect other facilities or equipment. 2. Use only noise filters manufactured by Toshiba. The noise filter of this system is designed taking into account extreme phenomena such as lightning. If a noise filter made by a manufacturer other than Toshiba is used, the system may not be protected adequately.

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[Page 8: Scope](#)

No. 2A201-519EN*A SCOPE This document applies to the Toshiba scanner Aquilion model TSX-101A. Model Type Standard patient couch TSX-101A/I series 32-slice system CBTB-019A or CBTB-019B TSX-101A/H series 64-slice system CBTB-019A or CBTB-019B : The patient couch used in combination depends on the system model.

[Page 9: Main Specifications For Site Planning](#)

No. 2A201-519EN*A MAIN SPECIFICATIONS FOR SITE PLANNING Classification of the equipment Class of protection against electric shock Class I Type of protection against electric shock Type B Level of protection against the ingress of Normal equipment (IPX0) water Type of safety when used in an environment Equipment that should not be used in an where flammable gas mixtures with air or environment where flammable gas mixtures...

[Page 10](#) No. 2A201-519EN*A Site environment Ambient temperature, humidity, and calorific value Table 4-1 Heat generation by units and environmental conditions Maximum heat Normal heat Environmental conditions Names of rooms generation *1 generation *2 and units [kW] [kJ/h] *3 [kW] [kJ/h] Relative humidity (%) Temperature *4 (°C) 1.

[Page 11](#) No. 2A201-519EN*A External dimensions and mass External dimensions Mass Unit name (kg) Width (mm) Depth (mm) Height (mm) Gantry (with cover) 2,330 1,950 1,750 Gantry (without cover but with 2,290 1,935 1,650 median-line metal plate) Patient couch (CBTB-019A) 2,690 Patient couch (CBTB-019B) 2,390 Console (CKCN-012B/2A) 2,470...

[Page 12](#) No. 2A201-519EN*A (12) Installation conditions Installed location : Group 1 according to IEC60364-7-710 NOTE: 1. Group 1 requirement is described in IEC60364-7-710. 2. The title of IEC60364-7-710 is "Electrical installations of buildings - Part 7-710: Requirements for special installations or locations - Medical Locations". 3.

[Page 13: Space Requirements](#)

No. 2A201-519EN*A SPACE REQUIREMENTS The floor space for unit installation should be 25 m or more, divided into two rooms. Subsection 5.3 provides an example of the layout for the minimum space and subsection 5.4 provides a reference figure for the maintenance space. For patient couch CBTB-019A : Required space 27 m or more...

[Page 14](#) No. 2A201-519EN*A Miscellaneous The following should be provided where required:
• Washstand : For water phantom or contrast medium injector • Storage rack : For first-aid kit or accessories • Gases required for medical treatment : Oxygen and nitrogen dioxide •...

[Page 15: Scan Control Room](#)

No. 2A201-519EN*A Scan Control Room The console (CPU BOX, monitors×2, keyboards×2, mice×2) is installed in the scan control room. CAUTION: If the system transformer is installed beside the console, adequate distance must be kept between them. Otherwise, the displayed images may be adversely affected.

[Page 16: Layout](#)

No. 2A201-519EN*A Layout An example of the layout for the minimum space is given below. Gantry Patient couch (CBTB-019A) Console (in scanning room) • REC BOX Console (in control room) • CPU BOX • Liquid-crystal monitors • Keyboards • Mice Patient observation system (This is not included in...

[Page 17](#) No. 2A201-519EN*A Gantry Patient couch (CBTB-019B) Console (in scanning room) • REC BOX Console (in control room) • CPU BOX • Liquid-crystal monitors • Keyboards • Mice Patient observation system (This is not included in the system configuration. In this example layout, the patient observation monitor is provided by...

[Page 18: Maintenance Space](#)

No. 2A201-519EN*A Maintenance Space Gantry Patient couch Console (in scanning room) Console (in control room) Since the scanner front cover opens outward, provide a clearance of 1400 mm for opening/closing the cover. Provide a clearance of at least 650 mm behind the scanner for servicing the LCSR, data transfer section.

[Page 19: System Operating Environment And Emc](#)

No. 2A201-519EN*A System Operating Environment and EMC Recently, the EMC (electromagnetic compatibility) problem in hospitals has drawn attention. To prevent the problem from occurring and to ensure that the system operates in a stable manner, this system conforms to IEC60601-1-2, the international standards regarding EMC. The standards specify the requirements taking into account the following points: <1>...

[Page 20: Classification Of Installation-Related Work](#)

Water supply and drainage work (e.g., for a washstand) (Refer to section 9.) Scope of Work to Be Executed by Toshiba Bringing-in, installation, and adjustment of the entire system Intersystem wiring and cable connections to the customer's facilities...

[Page 21: Building Construction Work](#)

Bringing-in method The system is normally shipped with the covers mounted. If it is necessary to disassemble the system to reduce the external dimensions or mass for any reason, consult Toshiba in advance. External dimensions and mass The following figure shows the external dimensions and mass of the gantry and the required size of the bringing-in entrance.

[Page 22: X-Ray Shielding In The Scanning Room](#)

No. 2A201-519EN*A X-ray Shielding in the Scanning Room The gantry (scanner) and the patient couch in the patient environment must be installed in a scanning room provided with X-ray shielding. The console is installed in the control room outside the scanning room. Operations related to X-ray generation are basically performed from the control room.

[Page 23: Tools And Materials Required](#)

Used for epoxy resin finishing (19) Electric mixer (BMV-150A) manufactured by It is recommended that an electric Toshiba mixer be used to mix the resin. <Supplier of the epoxy resin> Epoxy resin, diluent, and curing agent: Dainippon Ink and Chemicals, Inc.

[Page 24: Application Area](#)

No. 2A201-519EN*A 7.4.1.2 Application area The following shows the application area. It is recommended that the full-scale gauge be used for marking and anchor hole drilling work. (Full-scale gauge for Aquilion: BSX78-0564) Dimensions in [] show the dimensions of the epoxy base. Anchor hole for fine adjustment during installation (Use this...

[Page 25](#) No. 2A201-519EN*A Dimensions in [] show the dimensions of the epoxy base. Anchor hole for fine adjustment during installation (Use this hole as required.) or more Unit: mm Figure 7.4-2 Reference figure for levelling using epoxy resin (for patient couch CBTB-019B)

[Page 26: Work Procedures](#)

No. 2A201-519EN*A 7.4.1.3 Work procedures The main work procedures are as follows: Marking off the floor Drilling the anchor holes Removing the floor covering Making the frames for resin application Applying resin Finishing (forming) Marking 1. Determine the installation locations for the gantry and the patient couch (refer to subsection 5.3 "Layout").

[Page 27](#) No. 2A201-519EN*A Making the frames for resin application 1. Cut off the plastic L-angle plates along the marking line using a saw. Treat the corners as shown below. 2. Tape along the marking line of the plastic L-angle plates that have been cut off. 1) Tape the outside of the plastic L-angle plate to secure it.

[Page 28](#) No. 2A201-519EN*A 5) Using a spatula, apply caulking compound (joint sealant) to all sections where the resin may leak, such as the connections at the corners of, and the joints between, the plastic L-angle plates, the clearances between the installation surface and the base, etc.

[Page 29](#) No. 2A201-519EN*A Applying resin CAUTION: Observe the following precautions when applying epoxy resin during floor-leveling work. • Good ventilation must be provided since the epoxy resin is a volatile chemical. • This job must be performed with a plastic floor-covering sheet laid on the floor.

[Page 30: Wiring Pits And Wall Ducts](#)

No. 2A201-519EN*A Wiring Pits and Wall Ducts Wiring pits, wall ducts, and conduit pipes should be provided to facilitate wiring and interconnections between the units of the system. Be sure to give the following instructions to prevent incorrect system operation or abnormal image generation due to noise.

[Page 31: Precautions](#)

No. 2A201-519EN*A 7.5.3 Precautions The pit and duct must be electrically shielded. The pit and duct must be protected against flooding. The cover should be divided into sections approximately 1 meter in length. Divided into approximately 1 meter sections Iron cover Floor surface Iron sheet Iron sheet...

[Page 32: Pit Layout Example](#)

No. 2A201-519EN*A 7.5.4 Pit layout example Gantry Patient couch Console (in scanning room) • REC BOX Console (in control room) • CPU BOX • Monitors • Keyboards • Mice PC for InnerVision Pit for power cable Pit for signal cable Figure 7.5-2 Pit layout example...

[Page 33: Electrical Work](#)

No. 2A201-519EN*A ELECTRICAL WORK Electrical Equipment 8.1.1 Electrical specification For X-ray system Gantry stationary Application (gantry rotation section) section/console Number of phases Three phases Line voltage 200 V Frequency 50 Hz or 60 Hz Power capacity 100 kVA Rated capacity 85 kVA 14 kVA (Actual load capacity)

[Page 34: Power Transformer And Power Distribution](#)

No. 2A201-519EN*A 8.1.2 Power transformer and power distribution 8.1.2.1 Power transformer and power distribution cabling Works for the power transformer and power distribution cabling must be performed to meet the electrical specification shown in subsection 8.1.1. Design and installation should be made considering the maximum input currents listed below if a power distribution cable is very long.

[Page 35](#) No. 2A201-519EN*A Nominal sectional area for the wiring cables (mm Voltage 200 V 100 kVA (Actual lead 99 kVA) 600 V, IV wire used Conduit wiring Transformer capacity 150 kVA 100 kVA Distance between the power receiving transformer and the power distribution board (unit: m) Figure 8.1-1 Power supply system...

[Page 36](#) No. 2A201-519EN*A Voltage 200 V 100 kVA (Actual lead 99 kVA) 600 V, CV wire used Conduit wiring Nominal sectional area for the wiring cables (mm Transformer capacity 150 kVA 100 kVA Distance between the power receiving transformer and the power distribution board (unit: m) Figure 8.1-2 Power supply system...

[Page 37: Grounding For Power Transformer And Hospital Power Supply](#)

No. 2A201-519EN*A 8.1.2.2 Grounding for power transformer and hospital power supply When the hospital power is supplied using an isolation transformer or an isolated power supply, it is necessary to ground the neutral point or one of the phases of the secondary-side circuit connected to the gantry rotation section.

[Page 38: Ground Fault Interrupter](#)

No. 2A201-519EN*A 8.1.3 Ground fault interrupter 8.1.3.1 Leakage current Leakage current based on the IEC standards The leakage current test was conducted according to the IEC standards and it was confirmed that the results completely satisfy the standards. International standards and IEC60601-1 Medical electrical equipment test methods Continuous leakage current and patient auxiliary...

[Page 39: Countermeasures](#)

- The ground fault interrupter should be noise proof. (For example, Toshiba model NJV225F or equivalent) It is desirable that the breaker be replaced with a Toshiba-recommended breaker to prevent the leakage current problem described above. Countermeasures against incorrect operation due to high-frequency elements have been taken in the leakage detector of the recommended breaker, therefore the effects of the high- frequency elements are eliminated.

Page 40: Voltage Regulation

Use only noise filters manufactured by Toshiba. The noise filter of this system is designed taking into account extreme phenomena such as lightning. If a noise filter made by a manufacturer other than Toshiba is used, the system may not be protected adequately.

Page 41: Power Distribution Board

No. 2A201-519EN*A Power Distribution Board When 400 V is supplied Ground resistance: As per applicable legal requirements. 100A For 3-phase 400 V Note: The mounting orientation must be in accordance with IEC 60447. Figure 8.2-1 Cable connections to the power distribution board Grounding Grounding must be provided in accordance with all applicable legal requirements for medically used electrical equipment.

Page 42: Electrical Equipment

No. 2A201-519EN*A Electrical Equipment Electrical work should be executed according to the procedures below: Mount an "X-ray ON" lamp (100 VAC or 200 VAC) indicating "X-ray exposure in progress" above the entrance to the scanning room and connect the power cable of the lamp to the corresponding power supply facility (100 VAC or 200 VAC) of the site.

Page 43 No. 2A201-519EN*A [COLOR : BLACK] SPEAKER SPEAKER C-ROOM [GCIFA-D1 IC6B] [DAS1] [GCIFA-D2 IC6B] [DAS2] [GCIFA-D3 IC6B] [DAS3] [GCIFA-D4 IC6B] [DAS4] [CNN4] [INTERCOM] CS02 [S-CONT1] [S-CONT1] [CN603] [GTS.XC] CS03 [S-CONT2] [S-CONT2] [CNN5] [TB2] CS04 [CONT IDD] [CONT IDD] CS01 [CONT FC-AL] [CONT FC-AL] [TB1] SYSTEM...

Page 44 No. 2A201-519EN*A Table 8-1 List of inter-unit cables (1/3) Power cables Number of cores × Cable Wiring Connected Connected Standard Effective Retract length Maximum Outer cable Connector diameter (mm) Remarks to: (1) to: (2) length (m) length (m) length (m) diameter (mm) section area (mm 3 cores ×...

Page 45 No. 2A201-519EN*A Table 8-1 List of inter-unit cables (2/3) Signal cables (1/2) Number of cores × Cable Wiring Connected Connected Standard Effective Retract length Maximum Outer cable Connector diameter (mm) Remarks to: (1) to: (2) length (m) length (m) length (m) diameter (mm) section area (mm (mm)

Page 46 No. 2A201-519EN*A Table 8-1 List of inter-unit cables (3/3) Signal cables (2/2) Number of cores × Cable Wiring Connected Connected Standard Effective Retract length Maximum Outer cable Connector diameter (mm) Remarks to: (1) to: (2) length (m) length (m) length (m) diameter (mm) section area (mm (mm)

Page 47 No. 2A201-519EN*A Table 8-2 List of cables between the CPU BOX and the REC BOX Cable Wiring Connected Connected Standard Effective Retract length Number of cores × Outer cable Connector diameter (mm) Remarks to: (1) to: (2) length (m) length (m) section area diameter (mm) CS01...

Page 48 No. 2A201-519EN*A Console (REC BOX) Speaker 12 (17) (Scanning room) 12 (17) Console Gantry (CPU BOX) 11 (11) Patient System couch transformer Speaker (Control room) 8 (12) 8 (18) Power distribution board Unit: m * Distance between the units = Cable length - Retract length (Refer to tables 8-1 and 8-2.) * Values in parentheses indicate distances between units when the maximum- length cable is used.

Page 49: Installing A Public Telephone Line Jack For Innervision

No. 2A201-519EN*A Installing a Public Telephone Line Jack for InnerVision The Toshiba medical equipment remote maintenance system InnerVision is intended to provide the following service functions: • Diagnosis, inspection, etc. of the medical equipment • Image check By installing a service processor between the medical equipment and the telephone line jack,...

Page 50: Air Conditioning/Water Supply And Drainage Works

No. 2A201-519EN*A AIR CONDITIONING/WATER SUPPLY AND DRAINAGE WORKS Air Conditioning Air conditioning system Refer to the calorific values and environmental requirements of each room given in section 4 and install an air conditioning system that satisfies the given environmental requirements. Insure appropriate air flow in the rooms so that temperature distribution is uniform.

[Page 51: Water Supply And Drainage](#)

No. 2A201-519EN*A Dust Since the inside of the console is easily affected by dust, take extreme care to keep dust from the CPU BOX and REC BOX. Water Supply and Drainage A water supply and drainage facility is not required for this system, however, it is recommended that a washstand be provided.

[Page 52](#) No. 2A201-519EN*A or more HORIZONTAL SCAN AREA (A) BODY SCAN COUCH TOP 1472 (B) HEAD SCAN Unit: mm COUCH TOP Figure 10-1 Gantry and patient couch (for patient couch CBTB-019A)

[Page 53](#) No. 2A201-519EN*A or more HORIZONTAL SCAN AREA (A) BODY SCAN COUCH TOP 1172 (B) HEAD SCAN Unit: mm COUCH TOP Figure 10-2 Gantry and patient couch (for patient couch CBTB-019B)

[Page 54](#) No. 2A201-519EN*A Anchor hole for DETAIL "A" fine adjustment during installation (Use this hole as $\phi 18$ $\phi 24$ required.) or more Unit: mm ANCHOR Figure 10-3 Grounding and anchoring positions of the gantry and the patient couch (for patient couch CBTB-019A)

[Page 55](#) No. 2A201-519EN*A Anchor hole for DETAIL "A" fine adjustment during installation (Use this hole as $\phi 18$ $\phi 24$ required.) or more Unit: mm ANCHOR Figure 10-4 Grounding and anchoring positions of the gantry and the patient couch (for patient couch CBTB-019B)

[Page 56](#) No. 2A201-519EN*A Unit: mm Figure 10-5 Layout drawing of the gantry and the patient couch (for patient couch CBTB-019A)

[Page 57](#) No. 2A201-519EN*A Unit: mm Figure 10-6 Layout drawing (top view) of the gantry and the patient couch (for patient couch CBTB-019B)

[Page 58](#) No. 2A201-519EN*A (580) 2320 30° 30° (TILT ANGLE) 2330 Unit: mm Figure 10-7 Gantry...

[Page 59](#) No. 2A201-519EN*A <1> 1st monitor <1> <2> <4> <2> <2> Mice <3> 1st keyboard <4> 2nd monitor <5> 2nd keyboard <6> CPU BOX <7> REC BOX Cable length • CPU BOX-Keyboard : 2 m. Maximum length: 6 m CPU BOX-Monitor : 1.5 m.

[Page 60](#) No. 2A201-519EN*A INPUT Approx. 2 kg Figure 10-9 Speaker...

[Page 61](#) No. 2A201-519EN*A Metal screen Only two sides Weight 550 kg Figure 10-10 System transformer (Option) (CETF005C)

[Page 62: Appendix](#)

No. 2A201-519EN*A APPENDIX HANDLING EMC A.1.1 Effects of EMI noise and countermeasures Symptoms Some of the symptoms of EMI noise are listed below: 1. Noise occurs on the screen of an ultrasound system being used near the CT system. 2. Waveforms obtained by ECG equipment used near the CT system are irregular. 3.

[Page 63](#) No. 2A201-519EN*A 1. Countermeasures for the CT system Cause/route Cause/route Countermeasures identification procedure • System receives • Turn OFF the power of the CT • Change the orientation or position of radiation noise. system and check whether the system receiving noise. there is any change in the •...

[Page 64](#) No. 2A201-519EN*A 2. Countermeasures for the ultrasound system Cause/route Cause/route Countermeasures identification procedure Radiation noise Move the ultrasound system to a Ask the customer to use the ultrasound location far from the CT system. system at a location away from the CT Check whether or not the noise is system if possible.

[Page 65: Influence Of Static Electricity And Required Countermeasures](#)

No. 2A201-519EN*A Cause/route Cause/route Countermeasures identification procedure Entry from cables exposed to radiation noise • Radiation noise from Check whether the cables of the Change the cable routing to increase the ultrasound system and the distance between the cables. the cables of the CT optional units are close to the system transfers to the cables of the

CT system.

[Page 66](#) No. 2A201-519EN*A Necessity of countermeasures against static electricity CT systems contain various semiconductor devices which are very sensitive to static electricity. The following table shows the static electricity levels at which each device is damaged. Table A.1.2-1 Voltage range resulting in Type of component component damage (V) VMOS...

[Page 67](#) No. 2A201-519EN*A Suppression and prevention of static electricity (Antistatic measures for nonconductors) 1. Increasing relative humidity As shown in tables A.1.2-2 and A.1.2-3, the generation of static electricity can be prevented by increasing the relative humidity. Table A.1.2-2 Dependence of generated static electricity voltage on relative humidity Static electricity voltage (V) Static electricity generated by...

[Page 68](#) No. 2A201-519EN*A However, increasing humidity too much causes humidity hazard. (Refer to figure A.1.2-1.) Overall hazard ratio Leakage hazard Humidity hazard Corrosion hazard Annoyance hazard Clean room Static electricity hazard Relative humidity (%) Figure A.1.2-1 The relation between relative humidity and relative hazard ratio The above relationship indicates that the relative humidity for systems should be controlled in the 50% to 55% range as far as possible.

[Page 69](#) No. 2A201-519EN*A Figure A.1.2-3 illustrates an example of walking in place followed by standing on a conductive floor with normal shoes and conductive shoes. Preventive measures against static electricity using a conductive floor and conductive shoes are extremely effective. This method should therefore be used during site planning to prevent damage due to static electricity caused by users or service personnel.

[Page 70](#) No. 2A201-519EN*A Conductive floor space GTS side service space Connect the ground cable of the conductive floor to the gantry. Servo amplifier side service space Connect the ground cable of the conductive floor to the gantry. (3), (4) Gantry front service space Connect the ground cable of the conductive floor to the patient couch.

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