

X-RAY RADIOGRAPHY TABLE
BK-120M, BK-120MK
INSTALLATION MANUAL

This manual is for professional service engineers.
It bears no relation to the usual operation.

SHIMADZU CORPORATION
KYOTO JAPAN

Contents

1. Introduction	1 - 1
2. Preparation for Installation	2 - 1
2.1 Installation Room	2 - 1
2.2 Installation Tools	2 - 1
2.3 Unpacking	2 - 2
3. Floor Work	3 - 1
4. Assembly and Installation	4 - 1
4.1 For Europe	4 - 1
4.2 For others	4 - 5
5. Adjustment	5 - 1
5.1 Table Top Vertical Movement Stop Switches	5 - 1
5.2 Table Top Move-up Temporary Stop Switch	5 - 1
6. Inspection	6 - 1
6.1 Inspection for Installation	6 - 1
6.2 Periodic Inspection	6 - 2
7. Maintenance	7 - 1
7.1 Information for USER's appropriately qualified technical personnel	7 - 1
7.2 Consumable parts	7 - 1
7.3 Replacement of fuse	7 - 1
 BK-120M Equipment drawing	 503-06192
BK-120MK Equipment drawing	503-06198

[NO TEXT]

1. Introduction

This manual describes installation of the X-ray radiography table BK-120M, BK-120MK. From installation to adjustment are described in turn. Read this manual thoroughly before starting the installation work.

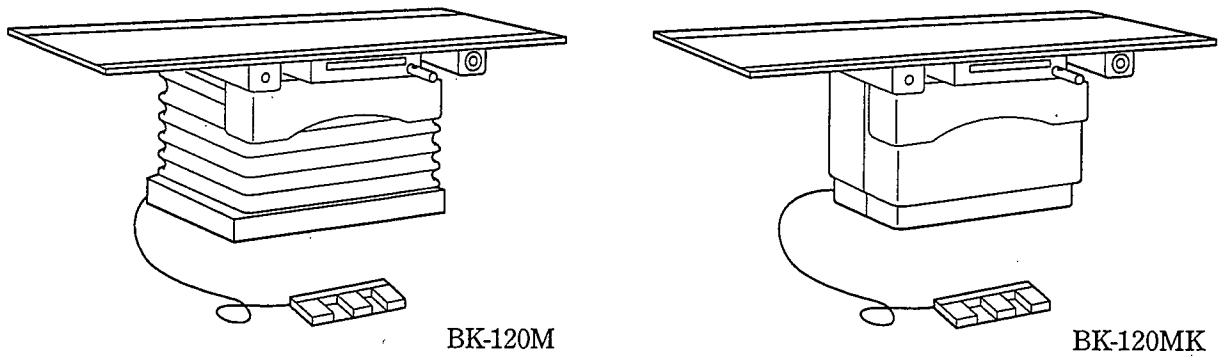


Fig. 1-1

Cautions on installation

- (1) Never irradiate X-rays beyond necessity.
- (2) Make sure to turn off the power when performing wiring.

The separation devices are following:

	VOLTAGE	device
For Europe	100V	the power SW of the X-ray generator
	200, 400V	the power SW of the TRANS UNIT
For others	100, 200V	the power SW of the X-ray generator

- (3) Take appropriate measures when handling heavy objects so that thumbs and fingers are not caught and that the waist is not damaged.
- (4) During installation of disassembled components, make sure that stoppers are appropriately provided.
- (5) Only for Europe.

The shipping cable is not IEC approved for 400V that terminal marks are "L" and "N".

Therefore exchange the cable for IEC approved cable.

Specification for cable is following;

Nominal VOLTAGE U0/U 300/500V

NO. of WIRE more 2

CONDUCTOR

SIZE 1.0sq.mm

DIA. of OUTER INSULATOR

less than 15mm

DIELECTRIC WITHSTANDING

TEST VOLTAGE 3000V/1min.

CONDUCTIVE RESISTANCE (reference)

35.7 OHM/km @20 deg.C

TEMPERATURE RANGE

-5°C to +70°C

2. Preparation for Installation

2.1 Installation Room

Check the following items for the installation room.

Item		Description
Outside dimensions of BK-120M		Equipment drawing 503-06192
Outside dimensions of BK-120MK		Equipment drawing 503-06198
Installation floor area		5,000W × 3,500W (recommended)
Weight		Approx. 320 kg
Power supplies		Single-phase, 100V, 1A, 50/60Hz
		Single-phase, 200V, 5A, 50/60Hz
	For Europe	Single-phase, 100V, 0.1KVA, 50/60Hz
		Single-phase, 400V, 1KVA, 50/60Hz

2.2 Installation Tools

Prepare the following tools for installation.

Quantity

①	Concrete drill	1
②	Anchor bolt M12 (offered as accessories of BK-120M, BK-120MK)	4
③	Measuring tape	1
④	Level	1
⑤	Phillips-head screwdriver	1
⑥	Monkey spanner	1
⑦	Tester	1
⑧	Hexagon rod wrench	

2.3 Unpacking

The BK-120M, BK-120MK is disassembled into the following components in a pack.

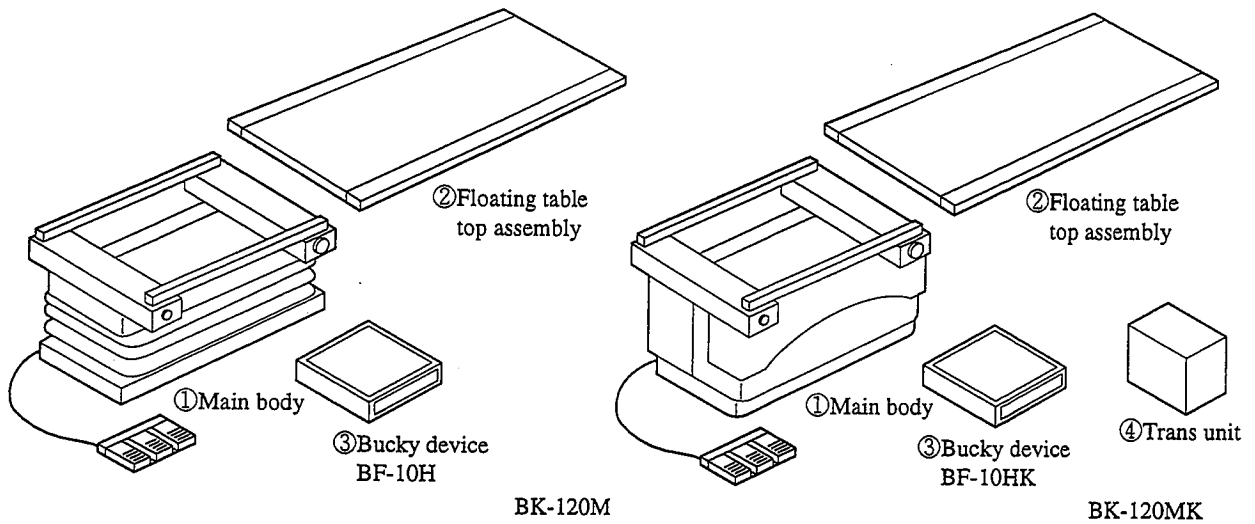


Fig. 2.1

- | | | |
|---|--|-------|
| ① | Main body (including foot switches) | 1 set |
| ② | Floating table top assembly | 1 set |
| ③ | Bucky device BF-10H (BK-120M) | 1 set |
| | Bucky device BF-10HK (BK-120MK) | |
| ④ | Trans unit (BK-120MK, only for Europe) | 1 set |
| ⑤ | Installation parts | 1 set |
| | Anchor bolt M12 | 4 |
| | Resin shoe for compression belt | 1 |
| | Bolt M12 × 30 | 4 |
| | Spare fuse 250VAC, 5A (slow-blow type) | 2 |
| | Spare fuse 250VAC, 1A (slow-blow type) | 2 |

After unpacking, make sure that no nonconformity is detected in each component.

3. Floor Work

Perform the floor work to fix the BK-120M, BK-120MK on the floor. (The BK-120M, BK-120MK cannot stand by itself while the table top is moved. Make sure to fix the BK-120M, BK-120MK to the floor.)

- (1) Mark anchor bolt positions on the floor in accordance with the equipment drawing.
- (2) When marking in the step (1) is finished, make holes on the floor using a concrete drill, and strike anchor bolts offered as accessories into the holes.

[NO TEXT]

4. Assembly and Installation

4.1 For Europe

4.1.1 Removing the cover

1. Unscrew the outer cover fixing screws.
2. Remove the outer cover.
3. Unscrew the inner cover fixing screws.
4. Remove the inner cover.

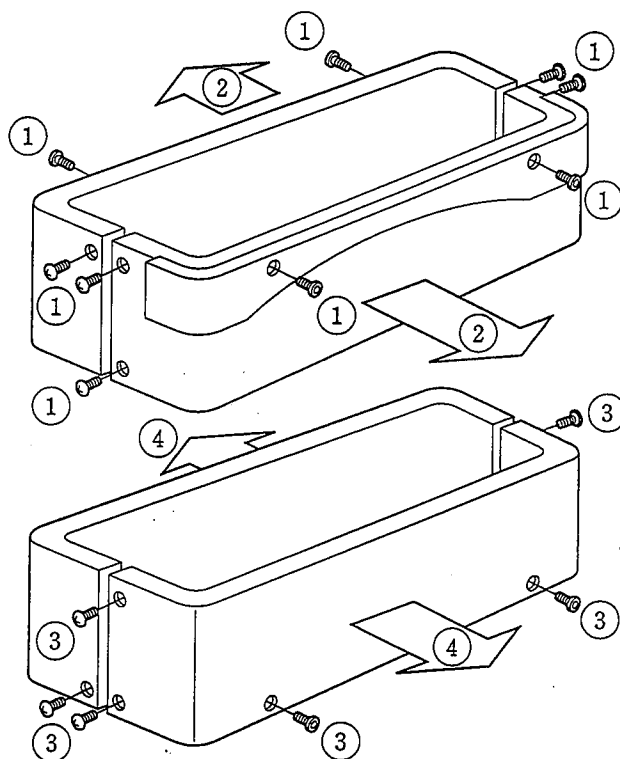


Fig. 4.1

4.1.2 Fix the main body on the floor.

(If there are deformations on the floor, repair them with liners, etc., assure level of the BK-120MK, then fix it. While level is adjusted, mounting holes on a main body floor plate can be used as jack screw holes. When assuring level, place a level on the table top.)

4.1.3 Exchange the power cable (400V)

The shipping cable is not IEC approved cable that terminal marks are "L" and "N".

Therefore exchange the cable for IEC approved cable.

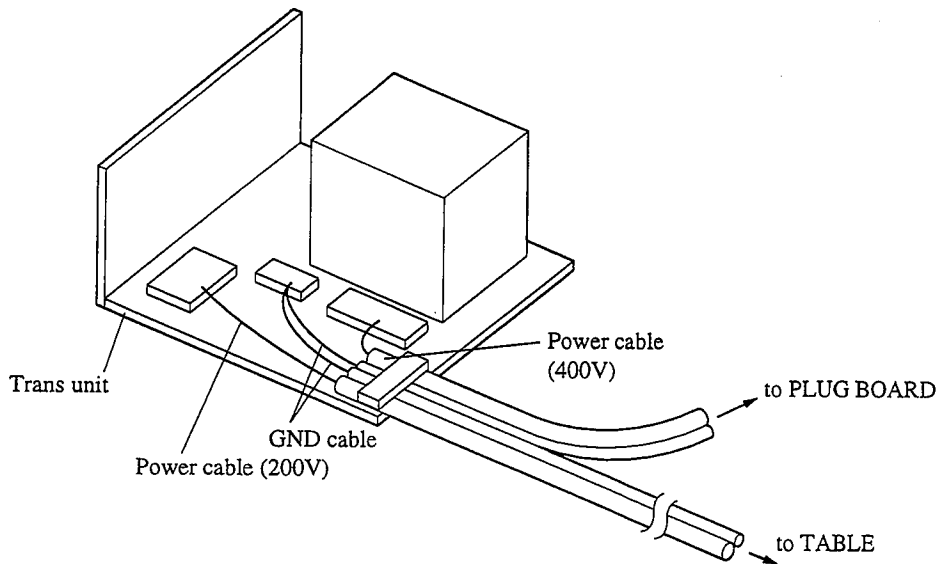


Fig. 4.2

4.1.4 Connect the power cable (400V) and the ground cable to the PLUG BOARD.

NOTE

Residual voltage of motor starting capacitor is more than 60V.
 Do not touch the terminals of TR1 and BK CONT PCB "U", "V", "Y".
 Keep pushing the switch for 10 sec, residual voltage is discharged and touch the terminals safety.

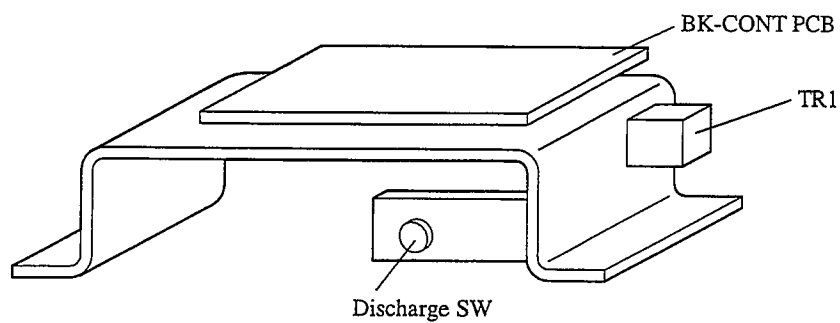


Fig. 4.3

Connect the trans unit to the table with the power cable (200V) and ground cable.

Connect the table to the X-ray high voltage generator with the power cable (100V).

Connect the foot switch cable to the BK-CONT PC Board.

Lay out the foot-switch cable along the power cable that is already laid out.

When phototimers are used, fix the phototimer cable together with other cables.

Make sure that the wiring from the BK-CONT PC Board to the Bucky device goes along with the Bucky cable which has been already wired.

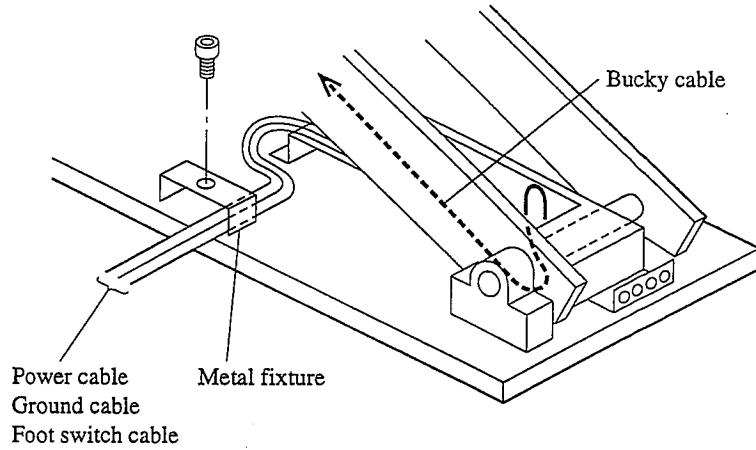


Fig. 4.4

4.1.5 Confirm the setting of the DIP switch provided on the BK-CONT PC Board.

Usually, it has been already set as shown below when shipped from the factory.

SW1	States	Remark
1	ON	Always ON
2	OFF	Always OFF
3	OFF	Always OFF
4	ON	Always ON
5	ON	Always ON
6	OFF	Always OFF
7	OFF	Always OFF
8	OFF	Collimator lamp lights simultaneously when the foot switch turned on.

4.1.6 It is recommended to let the power cable, the ground cable and the phototimer cable go outside from the cable fixture of the BK-120MK main body and treat them in a pit below the floor.

4.1.7 Fix the Bucky device to the mounting frame with bolts.

Connect the Bucky cable to the BF-CONT PC Board. Connect the Bucky handle switch cable to the Bucky cable.

When phototimers are used, treat the phototimer cable together with the Bucky cable. (For details, refer to the instruction manual of the Bucky device.)

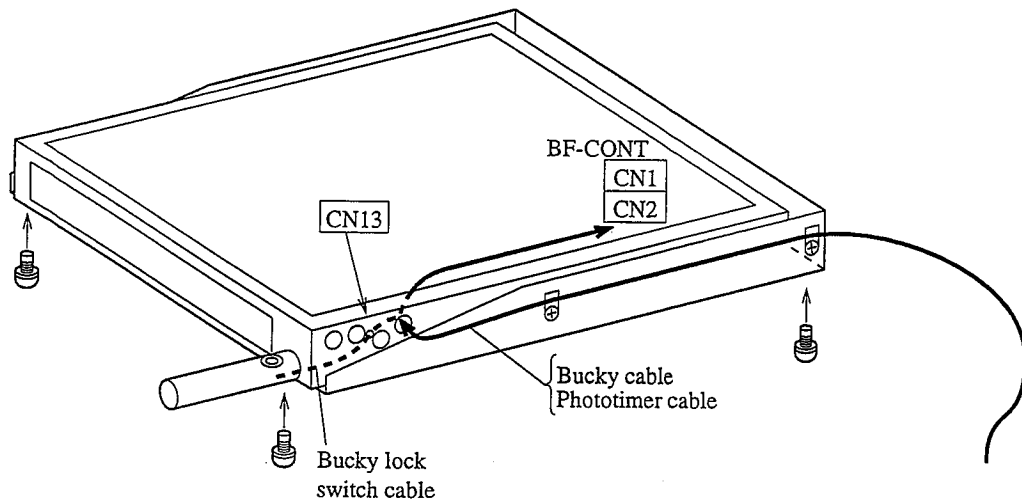


Fig. 4.5

4.1.8 Fixing the table top

1. Unscrew the stopper bolt (hexagon socket head cap screw: M10) on the left-to-right moving frame (the rear side).
2. Mount the table top from the unscrewed stopper bolt side. (The caution plate stuck on the aluminum side-rail of the table top should be on the front side.)
3. Screw the stopper bolt immediately after mounting the table top.

CAUTION

Make sure to attach a stopper to assure safety. If the stopper is not attached, the table top and a patient may drop together in the worst case, and the patient may be injured.

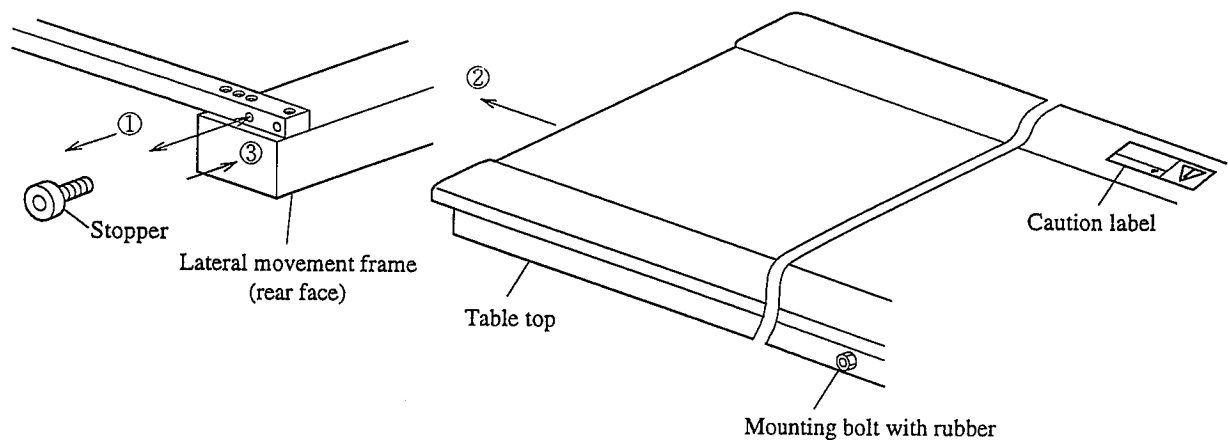


Fig. 4.6

4.1.9 Attach the main body cover

Fix the cover following the removing procedure in Section 4.1 in reverse order.

4.2 For others

4.2.1 Removing the Cover

4.2.1.1 In case of BK-120M:

1. Unscrew the cosmetic cover fixing bolts.
2. Remove the cosmetic cover.
3. Unscrew the stay fixing bolts.
4. Remove the stay. (Keeping the stay hooked by the loosened center bolt makes this work easier.)

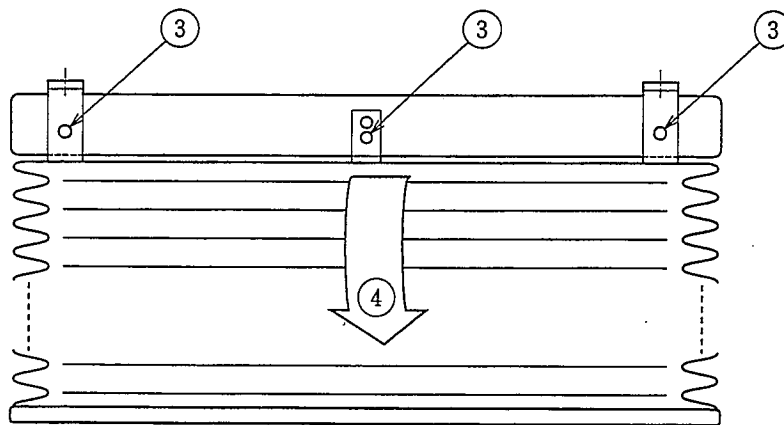
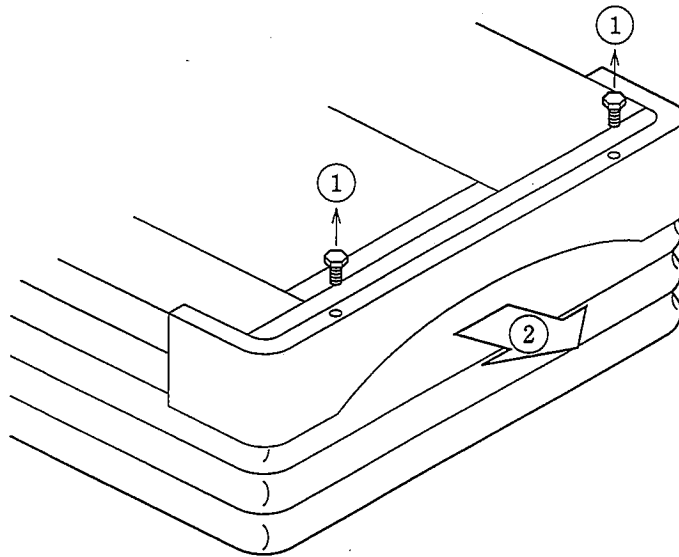


Fig. 4.7

4.2.1.2 In case of BK-120MK:

1. Unscrew the outer cover fixing screws.
2. Remove the outer cover.
3. Unscrew the inner cover fixing screws.
4. Remove the inner cover.

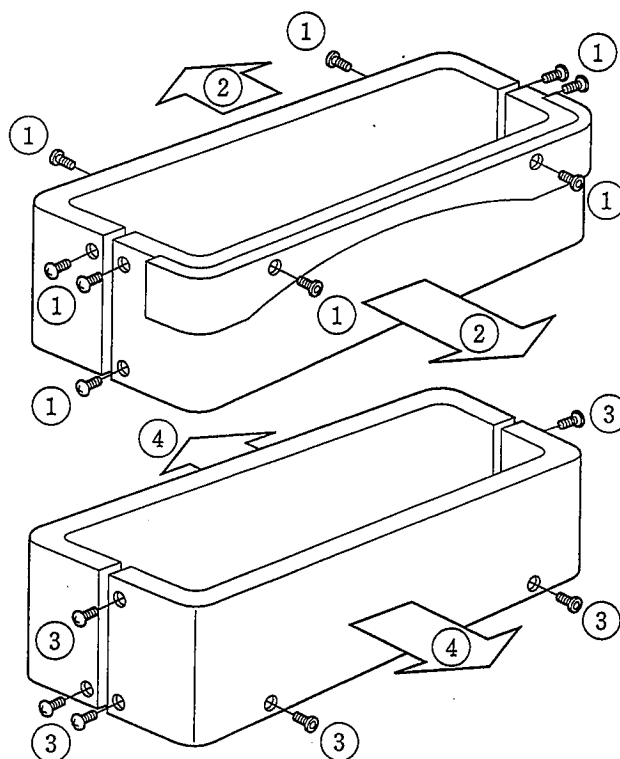


Fig. 4.8

4.2.2 Fix the main body on the floor.

(If there are deformations on the floor, repair them with liners, etc., assure level of the BK-120M, BK-120MK, then fix it. While level is adjusted, mounting holes on a main body floor plate can be used as jack screw holes. When assuring level, place a level on the table top.)

4.2.3 Connect the power cable and the ground cable to the X-ray high voltage generator and the ground respectively.

Connect the foot switch cable to the BK-CONT PC Board.

Lay out the foot-switch cable along the power cable that is already laid out.

When phototimers are used, fix the phototimer cable together with other cables.

Make sure that the wiring from the BK-CONT PC Board to the Bucky device goes along with the Bucky cable which has been already wired.

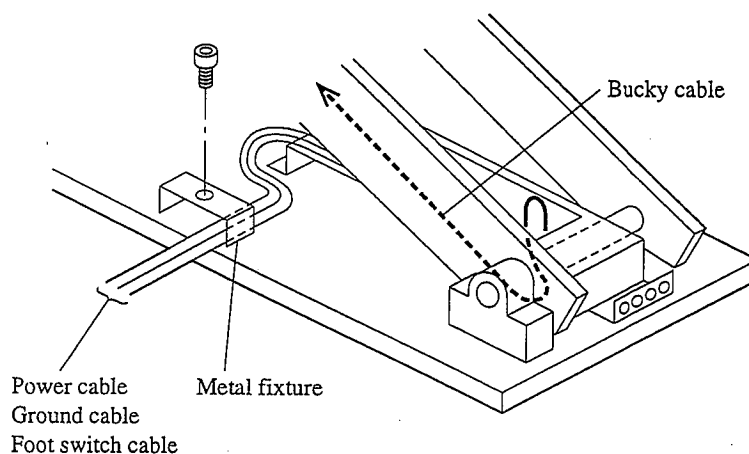


Fig. 4.9

4.2.4 Confirm the setting of the DIP switch provided on the BK-CONT PC Board.
Usually, it has been already set as shown below when shipped from the factory.

SW1	States	Remark
1	ON	Always ON
2	OFF	Always OFF
3	OFF	Always OFF
4	ON	Always ON
5	ON	Always ON
6	OFF	Always OFF
7	OFF	Always OFF
8	OFF	Collimator lamp lights simultaneously when the foot switch turned on.

4.2.5 It is recommended to let the power cable, the ground cable and the phototimer cable go outside from the cable fixture of the BK-120M, BK-120MK main body and treat them in a pit below the floor.

4.2.6 Fix the Bucky device to the mounting frame with bolts.

Connect the Bucky cable to the BF-CONT PC Board. Connect the Bucky handle switch cable to the Bucky cable.

When phototimers are used, treat the phototimer cable together with the Bucky cable. (For details, refer to the instruction manual of the Bucky device.)

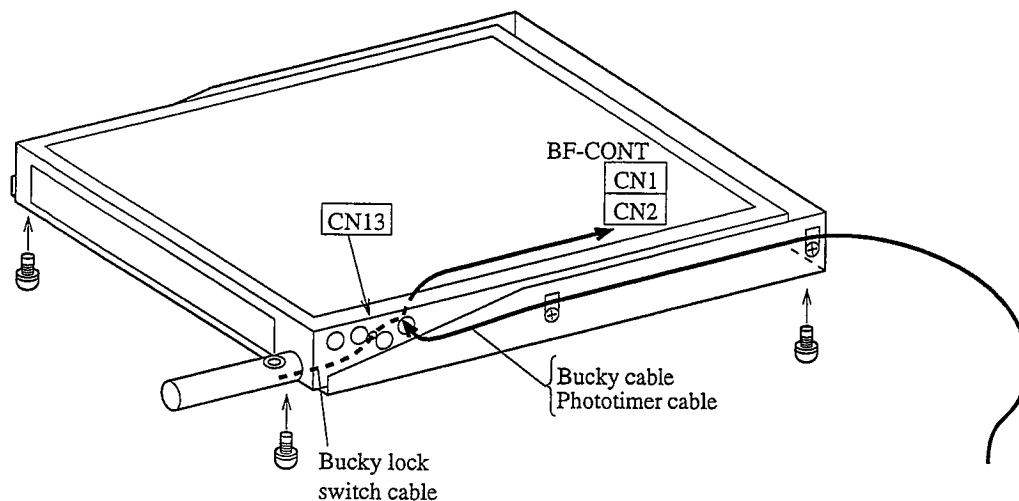


Fig. 4.10

4.2.7 Fixing the table top

1. Unscrew the stopper bolt (hexagon socket head cap screw: M10) on the left-to-right moving frame (the rear side).
2. Mount the table top from the unscrewed stopper bolt side. (The caution plate stuck on the aluminum side-rail of the table top should be on the front side.)
3. Screw the stopper bolt immediately after mounting the table top.

CAUTION

Make sure to attach a stopper to assure safety. If the stopper is not attached, the table top and a patient may drop together in the worst case, and the patient may be injured.

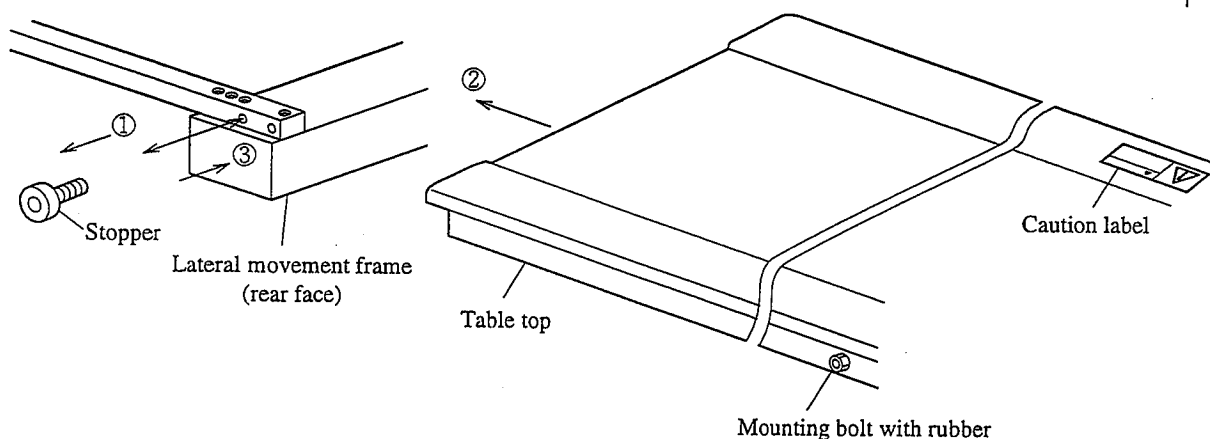


Fig. 4.11

4.2.8 Attach the main body cover

Fix the cover following the removing procedure in Section 4.1 in reverse order.

5. Adjustment

Each portion is already adjusted when shipped from the factory. However, the adjustment values may be deviated by disassembly and assembly. Adjust each portion if necessary.

5.1 Table Top Vertical Movement Stop Switches

Adjust the switch positions so that the LS-1 is actuated when the table top reaches the highest position and that the LS-2 is actuated when the table top reaches the lowest position.

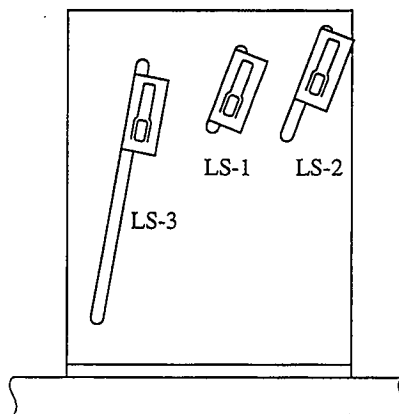
	Bellows cover	Metal cover
Highest table position	900mm	850mm
Lowest table position	350mm	535mm

5.2 Table Top Move-up Temporary Stop Switch

The temporary stop function is valid exclusively while the table top is moving up.

The temporary stop position can be arbitrarily set within the range in which the distance between the table top and the floor is 600 to 700mm.

When shipped from the factory, the switch L3 is adjusted so that it is actuated when the table top reaches 700mm.



[NO TEXT]

6. Inspection

6.1 Inspection for Installation

6.1.1 Make sure that dusts or foreign objects are not adhered to the screw area of the elevating jack before attaching the covers.

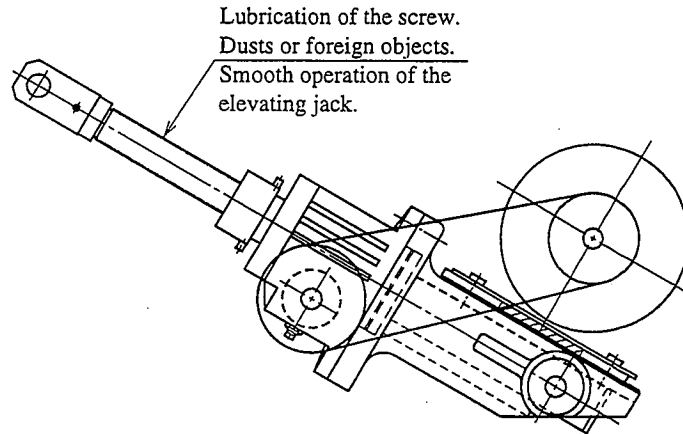


Fig. 6.1

6.1.2 Make sure that the elevating jack operates smoothly and the screw area of the elevating jack is lubricated normally.

6.1.3 Make sure that the bearing for supporting the table top operates smoothly.

6.1.4 Make sure that the bolts and nuts are not loose.

6.1.5 Make sure that the tension of jack belt is appropriate.

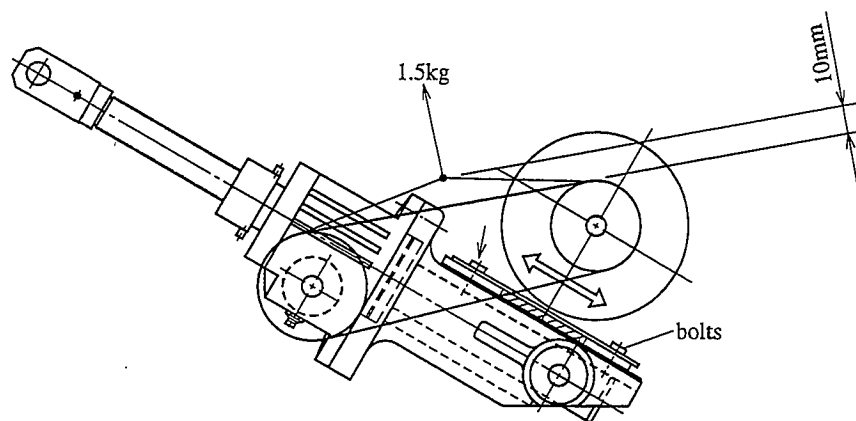


Fig. 6.2

If the tension is not appropriate, adjust it by moving the motor while loosening the fixing bolts of the motor mounting board.

6.1.6 Refer to the Operating manual for Bucky device about the inspection of Bucky device.

6.2 Periodic Inspection

Check the installation inspection items, and at the same time check the jack as follows.

- (1) Lift or lower the table top, and stop it at the position where the hole of the outer link is on the inner link. (Refer to Fig. 6-3.)
- (2) Put a M16 hexagon socket head cap screw in the hole and hold it with a nut (to prevent the link from falling).
- (3) Measure the dimension A in Fig. 6-4. Replace the jack if A is less than 3.5 mm.
- (4) If A is more than 3.5 mm, wipe off the grease on the screw and apply new grease. (Use the grease specified by our company.)

Specified grease: Cosmo grease Ginga No. 2

- (5) Remove the M16 bolt and nut.

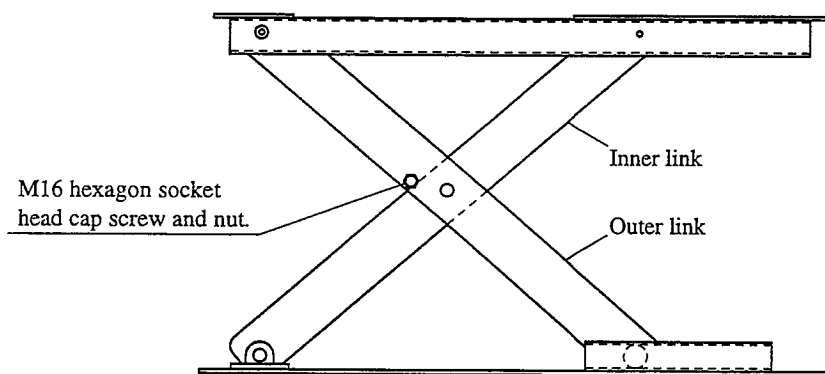


Fig. 6.3

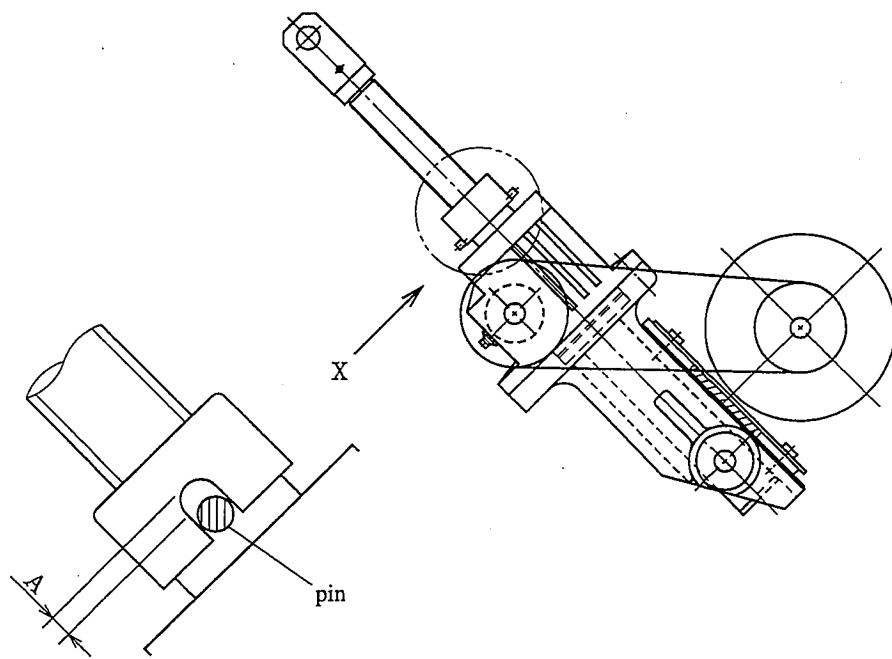
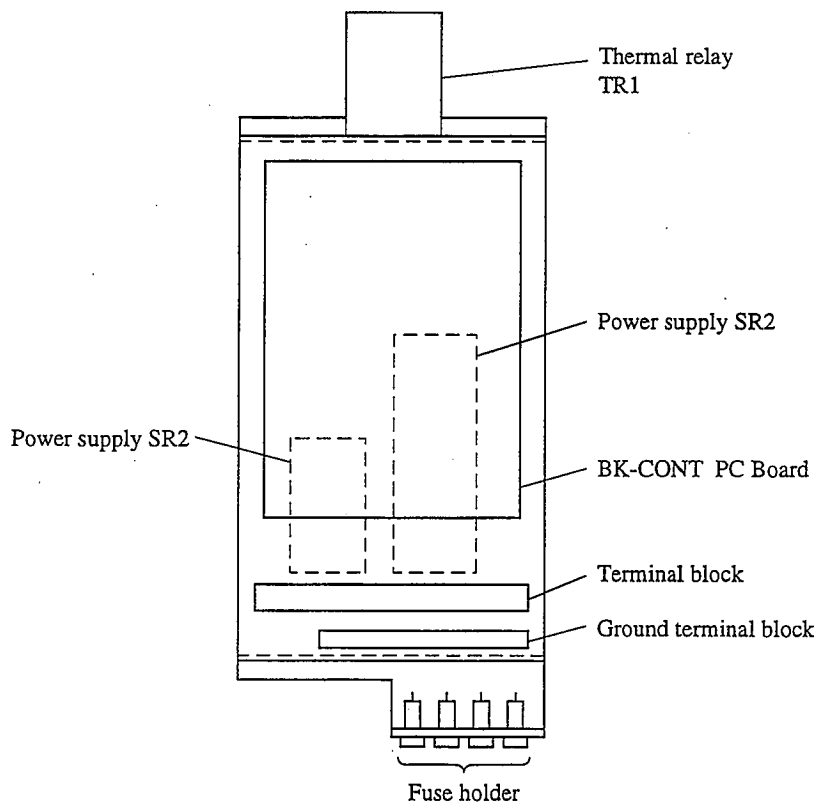


Fig. 6.4



BK-120M, BK-120MK LAYOUT OF CONTROL UNIT

[NO TEXT]

7. Maintenance

7.1 Information for USER's appropriately qualified technical personnel

SHIMADZU will make available on following information for the USER's appropriately qualified technical personnel.

Name	Document number
BK-120 M/MK Connection diagram	503-03736
BK-120 MK Connection diagram (For Europe)	503-03902
BK-CONT CIRCUIT diagram	503-03727
BK-120MK Parts list	M511-4006

7.2 Consumable parts

The consumable parts used for BK-120MK are as follows:

When replacing the parts, use the regular parts with following part number:

Name	Part number
V-belt M27	032-20015
Jack: NJ40-UBL158C (T)	511-32028
Fuse: 313001 (250VAC, 1A)	072-01664-20
Fuse: 313005 (250VAC, 5A)	072-01664-33
Fuse: 3AB-326005 (250VAC, 5A, ON TRAS UNIT)	072-01665-30

7.3 Replacement of fuse

Only service personnel and USER's appropriately qualified technical personnel are allowed to replace the fuse.

Please do not allow users to replace them.

[NO TEXT]