Caution:
Don't mark on the phantom with pen or leave printed materials contacted on its surface.
Ink marks on the phantom will be irremovable.

PH-2B

CT Whole Body Phantom PBU-60

Instruction manual

Contents

KYOTO KAGAKU CO.,LTD

Whole body phantom PBU-60

The whole body phantom is life-size human phantom with a life-size synthetic skeleton are embedded in radiological soft tissue substitute.

There are no metal parts that would impair realistic imaging.The joints, knees, elbows, shoulders and hip-joints, are flexible and able to maintain the necessary positions. The phantom is separable into 10 parts facilitating a variety of application. A positioning stand for the head part is available as an optional part.

Specifications

Whole body phantom PBU-60

Intended application: Positioning phantom for plain radiography

Length: approx.165cm

Weight: approx. 50kg

Can be dismantled at: shoulders elbows, hip joints, knees, neck

Embedded organs: brain, eye balls, lungs with vessels, trachea, mediastinum, liver with vessels (incl. portal vein), kidneys, spleen, pancreas, stomach (air), sigmoid colon, rectum, prostate

* The product has two 3mm dia holes made in the chest wall to prevent the damage caused by atmospheric pressure change that may occur in transit.

Movable joints and their range of movement

Shoulders: rotate 360 degrees to back and forward, 180 degrees side-ways

Cubital joints (bilateral): bend inward up to 90 degree

Coxae (bilateral): rotate forward up to 90 degrees, then rotate outward up to 45 degrees each.

Articulatio genus (bilateral): bend up to 90 degrees.

Materials: Human tissue substitute (urethane, epoxy, etc.,)

Accessories: Flat head screwdriver 1 piece
Hand positioning belt 1 piece

Replacement parts: screws and connection tapes for Patella.

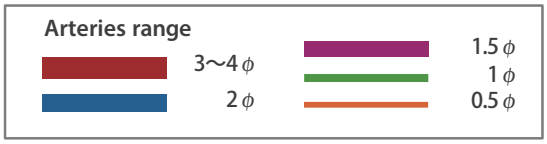
HU numbers of each organ

Organs		HU* numbers	Remarks
Soft tissue		8	
Brain	Brain	40	
	Ventricles	10	
	Cerebral artery	280	
Eye balls		20	
Aorta		40	
Vena cava		40	
Trachea	Up to the first bifurcation	−800	Urethane foam
	From the first bifurcation to the small branches	8	Pipe wall's HU number
Heart		40	
Pulmonary vessels		8	Shown up to the forth bifurcations
Coatal cartilage		90	
Liver	Liver	70	Incl. the portal vein
	Hepatic veins	40	

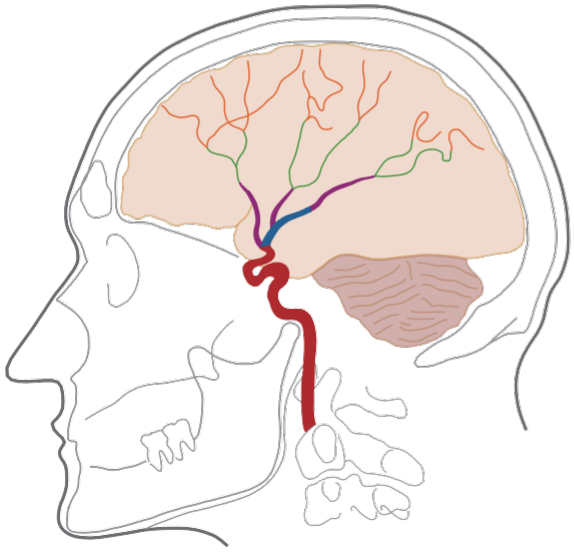
Organs		HU* numbers	Remarks
Gall bladder		20	
Pancreas		30	
Spleen		50	
Kidneys	Kidneys	30	
	Renal veins	40	
	Ureters	10	
Ureters		10	
Urinary bladder	Simulated content	10	
	Bladder wall	30	
Semibal vesicle		25	
Prostate		50	
Sigmoid colon wall		70	
Rectum wall		70	

* The Hounsfield numbers shown above are approximate figures of the calculated values and not actual measurement values.

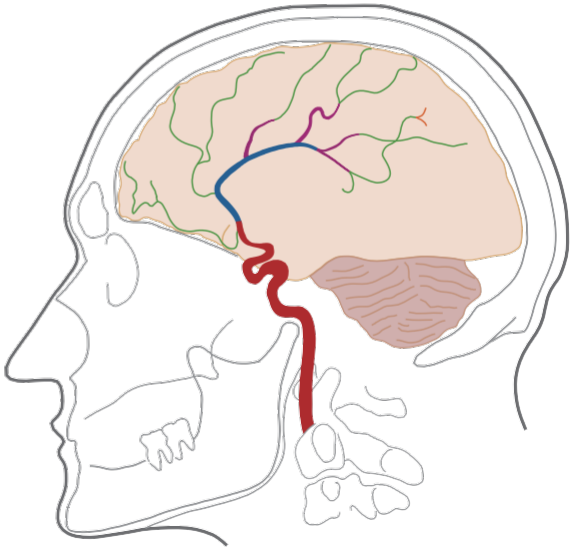
Cerebral artery



Middle cerebral artery



Anterior cerebral artery



Please note

1) Bone trabeculae are observed only at hands.

2) Contours of the bones are slightly stranger than actual human x-ray image, to facilitate clear understanding.

3) Basically the phantom is designed to be radiographed under same setting as human body, though, the joints areas may require some adjustment to have better image.

Caution

1) Do not make the phantom to take the position unintended by the manufacturer. It may cause the breakage in the phantom if the joints are forced to bend or rotate to the directions or degrees of angles outside of designed movable range.

2) **Do not remove the plastic protectors on the phantom s hands.** The protector prevents the phantom fingers from breaking.

3) Do not attempt to lift or carry the phantom if the head or limbs are attached to the trunk. Detach the joints before moving to avoid the excessive force on the joints.

4) When the training with the phantom is not made for a while, pay attention to storage condition (posture) of the phantom so as to avoid the burden to the connetion area. For example, condition the head has been resting on the pillow for a while can cause the breakage to the neck connection area.

5) Do not fasten the screws too tight.

6) The phantom is heavy and could cause damage not only to itself but to people or other objects. When you need to handle the assembled phantom, always do it by two or more people with utmost care.

7) Don’t mark on the phantom with pen or leave printed materials contacted on its surface. Ink marks on the phantom will be irremovable.

Storage Important Notes

Thank you for choosing our Phantom for CT.

Since this phantom is made of resin, contraction and expansion of resin may occur due to changes in temperature. A slight gap between organs may appear by contraction of resin. This air gap may be seen in the areas of resin in radiographic images.

To avoid this problem, store the phantom in environment of between 20 (68°F) and 25 degrees Celsius (77°F).

Please store away from direct sunshine, high temperature low temperature and high humidity

If the air gap image appears in unexpected position, keep the phantom in environment of between 20 (68°F) and 25 degrees Celsius (77°F). for minimum one week.

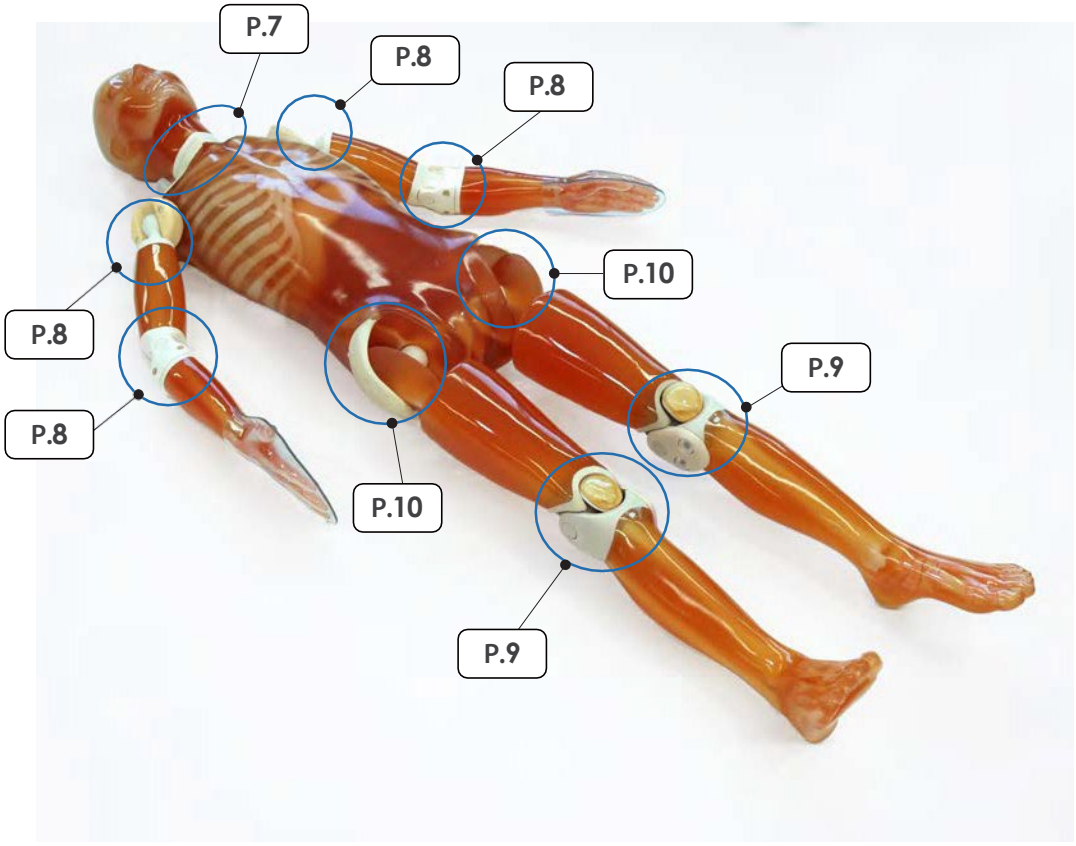
Our Phantom for CT is inspected by an X-ray CT scanner and the radiographic images. Please accept that the slight air gap is permissible range under our quality standard.

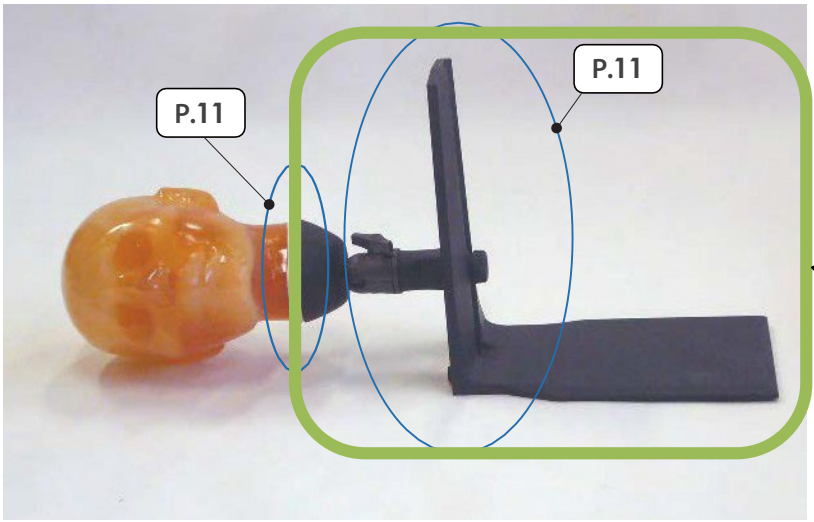
For any issues or inquiries, please contact us at any time.

PBU-60 Components

Parts #	Parts name	QTY
1	Head	1
2	Neck-head connection plate	1
3	Trunk	1
4	Right upper arm	1
5	Left upper arm	1
6	Right forearm	1
7	Left forearm	1
8	Right thigh	1
9	Left thigh	1
10	Right lower leg	1
11	Left lower leg	1
12	Right patella	1
13	Left patella	1
14	Connector for shoulder A (Right or left)	2
15	Connector for shoulder B (Right or left)	2
16	Connector for right elbow (lateral side)	1
17	Connector for right elbow (medial side)	1
18	Connector for left elbow (lateral side)	1
19	Connector for left elbow (medial side)	1
20	Connector for right hip joint	1

Parts #	Parts name	QTY
21	Connector for left hip joint	1
22	Supporting plate for right hip joint	1
23	Supporting plate for left hip joint	1
24	Connector for right knee	1
25	Connector for left knee	1
26	Screw bolt for neck connection M12 ×20	2
27	Screw bolt for neck connection M10×15	2
28	Screw bolt for shoulder connection Screw bolt for parts # 22.23 M 8×13	10
29	Screw bolt for elbow joint M 6×60	4
30	Screw nut for elbow joint M 6	4
31	Screw bolt for hip joint M8×35	6
32	Screw bolt for knee joint M12×18	4
33	Connection tape for the patellae	2
34	*Height adjustment panel (optional)*	1
35	*Base panel (optional)*	1
36	*Neck connector (optional)*	1
37	*Neck connector fixture (optional)*	1
38	*Screw for fixture (optional)*	1
39	*Screw bolt M6×18 (optional)*	2
40	Hand positioning belt	1





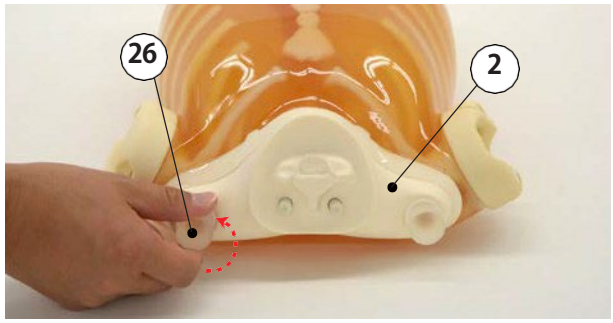
Head support stand is available as an optional part (41350-020)

The number indicated on the photos above correspond to the page numbers in this manual.

※ The circled numbers in the assembly images are parts numbers on the components table on page 3.

<NECK AND HEAD >

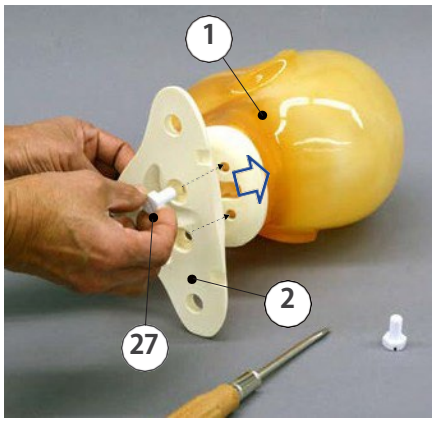
1. Remove the two bolts for the neck connection (part #26) and remove the neck head connection plate (part #2) from the trunk.

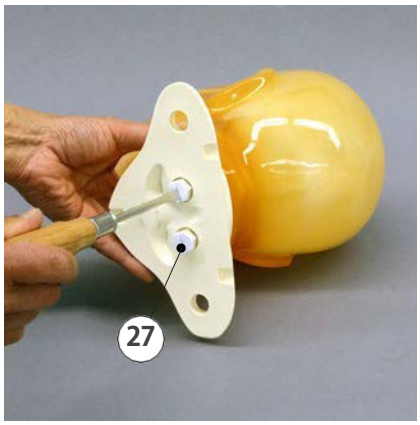


(26) Screw bolt for neck connection M12×20×2

【 Neck sub-assembly 】

2. Screw the neck head connection plate (part #2) on the head (part #1).





(27) Screw bolt for neck connection M10×15×2

【 Connection of the head and the trunk 】

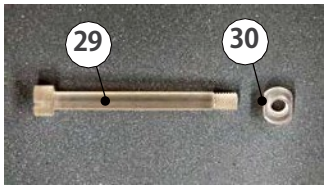
3. Mount the assembled parts (parts #1 and #2) to the trunk and secure each side with a screw bolt (part #26).

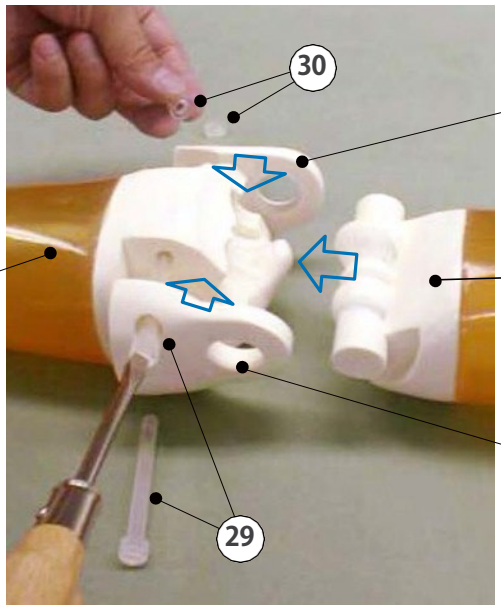
ELBOWS >

Assemble upper arm parts (part #4 or 5) and forearm parts (part #6 or 7) at joint section. Fix these parts with elbow connectors (part #16 or 18 and #17 or 19).

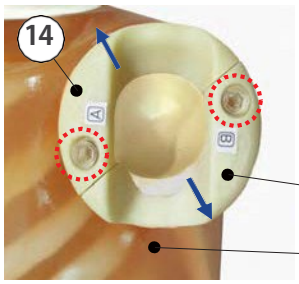
29 Screw bolt for elbow joint M 6×60×4

30 Screw nut for elbow joint M 6×4





<SHOULDERS >

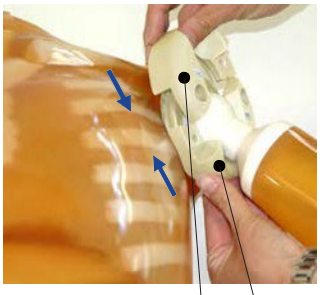


1. Remove the two clear bolts (part #28) and remove the external shoulder connector parts A (part #14) and connector parts B (part #15).

28 Screw bolt for shoulder connection M 8×13×4

2. Then attach the upper arms (parts #4 and #5) at the ball joint to the trunk and place over the two connectors for the shoulder (parts #14 and #15). Secure the connectors with the clear bolts (part #28). Follow these steps for both left and right side of the trunk.

Left and right upper arm 4 5



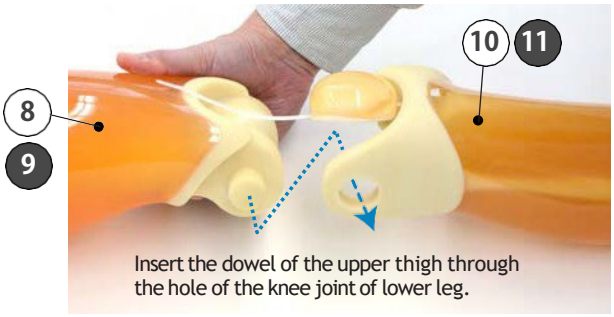
Connector for shoulder 14 15

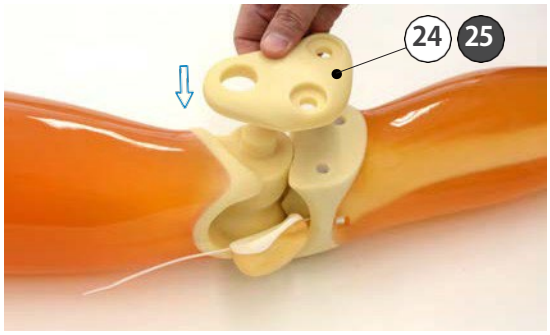
Caution

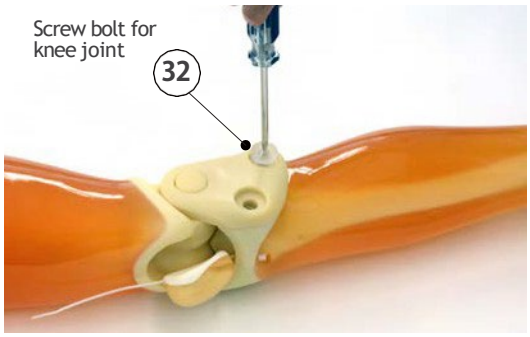
Screw the bolts after confirming the position of the screw hole.
Be careful not to mix up part #4 and 5. The shape of right and left arms are different.

<KNEES >

1. Connect the thigh (#8, 9) and lower leg (#10, 11) at the knee joint. Insert the dowel of the upper thigh through the hole of knee joint of lower thigh. Set the connector for knee (#24, 25) to the medial side then screw the knee joint bolt (#32) to fix it.

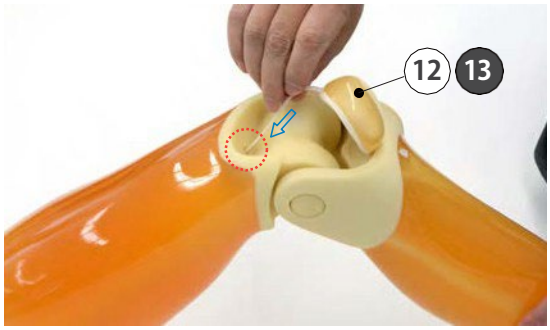






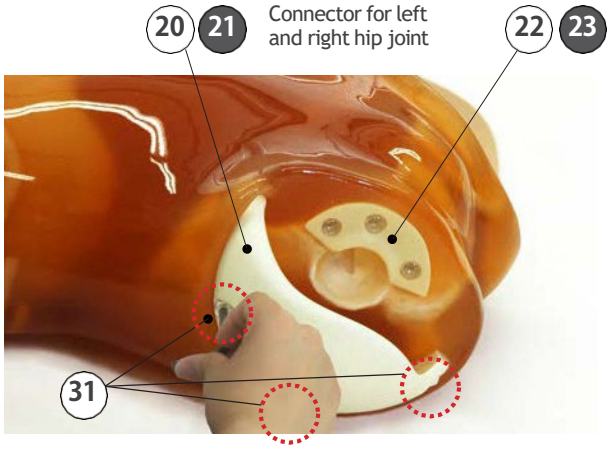
32 Screw bolt for knee joint
M12×18×4

2. After fixing the knee joint, bend the knee and insert the connection tape of the patella (#12, 13) to the guide aperture of the thigh.



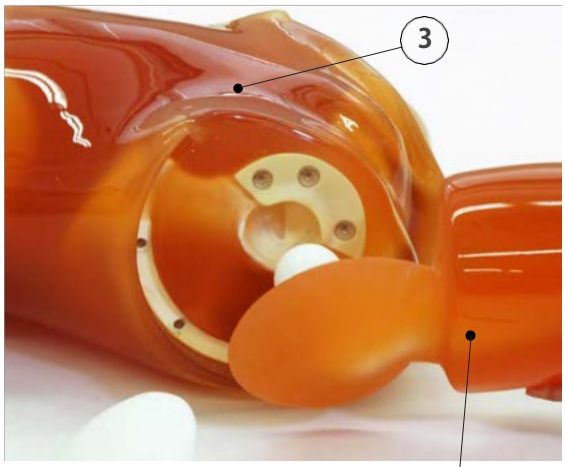
<HIP JOINTS >

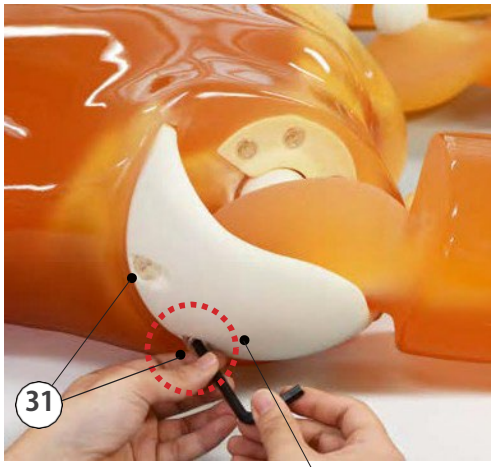
1. Remove the three bolts (part #31) to remove the hip joint connectors (parts #20 and #21). The supporting plates (parts #22 and #23) are already attached at the time of delivery.



31
Screw bolt for hip joint
M8×35×6

2. Mount the thighs (part#8, 9) so that the femur heads fit in the hip sockets and hold them in place with hip joints connectors (part# 20,21).
Each hip joint connector is fixed to the trunk with three screws. Start from the screw in the center and move to the sides. Hold the thigh upright when you fix the screw at the rear end. Be careful not to confuse parts for left and for right.

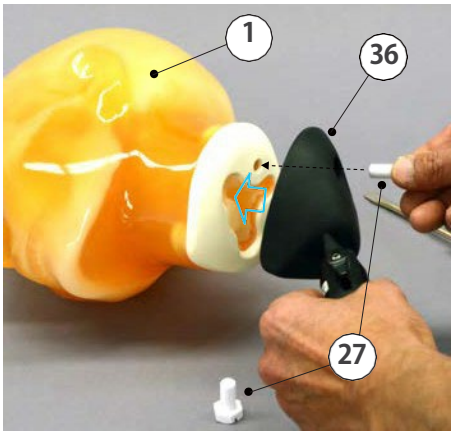




<HEAD AND STAND >

Head support stand is available as an optional part (41350-020)

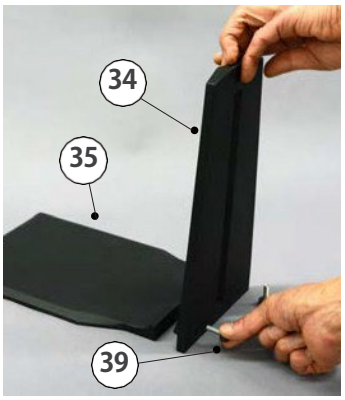
1. Mount the head phantom to the neck connector and fix it with two screws.

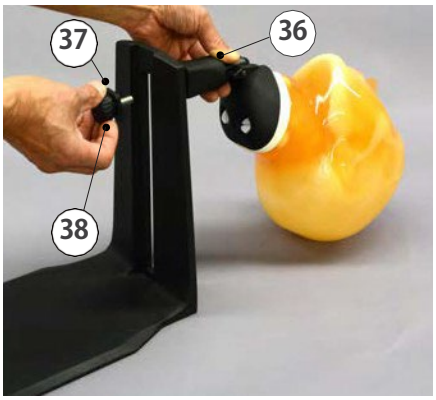


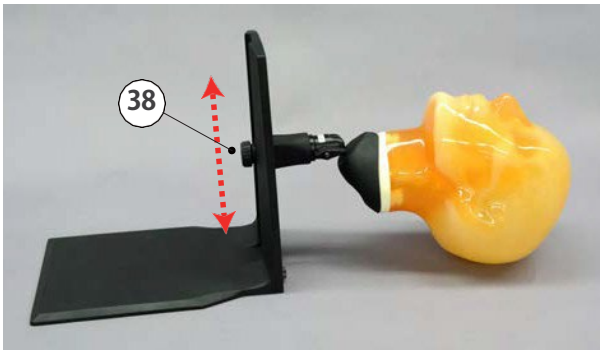
27 Screw bolt for neck connection M10×15×2

39 Screw bolt M6×18×2

2. Assemble the two panels. Attach the height adjustment panel (#34) to the base panel (#35) at right angle and fix with two screws.
Then, insert the end of the neck connector (#36) in the slit in the panel and fix it with the fixture (#37).







3. The phantom is ready.
Adjust the height of the neck as needed, by loosen the fixture and slide it through the slit. Tighten the fixture again at the designated height.

Information of product inspection

Head Phantom for CT imaging equipment

This is information regarding product inspection of our Head Phantom for CT imaging equipment. Head Phantom was inspected under the following condition.

X-ray tube voltage	120 KV
mAs	220 mAs
Table Speed	1.5 sec/rot
DAS	0.6mm x 16 DAS
Pitch	1.0mm
Slice Thickness	0.75 mm

CT image reconstruction was made by 2 different Window Level (WL) and Window Wide (WW) in order to check air bubbles and similarity to human brain. Both the width is 5mm.

Composition of Head Phantom is as follows.

Tissue	Estimated HU Value
Brain (White matter and Gray matter)	40
Ventricle	10
Gel as filler between skull and brain	0

1) Similarity Check	WL 40	WW 2000 (-960HU ~ -1040HU)
2) Air bubbles Check*)	WL 40	WW 300 (-110HU~ 190HU)

Please give us your understanding that it is impossible to manufacture the phantom with no air bubble.

If you have any inquiry, please contact us at any time.

⚠ Caution Don't mark on the phantom with pen or leave printed materials contacted on its surface. Ink marks on the phantom will be irremovable.

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