Chapter 2 — Positioning the Patient

In order to acquire an image of a particular anatomical region, the patient must be properly positioned on the Echelon MRI System patient table using one or more pads, then fitted with the appropriate coil. The patient table is equipped with lasers to guide you in positioning the patient outside the magnetic field. Once you have centered the region to be studied, you can move the patient into the magnetic field, where the imaging will be performed.

General instructions about the Echelon MRI System control panels and the proper use of the imaging hardware are provided in this chapter. Patient positioning terms, operation of the patient alert bulb, and patient table preparation directions are also included.

Gantry and Patient Table Data

The gantry is designed with a short bore and wide aperture to create an inviting patient environment without compromising clinical utility. While the large, high-capacity patient table comfortably supports a broad range of body types, the limits listed below should be followed.

- Patient aperture (diameter): 24 in. (61 cm)
- Weight limit:
  - Motor-driven: 400 lbs. (180 kg)
  - Manual longitudinal movement: 500 lbs. (225 kg)
- Patient table width: 28 in. (70 cm)
- Total longitudinal travel: 9.2 ft. (280 cm)
- Vertical range: 19.5-33.5 in. (49.5-85.2 cm)
- Class II laser positioning:
  - ±1 mm accuracy
  - Automatic movement to isocenter

Terminology

The following terminology is used throughout this manual to ensure clear and explicit instructions:

- References to the foot of the patient table indicate the end of the patient table farthest from the magnetic field.
- References to the head of the patient table indicate the end of the patient table nearest to the magnetic field.
- References to the right or left side of the patient table indicate the sides as if you were standing at the foot of the patient table looking at the magnet.

Patient Safety

While you are positioning the patient on the patient table, and while the patient is in the magnetic field, you must constantly monitor the patient's safety. Make sure that the receiver coil cable remains away from the patient and that the patient does not make contact with the gantry while the patient table is moving.

Warning

Do not allow persons with pacemakers or other implanted devices to enter the Controlled Access Area (within the 5-gauss field). The strong magnetic field could cause such devices to malfunction and pose a risk of serious injury or death to the person.

Warning

Do not introduce ferromagnetic materials (such as tools, scissors, gurneys, cleaning equipment, and similar items) into the magnetic field. The strong magnetic field can cause these materials to act like projectiles, drawing them into the system. Failure to comply could result in death or serious injury.

Warning

Patients requiring emergency treatment or assistance must be removed from the Controlled Access Area. Their proximity to the magnet could prevent the safe and effective use of electronic and/or metallic emergency medical equipment. Failure to comply could result in death or serious injury.

Patient Alert Bulb

After positioning the patient on the patient table and fitting him or her with the appropriate coil and pad(s), you should offer use of the patient alert bulb. When squeezed, this device beeps to alert you that the patient needs assistance during a procedure. Always offer this device to patients, especially those who have hearing impairments.

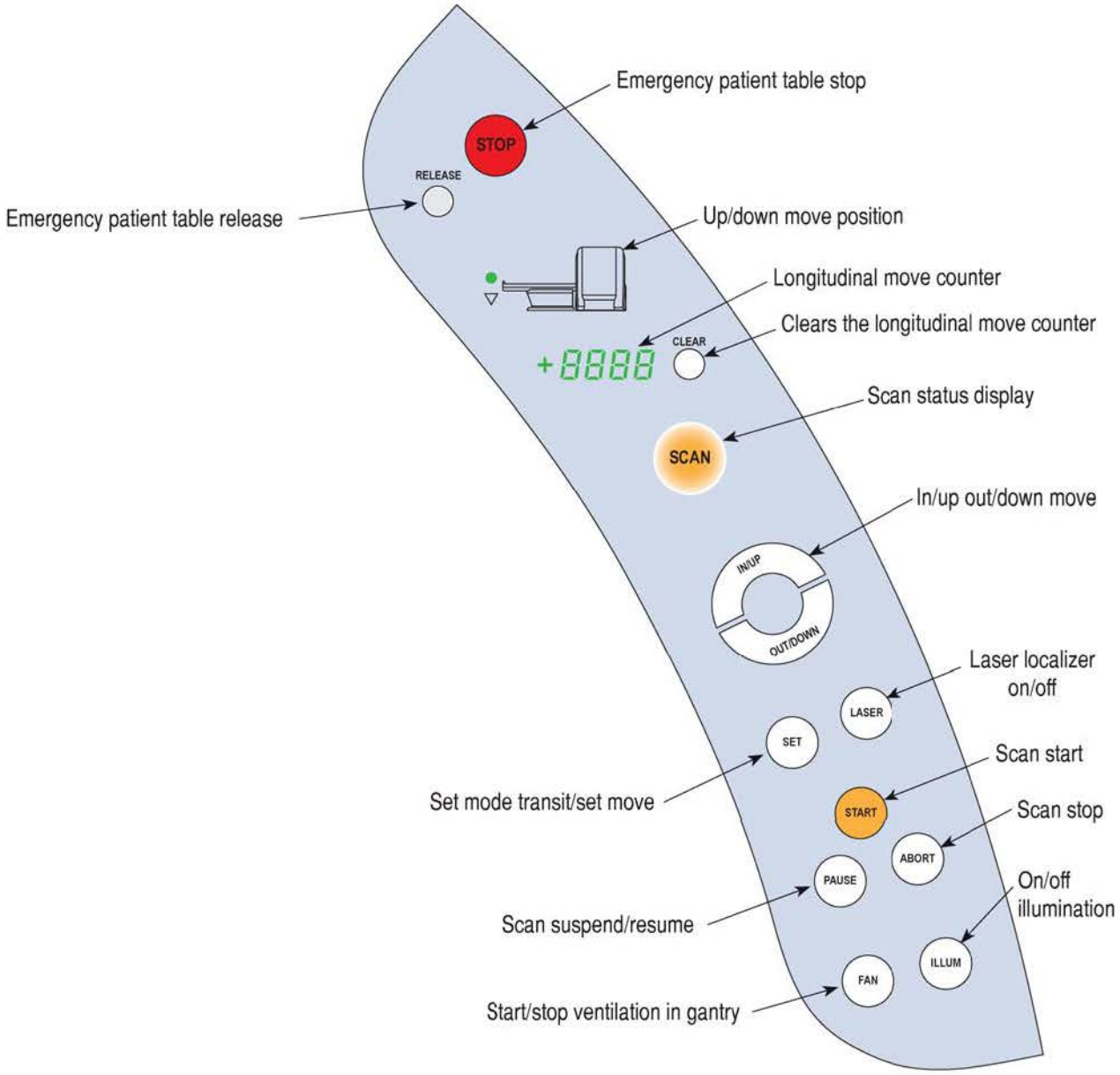
Caution

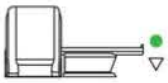
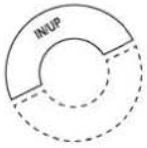
The patient alert bulb contains dry natural rubber, which may be problematic for patients with latex allergies.

For detailed safety information, refer to Chapter 1, *Safety*, in the *Echelon MRI System Reference Manual*.

Gantry Control Panels

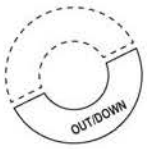
The gantry control panels provide all the functions for operating the patient table. All patient positioning controls are located on the gantry control panels. Identical control panels are located on the right and left sides of the front of the gantry.



Gantry Control Panel Button	Function	Description
	Emergency patient table stop	Quickly stops operation of the patient table and keeps the state of emergency stop until the RELEASE button is pressed. In the state of emergency stop, all control panel buttons are turned off.
	Emergency patient table release	Releases the patient table from the state of emergency stop.
	Up/down patient table position indicator	● : Highest position ▽ : Position other than the highest position.
	Longitudinal move counter	Indicates the position of longitudinal direction (forward and backward). When the origin (the back end of longitudinal direction) has not been detected right after the control program has been started, it is unlit.
	Clears the longitudinal move counter	Clears the longitudinal move counter to 0. If it is pressed during the set mode, the set mode is released.
	Scan status display	Lit during the scan.
	Brings the patient table to the up position	When the patient table is not at the highest position, the IN/UP button functions as an ascending button. As soon as the patient table reaches the highest position, the laser localizer is lit.
	Moves the patient table into the magnet bore	When the patient table is at the highest position, the IN/UP button functions as an advance button.
	Forward (slow)	If the IN/UP and OUT/DOWN buttons are pressed at the same time during a forward move, the patient table moves forward at slow speed.
	Set	Moves the laser-localizer area of interest to the isocenter of the magnet.
	Speed fixed	If the IN/UP button is pressed again (released once and pressed again right away), the current speed is maintained.

Caution

Except in cases of true emergency, do not use the emergency patient table STOP button. Routine use can lead to equipment failure due to excess wear and tear.

Gantry Control Panel Button	Function	Description
	Out	When the patient table is not at the back end of the longitudinal move, the OUT/DOWN button functions as a backward button.
	Out (slow)	If the OUT/DOWN and IN/UP buttons are pressed at the same time during a backward move, the patient table moves backward at slow speed.
	Down	When the patient table is at the back end, the OUT/DOWN button functions as a descending button. As soon as the lowest position is reached, the laser localizer goes out.
	Speed fixed	If the OUT/DOWN button is pressed again (released once and pressed again right away), the current speed is maintained.
	Set mode transit / set move	Moves the patient table to position the area of interest at the center of the magnetic field. The patient table move is carried out while the SET button is kept pressed. During the set mode, the SET button LED blinks and the longitudinal move counter shows the remaining distance. When the patient table move is complete, the laser localizer goes out.
	Speed fixed	If the SET button is pressed again (released once and pressed again right away), the current speed is maintained.
	Laser localizer on / off	While the LASER button is lit, the localizer laser is on. This laser is used for aligning the area of interest.
	Scan start	Starts the scan.
	Scan suspend / resume	Suspends or resumes the scan.
	Scan stop	Stops the scan.
	Start/stop ventilation in gantry	Blows air inside the bore. Blower can be set to high, low, or off.
	On / off illumination	Controls the illumination light inside the gantry. Brightness can be adjusted by two steps or turned off.

Preparing the Patient Table

Patient table preparation involves selecting and placing the table pads and the radio frequency (RF) coil(s). The appropriate pads and coil(s) are essential to acquire optimal images. Follow these steps when preparing the patient table:

Note:
The patient table must be moved completely out of the magnet before its height can be adjusted.

1. Press and hold the OUT/DOWN button to move the patient table completely out of the magnetic field, then lower the patient table to a position where the patient can easily sit on it.
2. Select the appropriate table pads and RF receiver coil and position them on the patient table. Your choice of pads will be affected by three factors: the anatomical region to be imaged, the size of the patient, and the coil you plan to use.

Positioning the Patient for an Examination in the Magnet

Patient positioning involves using a variety of table and patient positioning pads, placing the RF coil(s) on or around the patient in a variety of ways, and properly centering the anatomical region to be imaged. Although each patient and examination are different, the basic patient positioning procedures remain the same.

Various table pads and positioning pads and sponges are available for use with the Echelon MRI System. In addition to providing some degree of comfort for the patient, the pads help to support and position both the patient and the coil. Pads can be used in a variety of combinations, depending upon the region of interest, the coil you plan to use, and the size of the patient. The detailed positioning instructions in the next chapter will suggest the appropriate pads to use under many circumstances.

For patient comfort, use the knee cushion with virtually all scans when the patient is supine (except hip imaging). When a patient is prone, Hitachi recommends placing a pillow under the ankles.

Do not use too many pads, as this might raise the patient too high in the static field.

Caution

Secure long hair before moving the patient onto the imaging table. The patient's hair could become caught in the patient table mechanism. Failure to comply could cause patient injury.

1. Ask the patient to sit on the side of the patient table and then lie down.
2. Press and hold the IN/UP button until the patient table reaches the upper limit.
3. Position the anatomical region in the center of the selected RF coil. Add positioning pads and sponges as needed.

Warning

Make sure that all coils placed on the patient table are plugged into a table connector. Disconnected coils could cause patient injury or be damaged if exposed to RF energy. Remove any coils not being used for the selected scan protocols.

Caution

Some coils consist of two parts that lock together. Be sure that the patient's hair, skin, clothing, and/or other foreign material does not get caught between the two coil parts.

Warning

Instruct the patient to close his or her eyes when the lasers are on. Do not stare into the beam, as eye injury may result.

Note:
Many of the Echelon RF receiver coils have a transaxial mark to assist in centering the anatomical region.

4. Press and hold the IN/UP button to center the transaxial alignment line of the laser to the patient's anatomical region that is to be imaged.
5. Connect the receiver coil cable(s) to the patient table connector(s). A total of six table connectors are available on the patient table—four at the head and two at the foot. When making multiple connections, avoid crossing the coil cables. If possible, keep the cables fully extended and running parallel to each other.

Caution

Avoid loops in the cable. Place any excess cable between the patient table and the pads. Prevent the cable from touching the patient or any part of the magnet bore.

6. Press and hold the SET button on the gantry control panel until the patient table advances the patient to the magnet's isocenter (the center of the magnetic field) and stops. The imaging region centered under the lasers is now in the center of the magnetic field. The longitudinal move counter display on the gantry will be zero.

Caution

When moving the patient into the magnetic field, do not allow the receiver coil cable to loop, wind around the patient's body, or catch on the patient table.

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