

System knowledge for MR 6

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1. The MR scanner room

1.1. Camera hardware

The figure below is showing the hardware components included in the MRI scanner. The static magnetic field (B_0), gradient fields in x,y and z directions (G) and radiofrequency field (B_1) are also shown in the figure below.

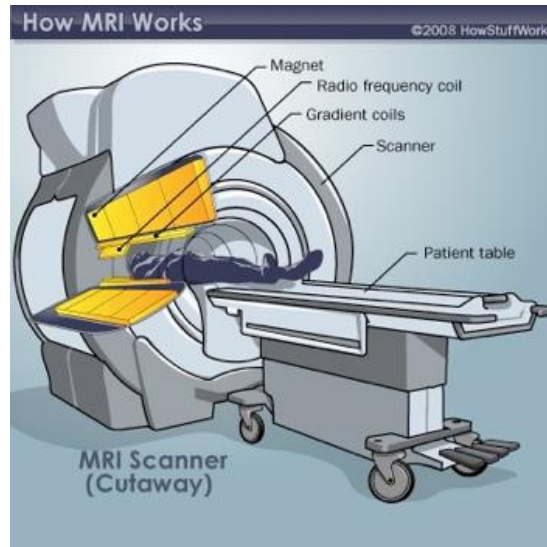


Fig. 1 Hardware components in the MRI scanner.

1.1. Coils

There are different types of coils used in MRI:

- transmit/receiver
- receiver coils.

The integrated body coil in the scanner is for example a transmit/receiver coil. The most used receiver coils are:

- Head / Neck coil (20 ch and 64 ch)
- Body 18
- Flex Large 4
- Spine 32 (integrated in the patient table).



Fig. 2 Scanning a patient in MRI where body 18 coil is used [1].

1.2. Computers

Several computers work together to control and process the data from the scanner:

- A *Host computer* which controls the scanner, including the gradients and RF-coil. Located in technical room.
- A *Reconstruction computer* which performs the necessary calculations and preprocessing to compute images from raw data. Located in technical room.
- A *Console computer* from which a user interacts with the system and plans scans. Located in control room.

2. The technical room

The technical room is a room located next to the magnet room and which houses several pieces of equipment that are needed for the MR scanner to function properly. The figure below is showing three cabinets, and these are (from left) gradient cabinet, power supply cabinet and cryo pump cabinet.



Fig. 3 From left: Gradient cabinet, power supply cabinet and cryopump cabinet in the technical room of the Siemens 3T scanner.

2.1. Cryo pump

The cryopump of the 3T scanner switches on automatically after power dip. Nevertheless, it is good to check whether the 3T cryopump makes a repetitive noise ('*hm-tjuk-hm-tjuk-hm-tjuk...*'). If not, please advise the MR-manager, or other staff that can take care of the condition. If the cryopump does not work the helium will boil off the system at an accelerated rate. Helium costs about 100 SEK/liter.



Fig. 4 Cryopump in the technical room of the 3T scanner, left mid of the technical room. After a power break it will start again automatically but please check the repetitive sound ('hm-tjuk-hm- tjuk-hm-tjuk....')

Bild på alla skåp (projektor, elskåp, klimatskåp, befuktare, elnödstopp)

3. The control room

The control room is where the system is being monitored and controlled. It also contains additional components used in various MR imaging protocols, listed in the figure below.

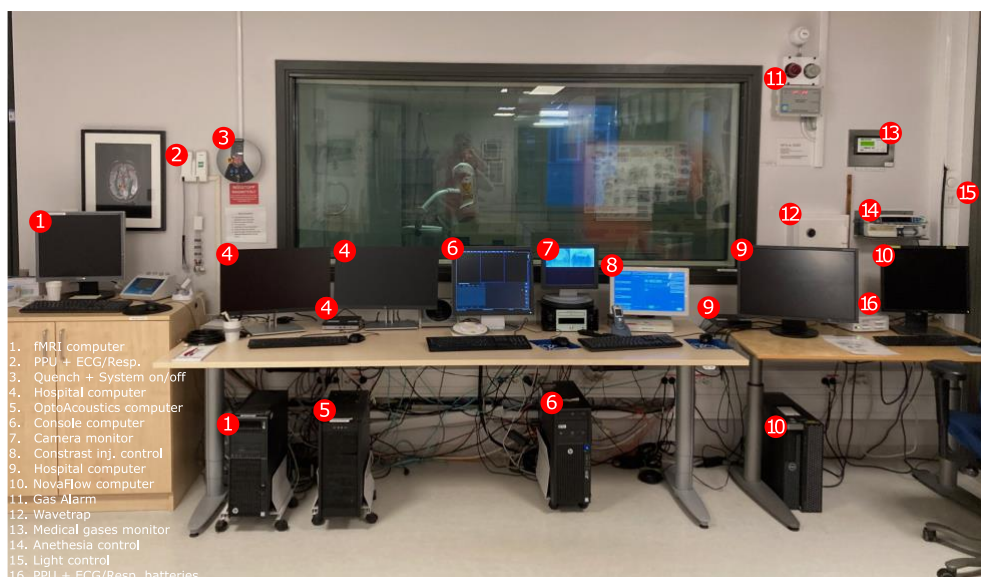


Fig. 5 MR control room, listing all components.

References

1. <https://www.siemens-healthineers.com/magnetic-resonance-imaging/options-and-upgrades/coils/body-18> [2023-10-18].