

STANDARD OPERATING PROCEDURE:
INSERT GRADIENT COIL CHANGEOVER (305/210 TO 205/120)

1. INTRODUCTION

- 1.1 Research involving Magnetic Resonance Imaging (MRI) at high magnetic field strengths presents unique hazards to individuals working within and around the MRI system. The potential for serious personal injury is present due to the sheer size and strength of the static magnetic field along with the immense flexibility of the research system and associated peripheral hardware.
- 1.2 There exist dangerous and potentially lethal levels of electricity in the 9.4T MRI system. As such, it is important that all individuals working around the MRI system be aware of the dangers and safety issues concerning electricity. Current carrying cables, connections and junction points in the vicinity of the main magnetic field are particularly susceptible to damage due to the extreme Lorentz forces created through the normal operation of the system. Periodically, the effects of prolonged mechanical fatigue will result in breakage causing electrical arcing, sparking and high heat levels before the system can shut down. There is therefore a high potential for personal injury and the possibility of a fire being ignited.
- 1.3 The handling and maintenance of the 9.4T MRI Facility gradient coil sub-systems requires in-depth training and as such is limited to select personnel having vnmr1 privileges within the laboratory.
- 1.4 Whenever a gradient coil changeover is being performed, someone with system administrator (i.e. vnmr1) privileges must be present. Always keep in mind the potential safety risks and hardware protection procedures and act in accordance with the guidelines set out in the Standard Operating Procedures.

2. GRADIENT CHANGEOVER

- 2.1 Turn off the gradient power amplifiers.
 - 2.1.1 Disable the amplifiers by pressing the INHIBIT button on each of the amplifiers. The LED in the middle of each INHIBIT button should be illuminated.
 - 2.1.2 Put the power switch in the off position.
 - 2.1.3 Put the Heavy Duty Safety switch in the off position.
- 2.2 Turn off the shim amplifier.
- 2.3 Prepare the 205/120/HD coil.
 - 2.3.1 Loosen the bolts on the front of the gradient coil to widen the o-ring groove.
 - 2.3.2 Tape down the feet.
- 2.4 Shut the valve on the water chiller.
- 2.5 Disconnect the cables and the water lines from the 305/210/HD coil.
- 2.6 Slide the 205/120/HD coil into the magnet.

- 2.7 Secure the 205/120/HD coil.
 - 2.7.1 Connect the coils together with the bolts located at the back of the coils.
 - 2.7.2 Use the long hex key to tighten the feet. The tool is quite magnetic. Be careful! Tighten the feet such that the coil is centred in the magnet.
 - 2.7.3 Clamp down on the o-ring by tightening the six bolts on the front of the coil.
- 2.8 Attach the cables and the water lines to the 205/120/HD coil.
- 2.9 Open the valve on the chiller until the flow meter reads 4.25 L/min.
- 2.10 Change the tuning circuits in the gradient amplifiers. This is done via dip switches on the back of the amplifiers. Put all the dip switches (Tune 0,1,2 and Ext Sync) in the off position except for the Ext Sync on the top (X) amp.
- 2.11 Change the coil ID on the back of the console. The ID should be labelled 205/120/HD.
- 2.12 Turn on the shim amplifier. The switch is on the back of the left bay of the console.
- 2.13 Enable the gradient amplifiers.
 - 2.13.1 Put the Heavy Duty Safety switch in the on position.
 - 2.13.2 Put the power switch in the on position.
 - 2.13.3 Press the RESET button on the Imaging System Status Board. It is located in the front of the left bay of the console. The READY LED should be illuminated.
 - 2.13.4 Press the INHIBIT button on each amplifier. The STATUS LEDs should be illuminated.

ROBARTS RESEARCH INSTITUTE
CENTRE FOR FUNCTIONAL AND METABOLIC MAPPING
9.4T MRI FACILITY

SOP #335-03

STANDARD OPERATING PROCEDURE:
305/210 TO 205/120 GRADIENT COIL CHANGEOVER

SOP Approval Signatures

Dr. Robert Bartha, Facility Director

Date

Dr. Greg Dekaban, RRI Biosafety Officer

Date