

How to make an Indium Seal for 9T Magnet

Note: Check all wire connection before crushing the indium!!!

Procedure

Preparation of the Magnet

- remove all external pipes and valves
- remove the top flange of the magnet that connects the sample chamber to the helium pump
- remove recovery system from magnet leads
- remove magnet leads
- remove needle valve
- remove nitrogen filler
- remove plugs for needle valve and he fill line
- open 4-pin (liquid he level sensor) and 8-pin (thermometer, magnet voltage, and switch heater) connectors at the safety pressure relief port and **unsolder the wires**
- tie a wire to the end of each bundle so they can drop down when the magnet is lowered
- connect a nitrogen tank to the ovc port and fill the ovc with nitrogen gas
- open double-BNC connector on the outside of the magnet (the ovc) and **unsolder the two wires** and also connect a wire to the end of these so they can drop into the magnet

Wire Connectors

4-pin connector (He - level sensor):

A yellow
B blue
C black
D red

8-pin connector

A,B,C,D “Sensor” = magnet thermometer

A = voltage +

B = current +

C = voltage -

D = current -

E (+), F (-) Heater current. Set to 34 mA. The switch heater has resistance of ~ 70 Ohms

G (-), H (+) Magnet voltage

Opening the Magnet

Mark the position of the bottom piece with respect to the cryostat and then unscrew the 8 bolts at the bottom with a regular '-' screw driver and remove the outer tail cover. It's quite heavy!

Unscrew the 12 bolts of the inner tail cover and remove it. It's not so heavy. It is the LN2 shield and probably has some goo at the connecting surface. There is also a groove where the wires enter and the vacuum chambers are connected.

You are now looking at the bottom of the helium chamber. This plate also holds the magnet and is very heavy. **Before you go any further mark the position of that plate with respect to the cryostat.** Otherwise, the needle valve and the he fill line won't fit later. Crack the 30 bolts open and then sit the magnet plate on a special cylindrical tube so that the magnet is still supported but you also can unscrew the bolts. Remove the bolts and leave 4 of them snug-tight right next to the 4 push-holes. The indium will glue the magnet plate to the cryostat and you need to screw in 4 bolts into the push-holes to push back the bottom plate. Screw in the push-bolts and unscrew the retaining bolts until you feel that the plate and the cryostat are separated. Remove the retaining bolts and hoist the cryostat up until you are clear. Watch the wires at the top and at the bottom at the diffuser.

Indium Seal

you need about 25 grams of indium. Rarefy it by melting used indium in a glass beaker and pouring it into the mould that makes the pellets for the press. Be as clean as you can. Use the hydraulic press in the machine shop to extrude the 3/32 inches thick wire from the die. You will have to feed two pieces of indium into the die since one isn't going to produce enough wire. Once the wire is there wrap it onto something clean. Before you use it clean it with acetone. From here follow the instructions sent by the company.

Reassembly

Just follow the steps in reverse. Make sure to **check all wire connections before crushing the indium seal.** Otherwise: good luck :-)

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