

## LN2 Auto-filling

These notes are intended for use with the Cass autofilling system.

On arrival at the WHT an hour before sunset, the auto LN2 filling system should already be connected. The telescope should be locked off, as of course it can't be moved when the filling system is connected. "Connected" means that all the filler tubes are inserted into the cryostats and the dewar is connected to the system and it is armed. This should be the case on either a weekday (when ops will have left it like this) or on a weekend when the TOs will have left it like this at the end of the night.

For normal operation, the filler tubes will be left in permanently and only the dewar hose and blue line are disconnected. If the filler tubes need to be removed, it may be necessary to use a heat gun to warm up the connection before pulling out the tube. The tube is attached with the black plastic part which screws into the cryostat, using an O-ring and a washer.

### **If the system is not connected, this is how to connect it:**

just to the right and above the ISIS blue detector is the point where the dewar is attached (i.e. the far side of CASS when the rotator mount PA is 45 degrees). On the dewar, there is a blue line for pressurising the system with compressed air and this is attached near the pressure gauge. The reading on the pressure gauge should be zero. Also on the dewar there is a long plastic tube insulated with thick black foam. (the blue line goes into the back of the control unit at its other end).

- 1) connect the insulated hose and push the red lever fully in to keep it in position. (In the future there will be a lock needed, and this will be the same as the t/s lockoff key)
- 2) connect the blue compressed air tube. It should be obvious where it goes, and it will click into place.
- 3) open the valve on the dewar

### **To disconnect before observing, or for whatever reason:**

- 1) close the dewar valve
- 2) remove the blue compressed air tube (by lifting the ring at the attachment point to release it)
- 3) remove the hose, but WAIT 15-20 MINS for it to soften first

**The control unit** is located to the left of the red cryostat and about 2m off the ground.

Buttons:

RESET: use if the system hangs

ARM: press this twice to arm the system (this gives a 6-hour countdown to filling). Also to abort press it twice.

UP/DOWN: use to cycle through menus. Or to illuminate the display. Or to access previous event info.

To access the menu: press arm, then up, then arm to enter the menu.

One important item on the menu is the transfer mask. This defines which of the 4 fillers are being used. When ISIS is on, the cryostats are numbered:

1: blue, 2: ACAM, 3: red. There are 4 available as all 4 will be needed when PNS is on. The mask positions (on or off) are chosen by cycling through the transfer mask menu until the correct configuration is shown, then selected with the arm button.

### **START OF NIGHT:**

Since the system can't be disconnected until filling has finished AND the tube has softened for 15-20 mins, the first thing to do on arrival at the t/s is initiate an immediate transfer. Select transfer and zero delay from the menu. Filling should start in one minute. After filling is complete and the hose has had 15-20 minutes to warm up, remove the hose and blue line, move the dewar out of the way and unlock the telescope.

### **END OF NIGHT:**

Park at zenith and lock off the telescope. Reattach the main hose and the blue line and the system will initiate an immediate transfer typically beginning in one minute. As soon as transfer has begun (i.e. when you can see gas escaping from the exit tube for the first cryostat) the system can be left unattended, since we can assume that all transfers will complete successfully. (NB: transfer of LN2 occurs sequentially, not simultaneously, for all the cryostats).

### **OTHER:**

Since to physically disconnect the system requires waiting ~20 minutes after filling has completed, i.e. about 30 mins after parking the telescope at the end of the night, we would have to wait around for 30 mins to disconnect the system if observers wanted dome flats the next afternoon on a weekend. So dome flats can't really be done in the afternoons at weekends, unless the system is disconnected and we fill the old way.

An automatic transfer should fill the cryostats completely, so after an automatic transfer the hold times should still be the same as after a manual fill (e.g. 15 hours).