Instruction Booklet

Liquid nitrogen precool loop user manual

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This instruction explains the preparations and procedure to precool a BF LD or XLD series fridge with liquid nitrogen (LN2).

For more information, please contact support@bluefors.com.

1 Preparations for the cooldown

1. Prepare the fridge for cooldown as described in the user manual but leave the pulse tube off.
2. The precooling consumes up to 100 kg of liquid nitrogen depending on the experimental mass in the fridge. Make sure enough liquid nitrogen is available.
3. We recommend to use a self pressurized LN2 dewar. The pressure in the dewar can be increased up to 3 bar to ensure adequate flow of LN2.
4. Most of the LN2 flowing through the system will vaporize. Make sure the nitrogen gas is properly vented out of the laboratory space. At the end of the LN2 run, liquid nitrogen can flow through the system. An open storage dewar can be used to collect the liquid.

2 Operating the precool loop

1. Insert the LN2 transfer line to the precool loop at the top of the fridge and secure with plastic o-ring and KF40 clamp. Connect the input side of the transfer line (see Fig. 2). to the LN2 dewar.
2. Start the pulse tube. Open the LN2 dewar to introduce flow of liquid through the loop. The flow rate should be up to 0.5 kg/min of liquid to ensure efficient cooling rate.
3. The LN2 flow can be stopped after the mixing chamber temperature has reached 90 K.
4. When the fridge is sufficiently cold, close first the input side of the precool loop and wait a few minutes to relieve pressure inside the loop. Close both sides of the precool loop and continue the cooldown. Alternatively, the LN2 transfer line can be disconnected from the top of the fridge and precool loop inside the fridge closed with a KF40 blind (the volume inside the precool loop is not connected to the main vacuum of the fridge).

Figure 1. The LN2 transfer line.

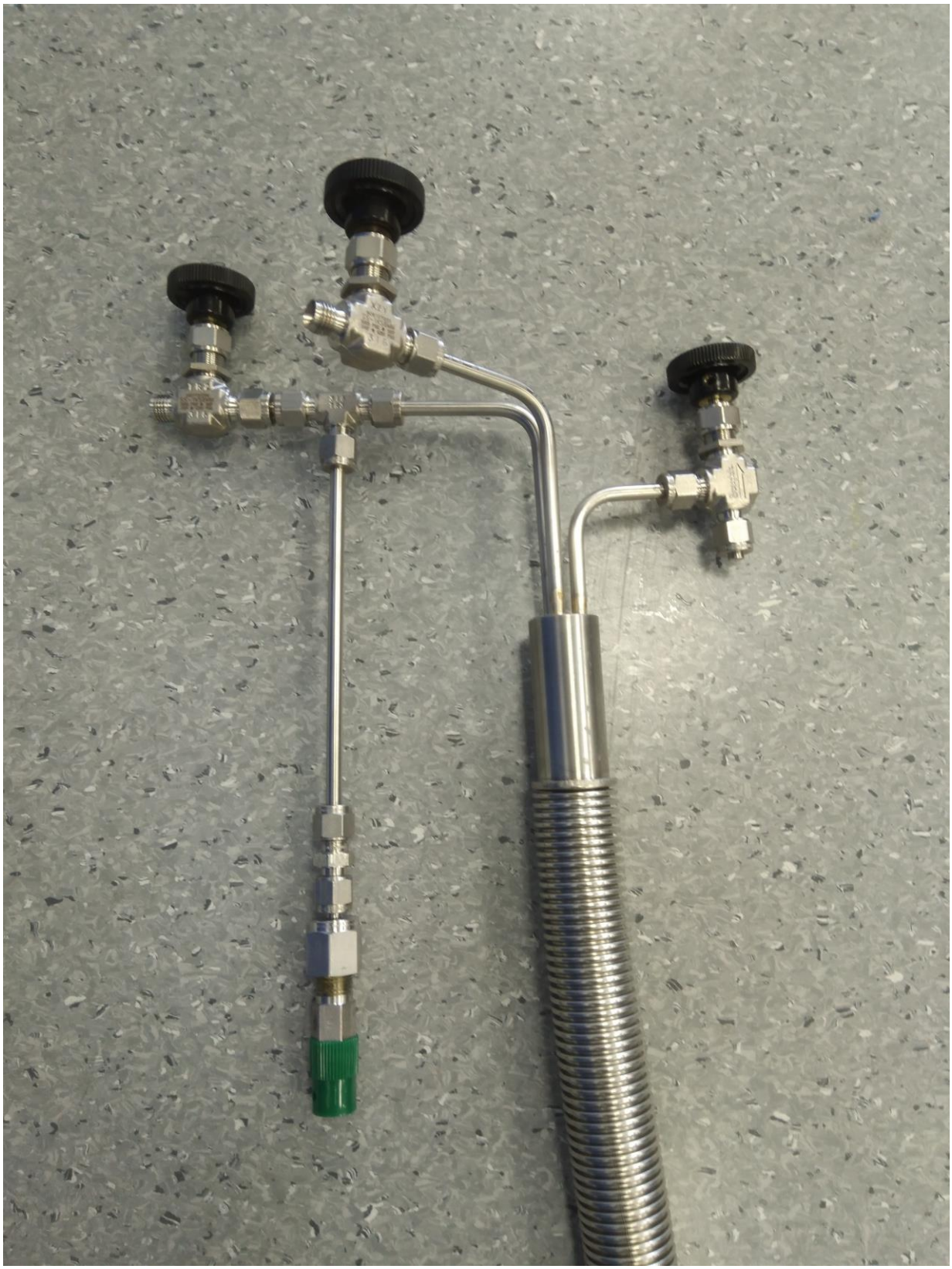

Figure 2. The shortest line with a Swagelok blind is used to maintain vacuum inside the transfer line (the black knob is removed). Input and output sides are labelled, the line with the overpressure relief valve (green cap) is the output side. All connections are 6 mm Swagelok.