

Updated Penetrations

The cables I have are just placeholders here. Please identify which cables you need for your hardware setup and fill in the cable type with diameter and length required.

My best information right now is:

West Penetration (66 ft to magnet rack): All connections running to the magnet rack (plus thermocouple lines)

East Penetration (22 ft out of penetration, 47 feet to cryoplatfom): Only NMR possible microwave-water

Front Penetration (55 ft to cryoplatfom) : All other cabling

West Penetration

Cryogenics

Vapor return for QT transferline (0.5 inch SS/copper line with 0.5-1 inch foam)

QT transferline for LHe magnet filling (see QT step)

Main Flow (10 inch SS)

Separator Flow (25 mm flex hose with 1-2 inch foam)

LN2 fill (copper tubing with 5-6 inch foam)

He gas (1/8 hose HDPE for gas lines for backfilling fridge)

Electrical

Superconducting Magnet Power:

Quantity: 2

Diameter: 0.430"

Length: 66 ft from magnet to magnet power-supply on west side of cryo-platform

Part Number: BS 638:PART 4 H.O.F.R 85 Deg.C. 25mm² ELAND

Website: <https://www.elandcables.com/electrical-cable-and-accessories/cables-by-standard/bs638-part-4-cable>

Datasheet: <https://www.elandcables.com/handlers/downloadpdf.ashx?url=/media/38106/0361tq-bs-en-60332-1-2-bs-638-black-welding-cable.pdf>

Helium Level Sensors Inside Superconducting Magnet and LHe Dewar:

Quantity: 4

Superconducting Magnet Aperature Thermocouples - Highly Length Sensitive:

Quantity: 8

Dimensions (each): 0.055" x 0.090"

Length: Somewhere near separator pump

Part Number: EXFF-T-16-100

Website: <https://www.omega.com/en-us/wire-and-cable/thermocouple-and-rtd-wire-and-cable/p/EXTT-TX-WIRE>

LHe level probe (one 7 mm cable)

LN2 level probe (one 7 mm cable)

Shim power (two 7 mm cable)

Top ceiling Penetration

Magnet boil off exhaust (25 mm flex hose with 0.5-1 inch foam) back to QT T-ed outside of cave to Quench relief outside of Hall

LN2 port exhaust (25 mm flex hose with 0.5-1 inch foam) should have a fan pulling vapor

East Penetration

(less than 47ft from target to cryo-platform)

NMR lines - Highly Length Sensitive

Quantity:

Diameter (each):

Diameter (Collective): < 30mm

Part Number:

EIP Microwave Frequency Counter (Gorex):

Quantity: 1

Diameter: 0.210"

Length:

Top Front-East Penetration

(shortest length is about 55ft from target to cryo-platform)

Other

Cooling Water Lines for EIO (microwave) R.A.W.

Quantity: 2

Outer Diameter (O.D.): 1/4"

Inner Diameter (I.D.): 11/64"

Material: High Density Poly Ethylene (HDPE)

Item Number: 2LZT2

Website: <https://www.grainger.com/product/GRAINGER-APPROVED-100-ft-Natural-Polyethylene-2LZT2>

Pneumatic air lines (two 3/8" HDPE tubing)

Cryo

Manometer (25 mm flex hose with 1-2 inch foam)

Electrical

Power Cables for the Annealing Plates:

Quantity: 2

Gauge: 14

Diameter (with insulation):

Length: From cave to control room

Insert sensors (one 7 mm cable):

Fridge Temperature Sensors (1KOhm RuO):

Quantity: 8 sensors, 16 wires. Use Multi-conductor

Diameter (overall):

Length:

2 pressure sensors cabling (two 7 mm cable)

Microwave HV cables to PS (one 20 mm cable) needs line conditioner

Microwave stepper controls (three 4 mm cable)

Actuator controls (two 7 mm cable)

All instrumentation for vacuum turbo will run along this path as well but not through penetration

Bottom Front-East Opening

(To Vacuum setup)

pfeiffer pressure sensor

turbo pump (KF-25 flex)

backing pump (no penetration)

turbo controller (no penetration)

Connects from Outside of Cave to Cryoplatform

HFM-305 flow meter (from inlet manifold to rack)

HFC-303 flow controller (from inlet manifold to rack)

THCD-400 4-channel readout controller (from rack to 2 HFM-305 main flow and magnet boil off)

PS AF-100-AM interconnecting cable (100 ft long)