



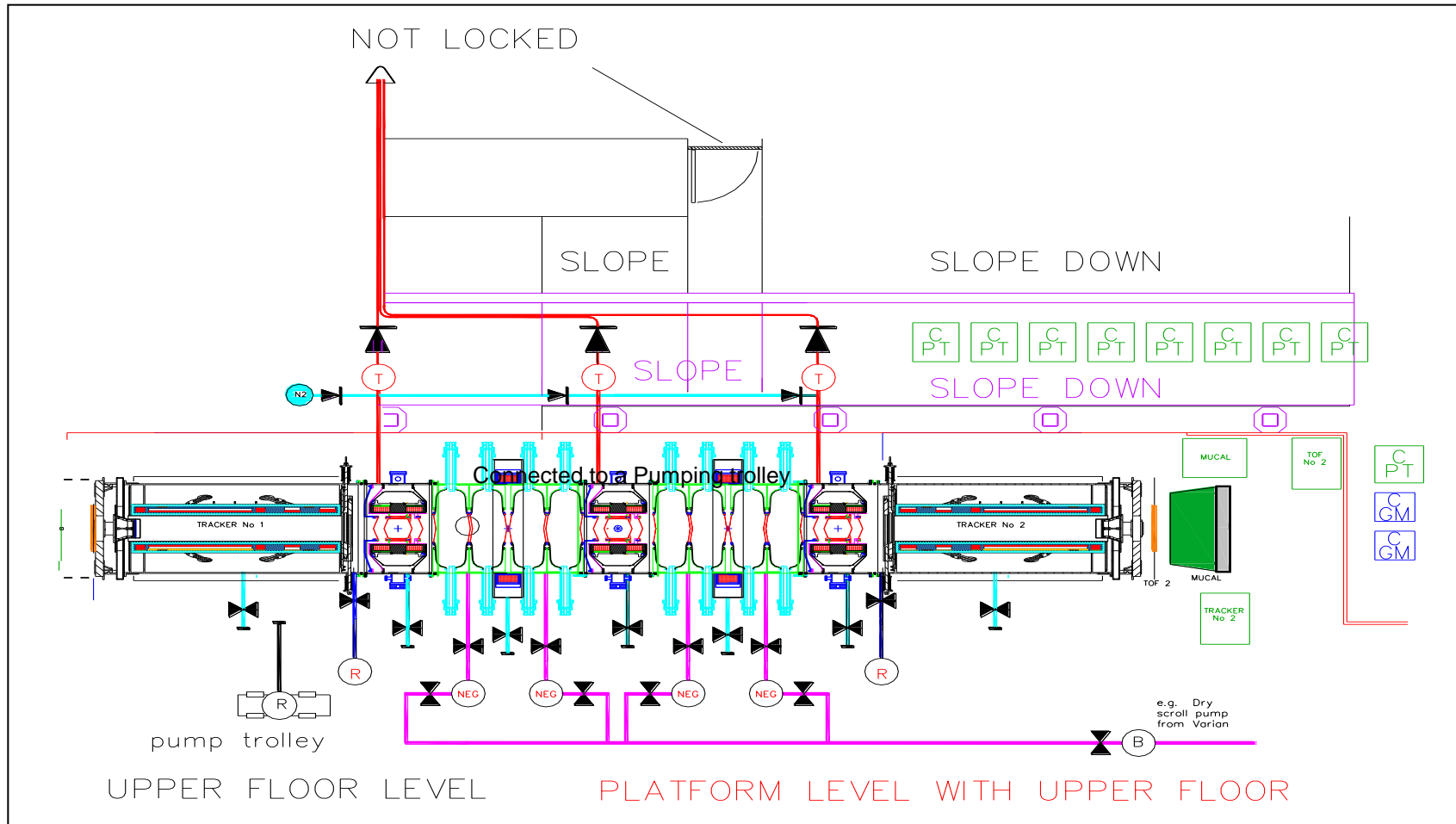
CM28 – Vacuum System Update

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MICE Cooling Channel Vacuum System



▲ — Non-return Valve

⊖ — Turbo pump

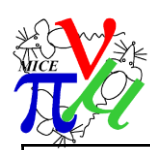
⊖ — NEG Pump

⊖ — Roughing pump

⊖ — Backing pump

⊖ — Dry Nitrogen





MICE Vacsys Pumps

Pump Ref.	Module	Vacuum position	Pump type	Port size	Pump requirement specifics	Ordering Details	Comments	Location	No. of Pumps	Group Responsible
CC-VP01	Spectrometer Solenoid left and right	Magnet vacuum	Turbo/Roughing Pump	25mm	Turbo stack with option to use as just scroll pump.	Leybold TURBOVAC 361 (C) ClassicLine Edwards Scroll Vacuum Pump XDS10 1-phase 115/230 V (set to 230 V) for Europe and UK	Pump mounted on a trolley Original design asked for a DN 40 port. This is a non-conformance. RAL needs to provide a KF flange at site.	Trolley	1	RAL
CC-VP02, CC-VP03		Warm Cryostat vacuum	Roughing pump	25mm	Dedicated dry scroll pump.	Edwards Scroll Vacuum Pump XDS10 1-phase 115/230 V (set to 230 V) for Europe and UK	Ditto. Also need to decide if it must be manifolded to the end of MICE Hall, or seated just local to module. Note: Larger diameter pipe needed if manifolded.	Inside hall, local to module	2	RAL
CC-VP01		Magnet vacuum	Roughing pump	40mm	A dry scroll Pump. Pump rate and manufacturer to be decided.	Edwards Scroll Vacuum Pump XDS10 1-phase 115/230 V (set to 230 V) for Europe and UK	Pump mounted on a trolley (common pumping set)	Trolley	N/A	RAL
HA-VP2a, HB-VP2a, HC-VP2a	AFC Left, Centre and Right	Hydrogen Safety Pump	Turbo Pump	100mm	Turbo pump of 150 L/sec and vacuum pressure at this interspace is 10^{-5} torr Max. pipe length from Cryostat to Turbo pump be less than 9.2m so that it maintain a conductance of 43L/sec -- out-gassing rate used in deriving this number is 0.002 mbar/sec.	Leybold Oerlikon TURBOVAC SL300 DN 100 ISO-K/16KF	Turbo pump to be located in the Mezzanine, with its backing pump located outside hall. Each module has its own pump and vent line. Pump manufacture to be decided. Nitrogen purge is needed and is provided for by gas bottles. Tesla to re-orientate the pumping port to the top of the cryostat to reduce pipe length. Notes: (1) Minimum pipe diameter required is 150mm, even though port is only 100mm; (2) there is no mention of the single roughing pump located outside the hall that services all three LH2 delivery systems.	South Mezzanine (possibly behind shield wall?)	3	RAL
HA-VP2b, HB-VP2b, HC-VP2b			Roughing pump	100mm	Dry scroll pump or ATEX approved Rotary Vane + Roots Blower	Leybold Oerlikon TRIVAC D65B, ATEX, 3-; Cat : 3i + 3o with RUVAC WAU 251 ATEX KAT.3i/3o T3		Outside Hall	3	RAL
HA-VP1		Hydrogen Delivery System Pump	Roughing pump	100mm	Dry scroll pump?	Edwards Scroll Vacuum Pump XDS10 1-phase 115/230 V (set to 230 V) for Europe and UK		Outside Hall	1	RAL
		Warm Cryostat vacuum	Roughing pump	N/A	N/A		Vacuum provided for by the adjacent Tracker Solenoid module	N/A	N/A	N/A
CC-VP01	RFCC module, left and right	Magnet vacuum	Roughing Pump	40mm	A dry scroll Pump . Pump rate and manufacturer to be decided.		Pump mounted on a trolley (common pumping set)	Trolley	N/A	RAL
		Cavity vacuum	NEG pump	200mm	Rate and manufacturer to be advised	Vacuum One CapaciTorr B1300 pump (4H0438) * Base flange with connector and heater * CF160 flange	One NEG pump for each cavity; 4 in total. Each NEG pump has its own roughing port which connects to a 100mm main backing line for all 4 pumps. Location of backing pump to be decided. Note: Check whether 100mm diameter backing line is sufficient when manifolded, especially as port size is 200mm. This provides the vacuum for the warm Cryostat which also shares the same vacuum with the AFC warm cryostat. Dry N2 required for back filling -- could be from gas bottles Additional nitrogen is needed for the RF tuner actuator. LBL to advise nitrogen pressure, volume and consumption rate, and RAL to decide if this could be provided for by gas bottle.	Under RFCC module	4	LBNL
CC-VP04, CC-VP05			Roughing Pump		TBD				Outside Hall?	2?





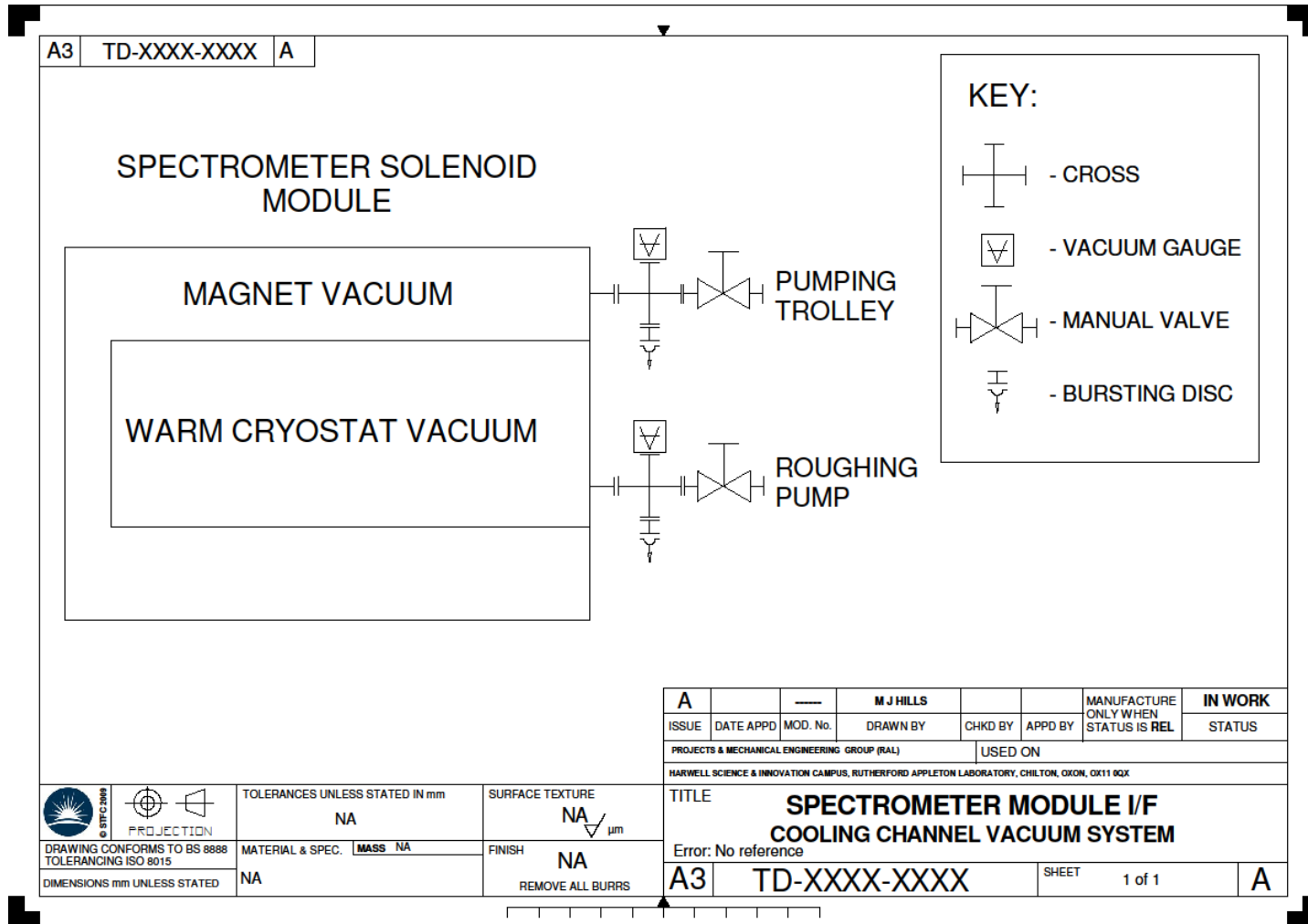
MICE Pumping System – Ancillary Equipment

Vacuum position	Pump Ancillary Equipment	Ordering Details	Quantity	Module Ancillary Equipment	Ordering Details	Quantity
Magnet vacuum	Gauge Isolating valve	LEYCON Valves, ISO-KF Flange, DN 25 KF, Manually Operated Right-angle valve, aluminum body, DN 25 KF	2	Isolating valve	LEYCON Valves, ISO-KF Flange, DN 25 KF, Manually Operated Straight-Through Valve, aluminum body, DN 25 KF	1
	Gauge head	IONIVAC Transmitter ITR 200 S	1	Gauge head	IONIVAC Transmitter ITR 200 S	1
	Pump Isolating Valve	LEYCON Valves, ISO-KF Flange, DN 25 KF, Manually Operated Right-angle valve, aluminum body, DN 25 KF	1	Burst Disc		1
	Module Isolating Valve	LEYCON Valves, ISO-KF Flange, DN 25 KF, Manually Operated Right-angle valve, aluminum body, DN 25 KF	1	Cross	4-Way Crosses ISO-KF (Stainless Steel 1.4301), DN 25	1
	Tee Lines	Tees ISO-KF (Stainless Steel 1.4301), DN 25	2			
	Warm Cryostat vacuum				Isolating valve	LEYCON Valves, ISO-KF Flange, DN 25 KF, Manually Operated Straight-Through Valve, aluminum body, DN 25 KF
				Gauge head	IONIVAC Transmitter ITR 200 S	1
				Burst Disc		1
				Cross	4-Way Crosses ISO-KF (Stainless Steel 1.4301), DN 25	1
Magnet vacuum	See CC-VP01	See CC-VP01				
Hydrogen Safety Pump	See separate H2 system notes					
	See separate H2 system notes					
Hydrogen Delivery System Pump	See separate H2 system notes					
Warm Cryostat vacuum	N/A					
Magnet vacuum	See CC-VP01	See CC-VP01				
•Cavity vacuum	St 185 Getter cartridge					
	NEG pump controller					
	Mains input cable for NEG pump controller (2 meter)					
	Supply output cable for NEG pump controller (3 meter)					
	Mating Connector (female 6 pin)					
	Bursting disc, main isolating valve, gauge head with isolating valve					





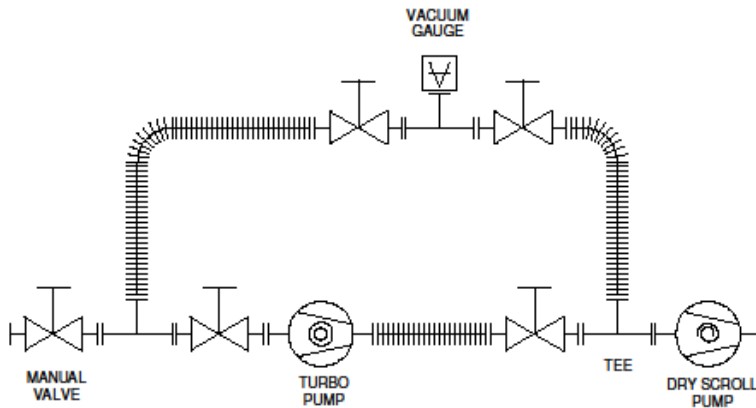
Pumping System for Spectrometer Solenoid










Turbo Pump Components


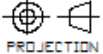
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KEY:

-  - TEE
-  - VACUUM GAUGE
-  - MANUAL VALVE
-  - DRY SCROLL PUMP
-  - TURBO PUMP

A		---	M J HILLS			MANUFACTURE ONLY WHEN STATUS IS REL	IN WORK
ISSUE	DATE APPD	MOD. No.	DRAWN BY	CHKD BY	APPO BY	STATUS IS REL	STATUS
PROJECTS & MECHANICAL ENGINEERING GROUP (RAL)					USED ON		
HARWELL SCIENCE & INNOVATION CAMPUS, RUTHERFORD APPLETON LABORATORY, CHILTON, OXON, OX1 0QX							

 	TOLERANCES UNLESS STATED IN mm	SURFACE TEXTURE
	NA	NA $\sqrt{\mu\text{m}}$
DRAWING CONFORMS TO BS 8888 TOLERANCING ISO 8015	MATERIAL & SPEC. MASS NA	FINISH
DIMENSIONS mm UNLESS STATED	NA	REMOVE ALL BURRS

TITLE		CC-VP01 P&ID	
		COOLING CHANNEL VACUUM SYSTEM	
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Issues & Progress

- **Outstanding issues:**
 - Insulating vacuums:
 - Need to decide as soon as possible whether roughing pumps or turbo pump stacks are required
 - Which insulating vacuums need to be continuously pumped?
 - What happens when magnets quench or warm up?
 - What size pumping ports will be required?
- **Recent progress:**
 - Pumps required immediately for the H2 R&D system have already been purchased

