

# Cryogen Free Measurement Systems (10 – 18 Tesla)

## Specification

Nominal Specifications:

Model	CFM-9T-H3-IVTI-25	CFM-12T-H3-IVTI-25	CFM-14T-H3-IVTI-25	CFM-16T-H3-IVTI-25
Central field (guarantee)	9.0 Tesla	12.0 Tesla	14.0 Tesla	16.0 Tesla
Imax for Bmax	120A	120A	120A	120A
Homogeneity in 10mm dsv	0.1%	0.1%	0.1%	0.1%
Persistence	20 ppm / hour	20 ppm / hour	20 ppm / hour	20 ppm / hour
CFVTI bore	25mm	25mm	25mm	25mm
CFVTI Sample Base Temperature	1.6K	1.6K	1.6K	1.6K
A superconducting switch is fitted to allow operation in the persistent mode.				
No liquid helium or nitrogen is required to operate the magnet. Only Helium gas (supplied) is required to operate the CFVTI.				

Typical Cryostat specifications:

Typical magnet cool-down time	30 hrs
Typical CFVTI cool-down time for standard sample probe, 300K to 1.6K	2 hours
System hold time	Minimum 1 year

VTI Specifications:

Sample Space	25mm as standard	
Temperature range	1.6 to 400K with continuous gas flow in VTI	
with optional inserts (not available for all measurements):	up to 100K with heated sample platform Down to 0.3 with He3 insert	
Temperature control: (with Lakeshore series unit)	5mK @ 10K 10mK @100K 50mK @ 300K	
Typical sample cooldown time to 1.6K	30 minutes	
Temperature stabilisation time for a typical 10K temperature step.	Accuracy: ± 1K ± 0.1K ± 0.01K	Set time: 1 minute 10 minutes 15 minutes

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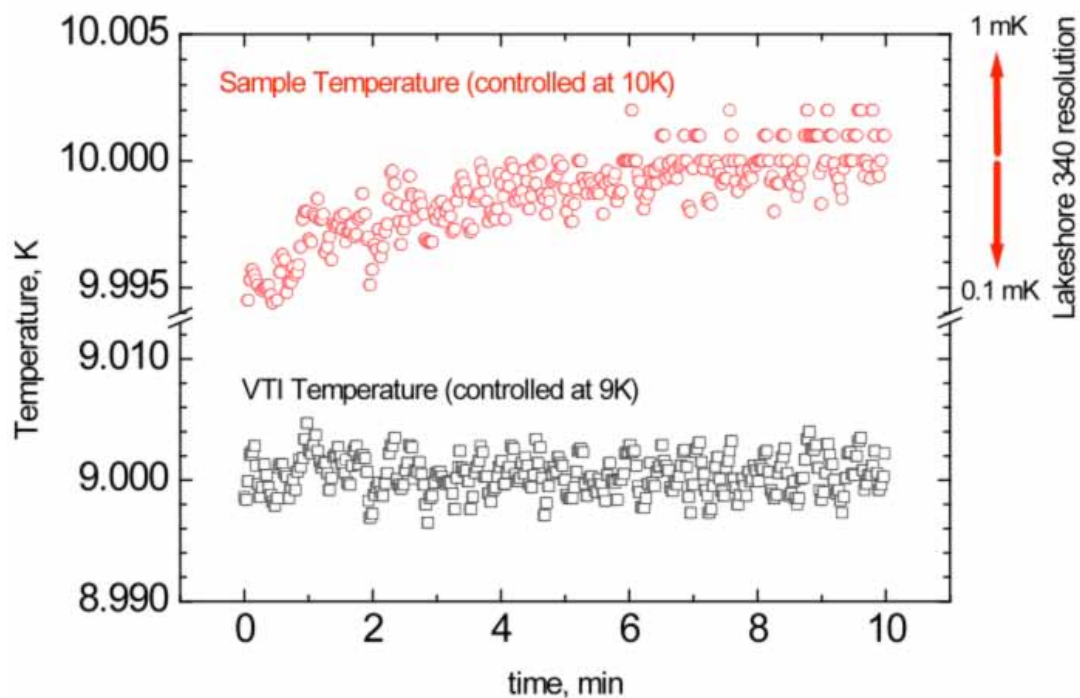
Typical Cryocooler specification (Cryocooler & cold head) for 7T and 9T models.\*

Sumitomo SRDK408:

Cooling powers at 50Hz	34W @ 40K 1.0W @ 4.2K
Cooling powers at 60Hz	42W @ 40K 1.0W @ 4.2K
Base temperature	<4K
Maintenance interval	10,000 hrs
Charcoal absorber life	30,000 hrs
Mains power requirement	7.5 KVA, 3-phase (200V, 25A)
Water cooling	7L/min 5°C to 30°C
Ambient temperature	5°C to 28°C
Compressor dimensions	W450mm, L500mm, H632mm, 115Kg
*Different Cryocooler models required for higher fields.	

### Temperature stability of VTI

Dual control loop was used, with the VTI temperature stabilized at 9 K and the sample temperature at 10 K. The peak-to-peak temperature fluctuations are within a few millikelvin. Note that the resolution of the temperature controller changes at 10 K, so that the digitization step in the data is larger at temperatures above 10 K.



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## Papers

Bulk Superconductivity in Bismuth oxy-sulfide  $\text{Bi}_4\text{O}_4\text{S}_3$

Giant Magnetoelastic Coupling in a Metallic Helical Metamagnet

Thermomagnetic irreversibility in  $\text{Ni}_2\text{Mn}_{1.36}\text{Sn}_{0.64}$  shape-memory alloy

Influence of the strong magnetocrystalline anisotropy on the magnetocaloric properties of MnP single crystal

Metastability and magnetic memory effect in  $\text{Ni}_2\text{Mn}_{1.4}\text{Sn}_{0.6}$

High-field magnetic phase transitions and spin excitations in magnetoelectric  $\text{LiNiPO}_4$