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SERVICE REPORT

Job Number:	SE0756 Quote:	Sage:	
Customer:	Minerva		
Contact:	Eloise Braun		
Instrument:	2x Integra2: 20802/4-2021/1259 (Integra 4) and 202802/4-2023/1305 (Integra 5)		
Date of Visit:	1 day visit 23/09/26, then 4 days starting 5/10/26 Days: 5		
Engineer:	Henry Connell Cooke		
Reason for Visit:			
Instrument Move			
Service Contract?	**Yes**	Expires:	
Warranty?	No	Expires:	N/A
Tick as Applicable:	Move and Routine Service		
Details of Visit:			

Sercon Ltd
Europa House, Coppicemere Drive
Crewe, Cheshire
CW1 6GZ U.K.
Company Registration No.: 4290072

Phone: +44 (0) 1270 580008

www.sercongroup.com
VAT No.: 771 1100 74

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Day 1

- Arrived at old lab to decommission both systems. Furnaces were already cold and gases off, so no pre specs ran
- Magnet positions marked before removing magnets, oil removed from pumps, everything packed
- Customer had discarded the grey autosampler boxes, so cardboard boxes filled with bubble wrap had to suffice
- Boxes containing all leads, PCs etc left alongside each system with their separate magnet and rotary pump, for the customer to complete their own shipping

Day 2 (Two weeks Later)

- Two weeks later, arrive at new lab with both systems already on desks
- Oil and filament changed first in Integra 5, system pumped down without problem
- When changing the rotary oil of integra 4, the top screw used to pour new oil in had been overtightened, resulting in slight breakage of the handle. It was eventually unscrewed not overtightened when screwing back in place
- The new gas lines were slightly purged before adding the piping to the back of the systems, brought from the old lab. O2 taps from the bench did not have the correct fittings to screw into these lines, so fittings had to be taken from other unused taps. Every tap was leak checked and pressure tested when connected to the back of both systems
- New tubes added and cold pressure test passed on Integra 5
- Both systems took ~2 hours to reach <2.0E-7. Both filaments conditioned as normal

Day 3

- Furnaces heated, sample dropped and trapped, magnet position and peak shapes found first on Integra 5. Very large N2 blank (initially 2nA) found to be a mixture of O2 line and sampler
- Pressure test failed on integra 4 due to sampler. Sampler stripped and cleaned, given a new PTFE block. PTFE shavings were found everywhere throughout the sampler, likely since it was shaken up during the move, especially in its incorrect box.
- Integra 4 now passes pressure test but combustion furnace has trouble heating. It is found that the Cal Controller has changed various settings in an unknown manner, and starts to runaway heating up when attempting to correct the settings. System switched off for safety
- Integra 5 passes CO2 precision despite high blank, with 0.03 ‰. N2 precision = 0.40 ‰ when swapping a test for the most erroneous sample. Bad results due to a mixute of high blank and magnet position optimised for CO2.
- It was found that the O2 crimp had come loose during transport, once the crimp was replaced and ~70mL/min O2 set, the blank fell to ~0.9 nA, once again a mixture of sampler and O2 line.
- Linearity run set overnight

Day 4

- Cal Controller on Integra 4 reset from scratch, setting all the level 5 settings correctly allowed the furnace to heat properly once again
- Hot pressure test passed, and magnet position/peak shapes found
- ~0.5nA blank from only O2 line matched Integra 5, suggesting a slight leak in the O2 line prior to the systems
- Integra 4 also has CO2 blank peaks, decreasing over time but still present around ~1E-10
- Despite the slight blank, both N2 and CO2 passed precision on integra 4: N2 = 0.12 ‰ and CO2 = 0.06 ‰
- Integra 5 linearity: CO2 = 0.27 ‰, N2 = 1.3 ‰. Precision reran after the slight blank improvement: CO2 = 0.02, N2 did not improve
- Customer stated that they did not wish to risk intervention with the sampler, or further magnet moving to optimise N2, since they only ever run CO2 samples.
- Customer standards ran overnight on Integra 5, while a linearity ran overnight on Integra 4

Day 5

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- Customer samples on integra 5 gave 0.02 ‰ when discounting one sample which was seemingly empty
- Integra 4 gave n = 5 CO2 linearity = 0.50, with the smallest sample excluded. One spike was observed in an N2 sample. CO2 retuned slightly and linearity reran. No further N2 spikes present, giving results of N2 = 0.16 ‰ and CO2 0.32 ‰ for n=5
- The linear working range for Integra 4 = 100 – 500 ug C, instead of 50 – 500 ug like for Integra 5

	Integra 4		Integra 5	
	CO2	N2	CO2	N2
Precision ‰ (n=5)	0.06	0.12	0.02	0.40
Linearity ‰ (n=6 except n=5 for CO2 integra 4)	0.32	0.16	0.27	1.3

Recommendations:

- If you ever want to start N2 analysis, please use Integra 4, not 5
- Please check your O2 line for a small leak, especially if you are using more than expected
- Please email me henry.cooke@sercongroup.com or service@sercongroup.com if you have any future problems or questions

Follow Up:

An invoice will be sent for the PTFE slide that was used on the sampler of Integra 4

Engineer: Henry Connell Cooke Date: 08 Oct. 26

Signed:

Henry Connell Cooke

Customer: CLOSE BRAWN Date: 9.10.26

Signed:

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