

3 - MACHINE SPECIFICATION

Client:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Ref No.	Product Description	Required
HS2022 (continuous flow)		
20402/1	HS2022 Ref Gas + P Mag	
20402/2	HS2022 Ref Gas + E-Mag	
20402/3	HS2022 Ref Gas + Hd Collector + E-Mag	
20402/4	HS2022 Ref Gas + Hd Collector+E-Mag+Trap Loop	
20501	Hd Collector Assy	***
50101/2	Trapping Loop Assy	
70201-1	70201-1 Analyser spares kit - Included	
EA Units		
10202/11	iso-EArth	
10202/13	iso-EArth+	
10202/14	iso-Earth HT Furnace Upgrade	
10202/15	Iso-Earth (Without Autosampler)	
11802/1	Earth+PC	
11802/2	EArth+Clarity+PC	
70501-1	Consumables for C and N for Combustion Only	
70501-11	Simultaneous CNS Consumables Kit (approx. 10000 analysis)	
70501-3	Sample Prep Kit (Inc.)	
70501-4	GSL Combustion and Gas C & N Start Up Kit	
70501-5	Simultaneous NCS Consumables Kit	
70501-6	C&N Combustion Only Consumables Kit (approx. 5000 samples)	
70501-8	Simultaneous CNS Consumables Kit (approx. 5000 samples)	
70601-1	Sulphur Start Up Kit (Inc. with Sercon EA Systems)	
70601-2	Sulphur Consumables Kit for 1000 Samples	
70601-4	Sulphur Consumables Kit (approx. 5000 Samples)	
70801-2	Pyrolysis Consumables Kit-Low temp for Solids	
71701-1	Sub Microgram Nitrogen Analysis Start Up Kit	
SI2040	PN150 Pneumatic Autosampler with one no.50 pos, carousel	
SI2345	ME Micro Balance	
SI2737/A	Sercon 50 Position Autosampler Assy	
SI2789	Extra 50 Position Carousel	
SI2744	Automatic Liquid Sampler 15 Position	
SI2743	Liquid Sampler Mounting Plate	
Headspace Equilibration		
10202/10	XYZ Gas Sampling Control Box	
10302/1	Aqua System	
11103	µCarbs for CF	
11103-1	µCarbs for DI	
11601	200 Place Dual Heated Block 240 Volt	
11801	Sercon XYZ Gas Autosampler	
71107-1	CF oxygen-18 equilibration kit	
71107-2	DI Oxygen-18 Equilibration kit	
71201-1	CF deuterium equilibration kit	
71201-2	DI Deuterium Equilibration kit	
71801-1	WES-DI start up kit (Inc. with WES-DI)	
GC Units		
10402/2	Orchid module 1500C (Will run Hd 70901-1 C Spares Kit Inc)	✓
10901	Nitrogen Option (71301-1 N Spares kit Included)	
HP7890/1	Agilent 7890B GC System	
HP7890/2	Agilent 7890B GC with Auto Injector	
HP7890/3	Agilent 7890B GC + Auto Injector + 150 Vial Sample Tray	
SI2561	Nexis GC 2010 Plus	

Ref No.	Product Description	Required
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*** When ordered alone IN no. / Blue book NOT required

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GC Units *continued*

SI2564	Nexis GC-2030	
70901-3	GC Pyrolysis H and O Start Up Kit	
70901-4	GC Pyrolysis H Spares Kit	
70901-5	GC Combustion C Spares Kit (approx. 5000 samples)	
70901-6	GC Pyrolysis h Start Up Kit (approx. 5000 samples)	
71301-1	GC N Spares kit	

ABCA2 Units

10502/1	ABCA2 Sercon XYZ Autosampler	
10602	ABCA2 Gas Box	
20602	Complete Sercon ABCA2 system	
20603	ABCA IR Analyser	
70101-1	ABCA2 spares kit (<i>Inc. With ABCA2</i>)	
70101-2	ABCA2 Spares Kit for AB Analitica Systems	
70101-3	ABCA2 Autosampler Upgrade Kit	
SI1767	CVL505 - Barcode Reader	
SC9973	13C Urea breath test kit for <i>Helicobacter pylori</i> infection	
SC9974	<i>Helicobacter</i> Test kit for children age 3-11 (45mg)	

Integra2 Units

20802/4	Integra2	
70201-2	Integra2 analyser spares kit - Included	
70401-1	Integra-2 consumables (<i>Inc. With Integra2</i>)	

Trace Gas Systems

10802/4	CryoPrep	
10802/5	Automated LN refiller	
10802/6	CryoFlex (TOC)	
10802/7	CryoGas	
10802/8	CryoFlex (LA)	
SI2533	Silicon Carbide Vertical Furnace	
SI2731	213nm Laser Ablation System	
SI2733	isoScell 100 sampler chamber	
71001-1	Cryoprep Spares Kit	
71001-5	CryoGas Consumables Kit	

TOC Units

14001	Thermalox Environmental TOC-IRMS	
14002	Thermalox Environmental TOC-Standalone	
14003	Thermalox Environmental TOC-Standalone No Sampler	
SI2772	CO2 Detector, High sensitivity Option	
SI2773	NOx detector Option	
SI2774	Vacuum pump Option	
SI2775	Stirred Vial rack Option	
72101-1	TOC Start Up Kit	
72101-2	TOC Chem Pack	
72101-3	TOC & TN Instrument with heavy usage - one year	
72101-4	TOC only - economy holding	

GEO 20-22 (dual inlet)

10702	GEO 20-22 Water Equilibration System (D & 18O)	
21802/1	GEO 20-22	
21802/2	GEO 20-22 + E-Mag	
21802/3	GEO 20-22 + E-Mag +Hd	
21802/4	GEO 20-22 Inlet	

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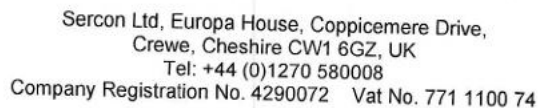
70301-1	GEO start up kit - Included	
70301-3E	Comprehensive GEO 20-22 spares kit for 5 years operation	
HT-EA		
11501/4	HT-EA (With Autosampler)	
11501/5	HT-EA With Liquid Option	
11501/6	HT-EA Stand Alone	
11501/7	HT-EA (Without Autosampler)	
SI2622	CTC PAL3-LSI-L-S	
SI2624	CTC PAL3-Kit-Standalone	
70801-1	Pyrolysis Consumables Kit-High Temp for Solids	
71501-1	HT-EA Pyrolysis Start Up kit O and H	
71501-2	HT-EA Pyrolysis Kit for Water injections	
71501-3	HT-EA Sensitivity Start Up Kit for O & H in small samples	
71501-4	HT-EA Sensitivity Consumables Kit for O & H in small samples	
71501-5	HT-EA Sensitivity Kit for O&H in Small Samples (5000 samples)	
71501-7	HT-EA Kit for Room Temp Equilibration	
71501-8	HT-EA Pyrolysis Kit for Water injections (approx. 1 year kit)	

Ref No.	Product Description	Required
Upgrades		
12101	Evacuation System ***	
12102	2 Ref Gas+ Dilutor Box ***	
20101	Standard Source Assy ***	
20102	HS Source Assy ***	
20301	Standard Collector Assy ***	
30202/1	System Control Upgrade (Pmag) installation not included	Edwards Or Pfeiffer
30202/2	System Controller Upgrade (Emag) installation not included	Edwards Or Pfeiffer
10202/7	Preparation PCB Upgrade	
30202/3	Hijack Box ***	
30302/4	nEXT85 Edwards Pumping System Upgrade Single - installation not included	
30302/5	nEXT85 Edwards Pumping System Upgrade Dual - installation not included	
30302/6	nEXT85 Edwards Pumping System Upgrade Triple- installation not included	
SI2542	ABCA2 Upgrade Kit	
CALLISTOW	Callisto software upgrade ***	
Specials		
11702	LC-I interface	
12202	Leco Interface Unit	
SI2320	Agilent 1260 Series Refractive Index Detection HPLC System	
71401-1	ABCA-G Start Up/Spares Kit	
71401-2	ABCA-G Equilibration Spares Kit - Room temp O only	
71401-3	ABCA-G Equilibration Spares Kit - Room Temp O & H	
71601-1	LC Interface Spares Kit	
ADDITIONS		
PC	Windows 7 based PC System with Callisto Software	
Printer	Printer	
INST1	Installation and start up training at customer's site by Sercon Engineer	
INST2	Installation and start up training at customer's site by Agents Engineer	
WARR	1 year warranty	
WARR2	2 year warranty	
TRAIN	Training in UK for one person for 3 days	
SCONTRACT	Maintenance Service Contract – 1 year	
SPECIFICATION REQUIREMENTS		
Voltage	Volts 50/60Hz	

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Plug Type	SI2510	3 Metre USA/Japan plug to IEC C 13	
	SI2511	2.5 Metre Australian plug to IEC C 13	
	SI2512	3 Metre UK 13 amp Fused plug to IEC C 13	
	SI2523	3metre Schuko (Euro) Plug to IEC C13 Socket	
	SI2514	2.5 metre Chinese mains to IEC C13	
Pallet	Stamped for export heat treated for 30 min @ 56 °C		
	Complies with all Export Requirements		



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Date	Action Taken	By Whom
09 Sept 25	Set up software on PC. Established coms to unit	
10 Sept 25	Set crimps and flows. EPC fail - No read backs. Replaced for new - All okay. Plumbing not fully crimped down. System requires GC Over to set correct flows. No leaks found. All values respond - OK.	DJH
10 Sept 25	Ready to ship	DJH DJH

Date	Action Taken	By Whom
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sercon
innovators in isotopes

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Test acceptance - 6

6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	GEO-data Logging GmbH		
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HS20-22

Reference Gas Precision (n=5) x5 Ref gas pulses of 5 seconds to be used.

¹³ C	(CO ₂)	0.06	
¹⁵ N		0.06	
¹⁸ O	(CO ₂)	0.06	
³⁴ S	(SO ₂)	0.1	
² H		0.4	

Reference Gas Linearity ref gas pulses ranging from 1-second trough to 10 seconds

¹³ C	≤0.02‰/nA STD Deviation <0.30	
¹⁵ N	≤0.02‰/nA STD Deviation <0.30	

IsoEarth & PyroEarth

Combustion (n=5) (For NCS use 0.3mg of Cystine) (Pyrolysis use silver caps) 0.4mg of Cystine for ¹⁸O and 4 mg of Cystine for H₂

¹³ C	100 µg C	0.1		10 µg C	0.8	
¹⁵ N	100 µg N	0.15		10 µg N	1.5	
³⁴ S	25 µg S	0.3		10 µg S	1.0	
Dual	400 µg C	0.1		100 µg N	0.15	
¹⁸ O	100 µg or 1 µl water	0.3				
² H	200 µg H or 1 µl water	1.0				

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EArth			
Solid specs to be completed using 2mg methionine calibration against 1,2,3mg (n=3) cystine. Combustion (n=5)			
		Accuracy (avg)	Precision (std dev)
¹³ C		+/- 0.4%	0.2
¹⁵ N		+/- 0.4%	0.2
² H		+/- 0.4%	0.2
³⁴ S		+/- 0.4%	0.2
¹⁸ O	Pyrolysis	+/- 0.4%	0.2
Liquid injections n=5 using 5µl methanol calibrated against 2,4,6µl injections of ethanol			
		Accuracy (avg)	Precision (std dev)
¹⁸ O	Pyrolysis	+/- 0.4%	0.2

Integra2			
Specs to be completed using AS beet mix 400C/100N for precision & 250C/100N for linearity			
¹³ C	100 µg C	0.2	
¹⁵ N	100 µg N	0.3	
Dual	100 µg N & 400 µg C	0.4 & 0.15	
³⁴ S	30 µg S	0.5	
¹⁸ O	100 µg O	0.5	
Dual	100 µg N & 250 µg C	0.5	
HT-EA (Pyrolysis use silver caps) 0.4mg of Cystine for ¹⁸ O and 4 mg of Cystine for H ₂			
Pyrolysis (n=5)			
¹⁸ O	100 µg O or 1 µl water	0.3	
² H	200 µg H or 1 µl water	1.0	

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Aqua, μ Carbs & GasBox					
Equilibrations (n=5)					
^{18}O	0.2 ml water	0.1			
^2H	0.2 ml water	2.0			
Carbonates (n=5)					
^{13}C	100 μg CaCO_3	0.08			
^{18}O	100 μg CaCO_3	0.1			
Gas Analysis (n=5)					
^{13}C	5% CO_2	0.1		Air CO_2	0.1
^{18}O	5% CO_2	0.1		Air CO_2	0.2
^2H	0.5 ml H_2	1.5			
^{15}N	0.5 ml N_2	0.1		100 ppm N_2O	0.5
^{13}C	Breath (12 ml)	0.1			
DIC (n=5)					
^{13}C	15ppm (0.5ml)	0.15			

LC-I					
(n=5)					
^{13}C		0.2			

GC Orchid					
Combustion (n=3 for each analyte)					
^{13}C	3 Alkanes	100 ng C	0.2	10 ng C	0.5
^{15}N	2 Amines	100 ng N	0.5	14 ng N	1.5

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Pyrolysis (n=3 for each analyte)						
² H	3 Alkanes	250 ng H	3.0		25 ng H	10.0
¹⁸ O	3 FAMES	100 ng O	0.5		20 ng O	2.0
Water pyrolysis (n=5)						
² H	0.1 µl water	3.0				
¹⁸ O	0.1 µl water	0.4				

CryoRange						
(n=5)						
¹³ C	Air CO ₂ (12ml)	0.1		Air CH ₄ (125ml)	0.2	
¹⁵ N	Air N ₂ (1ml)	0.1		Air N ₂ O (125ml)	0.4	
¹⁸ O	Air CO ₂ (12ml)	0.15		Air N ₂ O (125ml)	0.7	
¹⁸ O	Air O ₂ (1ml)	0.1				
² H	Air CH ₄	3.0				
¹³ C	TOC (5ppm)	0.4				
¹³ C	Laser					

Geo2			
Internal precision (no change overs)			
² H	200 Bar µl	0.15	
¹³ C	100 Bar µl	0.01	
¹⁵ N	100 Bar µl	0.01	
¹⁸ O	100 Bar µl	0.015	
³⁴ S	100 Bar µl	0.015	
Single cold finger volumes (10 change overs)			

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¹³ C	20 Bar µl	0.01	
¹⁸ O	20 Bar µl	0.015	
¹³ C	3 Bar µl	0.02	
¹⁸ O	3 Bar µl	0.03	
CAPS (n=5)			
¹³ C	50 µg CaCO ₃	0.03	
¹⁸ O	50 µg CaCO ₃	0.06	
WES (n=5)			
² H		1.0	
¹⁸ O		0.05	
Manifold (10 tubes)			
² H		0.5	
¹³ C		0.02	
¹⁵ N		0.02	
¹⁸ O		0.03	
³⁴ S		0.03	

Special tests

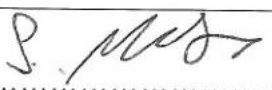


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Test acceptance - 6

6 - TEST / ACCEPTANCE SPECIFICATION

Customer:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Sales Signature: 	Date: 22/09/2025
Test Signature: 	Date: 02/10/25

6: SYSTEM CONTROLLER TEST REPORT

Client:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Serial Number:	20250007	Instrument Configuration:	2020
Tested By:	S. Mally	Date:	29/7/25

Initial Tests

Initial communication with PC	Initials: SM	Date: 29/7/25
Turbo speed readbacks respond	Initials: S. M	Date: 29/7/25
Pressure trip limits are set and respond	Initials: S. M	Date: 29/7/25
Vacuum gauges readbacks respond to changes in pressure	Initials: S. M	Date: 29/7/25
Filament switches on and regulates normally	Initials: SM	Date: 29/7/25
All source readbacks match and respond to changes in set values	Initials: SM	Date: 29/7/25
E Magnet limit is set and readbacks follow set values (if appropriate)	Initials: N/A	Date: 29/7/25
Valve banks respond (ensure all appropriate banks are checked)	Initials: SM	Date: 29/7/25
Flow meters respond appropriately	Initials: N/A	Date: 29/7/25
Gas pressure gauges respond appropriately	Initials: SM	Date: 29/7/25
N ₂ and CO ₂ peaks and stability are good	Initials: SM	Date: 29/7/25
HD system VFC fitted and tested (if appropriate)	Initials: N/A	Date: 29/7/25
All cables, boxes and equipment have been packed	Initials:	Date:

System Controller Sign Off

Ensure all boxes are filled in, signed and Dated as appropriate. If a test is not applicable the mark the associated boxes with N/A (not applicable)

Tests Completed By:	S. Mally	Date: 29/7/25
Dispatched By:	Go' come	Date: 19/09/25

6: SYSTEM CONTROLLER TEST REPORT

Client:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Serial Number:		Instrument Configuration:	
Tested By:		Date:	

Initial Tests

Initial communication with PC	Initials: <i>SM</i>	Date: <i>29/7/25</i>
Turbo speed readbacks respond	Initials: <i>SM</i>	Date: <i>29/7/25</i>
Pressure trip limits are set and respond	Initials: <i>SM</i>	Date: <i>29/7/25</i>
Vacuum gauges readbacks respond to changes in pressure	Initials: <i>SM</i>	Date: <i>29/7/25</i>
Filament switches on and regulates normally	Initials: <i>SM</i>	Date: <i>29/7/25</i>
All source readbacks match and respond to changes in set values	Initials: <i>SM</i>	Date: <i>29/7/25</i>
E Magnet limit is set and readbacks follow set values (if appropriate)	Initials: <i>SM</i>	Date: <i>29/7/25</i>
Valve banks respond (ensure all appropriate banks are checked)	Initials: <i>SM</i>	Date: <i>29/7/25</i>
Flow meters respond appropriately	Initials: <i>SM</i>	Date: <i>29/7/25</i>
Gas pressure gauges respond appropriately	Initials: <i>SM</i>	Date: <i>29/7/25</i>
N ₂ and CO ₂ peaks and stability are good	Initials: <i>SM</i>	Date: <i>29/7/25</i>
HD system VFC fitted and tested (if appropriate)	Initials: <i>N/A</i>	Date: <i>29/7/25</i>
All cables, boxes and equipment have been packed	Initials:	Date:

System Controller Sign Off

Ensure all boxes are filled in, signed and Dated as appropriate. If a test is not applicable the mark the associated boxes with N/A (not applicable)

Tests Completed By:	<i>P. Wey</i>	Date: <i>29/7/25</i>
Dispatched By:	<i>Doi corner</i>	Date: <i>19/09/25</i>

7: ASSEMBLY AND TEST RECORD

Client:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

PRODUCT:

*ELECTRO-MAG
ELECTRONICS UPGRADE*

SERIAL NUMBER:

30202/2-2025/1366

 ASSEMBLED:
 (Name)

[Signature]

Date:

27/7/25

 PRE-TEST
 INSPECTION:
 (Production name)

P. Hayes

Date:

27/7/25

 PRE-TEST
 INSPECTION:
 (Test name)

S. Meser

Date:

27/7/25

 SYSTEM TEST:
 (Name)

S. Meser

Date:

16/9/25

 PRE-DESPATCH
 INSPECTION:
 (Name)

P. Hayes

Date:

16/9/25

P.A.T. Test results

 In compliance with Low Voltage directive 73/23/EEC
 To Low Voltage standard EN61010 – 1:1993

Earth Continuity

[Diagonal line] Ω

N/A

Insulation

[Diagonal line] MΩ

Earth Leakage Current

[Diagonal line] mA. @ _____ kVA.

Tested by:

[Diagonal line]

Date:

[Diagonal line]

7: ASSEMBLY AND TEST RECORD

Client:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

PRODUCT:

ORCHID UNIT

SERIAL NUMBER:

10402/2-2025/1366

 ASSEMBLED:
 (Name)

[Signature]

Date:

21/7/25

 PRE-TEST
 INSPECTION:
 (Production name)

P. Hays

Date:

21/7/25

 PRE-TEST
 INSPECTION:
 (Test name)

[Signature]

Date:

09 SEP 2025

 SYSTEM TEST:
 (Name)

S. [Signature]

Date:

16/9/25

 PRE-DESPATCH
 INSPECTION:
 (Name)

P. Hays

Date:

16/9/25

P.A.T. Test results

 In compliance with Low Voltage directive 73/23/EEC
 To Low Voltage standard EN61010 – 1:1993

Earth Continuity

0.071 Ω

Insulation

7300 $M\Omega$

Earth Leakage Current

0.75 mA. @ 40.05 kVA.

Tested by:

[Signature]

Date:

21/7/25

UPGRADE 1



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Company Registration No. 4290072 Vat No. 771 1100 74

Serial Numbers - 8

8 - Serial Numbers Record Document

Client:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Units	S/N
MS/ABCA	
Integra 2	
Prep Unit 1	10402/2-2025/1366
Prep Unit 2/Misc	
Electronics Upgrade	30202/2-2025/1366
CETAC	
Gas Box	
Autosampler	
BCR	
Dual Heater Block	

Pump Kit and Optics	S/N
Turbo pump S	250396413
Turbo pump A	250372109
Rotary Pump	
Voltage	110 / 240
Gauge S	
Gauge A	
Source	
Collector 1	
Collector 2	
Magnet	

Parts	S/N
Fan PSU	
24V PSU	

Additional System Info:

PCBs	S/N
Electronics Box	20250010
Prep PCB	
VFC PCB	
Watchdog PCB	
Head Amp PCB 1	
Head Amp PCB 2	
Electromagnet RP	2506

Furnaces	S/N
Combustion	
Reduction	
HT-EA	
GC Oven	
Furnace 1	
Furnace 2	

PC	S/N
PC	HTYU264
Monitor	RS-0HR8GY-TV200-4CS-2KUB
Printer	

Key

Pumps: E: Edwards
P: Pfeiffer
Furnaces: V/S: Vecstar
E: Elite
Magnet: E: Electromagnet
S: Standard
Turbos & Gauges: S: Source
A: Analyser
Collectors: Std: Standard
S: Sulphur
HD: Hydrogen Deuterium

UPGRADE 2.



Sercon Ltd, Europa House, Coppicemere Drive,
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Company Registration No. 4290072 Vat No. 771 1100 74

Serial Numbers - 8

8 - Serial Numbers Record Document

Client:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Units	S/N
MS/ABCA	
Integra 2	
Prep Unit 1	
Prep Unit 2/Misc	
Electronics Upgrade	30202/1-2025/1306
CETAC	
Gas Box	
Autosampler	
BCR	
Dual Heater Block	

Pump Kit and Optics	S/N
Turbo pump S	250381582
Turbo pump A	250384545
Rotary Pump	/
Voltage	110 / (240)
Gauge S	
Gauge A	
Source	
Collector 1	
Collector 2	
Magnet	

Parts	S/N
Fan PSU	
24V PSU	

PCBs	S/N
Electronics Box	20250007
Prep PCB	
VFC PCB	
Watchdog PCB	
Head Amp PCB 1	
Head Amp PCB 2	
Electromagnet RP	

Furnaces	S/N
Combustion	
Reduction	
HT-EA	
GC Oven	
Furnace 1	
Furnace 2	

PC	S/N
PC	6SYUx64
Monitor	RS-0HR84Y-TV200-4C9-12RB
Printer	

Key

Pumps: E: Edwards
P: Pfeiffer
Furnaces: V/S: Vecstar
E: Elite
Magnet: E: Electromagnet
S: Standard
Turbos & Gauges: S: Source
A: Analyser
Collectors: Std: Standard
S: Sulphur
HD: Hydrogen Deuterium

Additional System Info:

Packing List

Customer Reference: 20250707

Shipper / Exporter:

Sercon Limited
Europa House
Coppicemere Drive
Crewe
CW1 6GZ
UK

Tel: +44 (0)1270 580008
Reference: IN1366

Consignee:

GEO-data Logging GmbH
Leinestr. 33
30827 Garbsen
Germany

Contact Name: Heinrich Kreipe
Contact Tel Number: 0513146810

BOX: 1

Quantity	Product Code	Product Description	Serial Number: if available
☒ 1		UPGRADE IRMS 1	
☒ 1	30202/2	SYSTEM CONTROLLER UPGRADE (ELECTRO MAGNET)	20250010
☒ 1		CABLE KIT.	
☒ 1		ELECTRO MAGNET CONTROL BOX	2506
☒ 1	30302/5	NEXT85 TURBO PUMPING UPGRADE 1	
☒ 1		TURBO 1	250372109
☒ 1		TURBO 2	250396413
☒ 1		PUMPING UPGRADE KIT	
☒ 2		PUMP COOLER FANS	
☒ 1		PC (EURO MAINS INSIDE)	4TYUX64
☒ 1		MONITOR	RS-0HR8GY-TV200-4CS-2KUB
☒ 1		WINDOWS RECOVERY DRIVE (IN PC BOX)	
☒ 1		SOFTWARE BACK UP DRIVE (IN PC BOX)	
☒ 1		ORCHID UNIT	10402/2-2025/1366
☒ 1		ORCHID BOX OF GC SPARES	
☒ 3		EURO MAINS CABLES	

Packed by:

Date:

P. Hayle
16/9/25

Claims for damage or shortages must be made within 3 days

Packing List

Customer Reference: 20250707

Shipper / Exporter:

Sercon Limited
 Europa House
 Coppicemere Drive
 Crewe
 CW1 6GZ
 UK

Tel: +44 (0)1270 580008
 Reference: IN1366

Consignee:

GEO-data Logging GmbH
 Leinestr. 33
 30827 Garbsen
 Germany

Contact Name: Heinrich Kreipe
 Contact Tel Number: 0513146810

BOX: 2

Quantity	Product Code	Product Description	Serial Number: if available
☒ 1		UPGRADE IRMS 2	
☒ 1	30202/1	SYSTEM CONTROLLER UPGRADE (PERMANENT MAGNET)	20250007
☒ 1		CABLE KIT.	
☒ 1	30303/5	NEXT85 TURBO PUMPING UPGRADE 2	
☒ 1		TURBO 1	250384545
☒ 1		TURBO 2	250381582
☒ 1		PUMPING UPGRADE KIT	
☒ 2		PUMP COOLER FANS	
☒ 1		ELITE FURNACE CONTROLLER (EURO MAINS LEAD)	3875/07/25
☒ 1		ELITE FURNACE STAND.	
☒ 1		ELITE FURNACE	
☒ 1	70901-1	GC-CP COMBUSTION C SPARES KIT	
☒ 1		PC (EURO MAINS INSIDE)	6SYUX64
☒ 1		MONITOR	RS-0HR8GY-TV200-4CG-1ZRB
☒ 1		WINDOWS RECOVERY DRIVE (IN PC BOX)	
☒ 1		SOFTWARE BACK UP DRIVE (IN PC BOX)	

Packed by:

Date:

P. Hayes
16/09/25

Claims for damage or shortages must be made within 3 days

Packing List

Customer Reference: 20250707

Shipper / Exporter:

Sercon Limited
Europa House
Coppicemere Drive
Crewe
CW1 6GZ
UK

Tel: +44 (0)1270 580008
Reference: IN1366

Consignee:

GEO-data Logging GmbH
Leinestr. 33
30827 Garbsen
Germany

Contact Name: Heinrich Kreipe
Contact Tel Number: 0513146810

BOX: Dimensions and weights

	<u>L</u>		<u>W</u>		<u>H</u>		
Box 1	<u>99</u>	x	<u>86</u>	x	<u>107</u>	cm	gw <u>96</u> kg
Box 2	<u>99</u>	x	<u>86</u>	x	<u>107</u>	cm	gw <u>90</u> kg
Box 3	_____	x	_____	x	_____	cm	gw _____ kg

COLLECTION NOTE

Job Number: **IN1366**
Customer: GEO-data Logging GmbH
Contact: **Heinrich Kreipe**

Collection on
Date: 19/9/25

No.
of boxes: 2

By:
Company: UC17

Vehicle
Reg No. RV70C2J.

Signature: [Signature]

Print: Chibson

11 – Installation Report

Client:	GEO-data Logging GmbH (Garbsen site)		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Contact:	Heinrich Kreipe		
Date of Visit:	6 th – 10 th Oct 2025	No. of Days:	5
Engineer:	David Harris		

Details of visit:

This is the first report for a two site upgrade. This part of the installation was carried out at the Geo-data Garbsen site

Arrived on site, inspected delivery. All items sent – All OK.

Customer powered down old unit and vented for upgrade to take place, system was fully operational prior to upgrade.

Setup is of bespoke design. No FID or FID split required. No Nafion in use, customer uses frozen CO₂ water trap.

2020 has no Ref Gas injection assembly, customer had been manually swapping in/out CO₂/O₂ on T-junction input in SS line (post-GC column, pre-reaction column).

System uses short packed SS GC column, not standard fused silica GC column.

This system will be used on gas samples only, not solvent liquid phase samples, as such the FID flow switch is not required.

Upgrade

Removed all non-required components from 2022, including turbo pumps and PCBs.

Removed all old external cables, replaced for new – All OK

New PSU fitted to unit– All OK. Engineer's boot stock had unfortunately been delayed at the airport. Used old copper gaskets to fit to system. New copper gaskets to be supplied to customer when boot stock delivered from airport – All OK.

Fitted new wiring and new external cables – All OK.

Set up new PC and Monitor. Established comms between new System Controller unit and Orchid unit. Comms respond as normal – All OK.

Issue with pump on/off control switch. On/off does not function. If relay override are activated pumps (rotary & turbo pumps) operate. Investigate issue. Power board will not function to activate turbos, no lights on PCB. Rewired power board, lights now active but still no functionality. Power board damaged. Rewired pump switch to new PSI. Pump switch now operates are normal – All OK. Removed damaged power board from 2020 as no longer in use – All OK.

All MS valves respond as expected – All OK. (Only one valve in use on 2020, V3 for isolation valve).

System pumps down with no issues. Vac pressure of 1.0^{e-08} mBar achieved over night – All OK.

All System Controller function as normal. Voltages to Ion Source stable – All OK.

Filament fires with no issue. Emissions low. Approx. 105µA with trap @50µA – All OK.

Installed new eMag power supply and wired into existing eMag – All OK.

Emag readback low compared to setting. Opened up SysCon and adjusted eMag variable resistor setup. Emag readback now match closely to set point – All OK.

Set up Orchid on desktop. Comms OK. All valves respond as expected – All OK

11 – Installation Report

Client:	GEO-data Logging GmbH (Garbsen site)		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Plumbed Helium carrier gas into Orchid, no leaks found – All OK
Installed new furnace unit with external power supply. Furnace heats as expected to desired set points – All OK.
All parts for the Garbsen site installed successfully.

System/method setup

The system is to have a non-standard setup due to the requirements of the Hewlett Packard 5890 series II GC oven and lack of classic Ref Gas assembly.

For tuning purposes Ref Gas (CO₂, N₂, or H₂) would normally be supplied via Ref Gas Assembly. This is not possible on this MS2020. The MS2020 also has no trapping loop capabilities. The only line in to the Ion Source is via the GC sample line in.

The customer also requires an O₂ line in to oxidise the reaction tube.

Customer was using a wide reaction tube prior to upgrade. This was connected with SS tubing. Standard reaction tube to be used from this point onwards. This will require fused silica tubing to operate.

Removed SS tubing from old setup. Fitted silica tubing from GC oven exit line to furnace.

Used double ferrule connection to add silica line in from "makeup" flow outlet from Orchid unit.

Split line in to oxygen port on Orchid inlet. Customer found tap valves to isolate/enable flow control of desired gases. One side set as 100% O₂ gas (to be used for reaction tube conditioning), the other as CO₂ gas for tuning purposes and stability traces.

V8 on Orchid unit to now control the in flow of O₂ or CO₂ gas, mixed with makeup flow (make up flow = approx. 1.5ml/min). CO₂ gas inlet can be exchanged for N₂ or HD gas if required at a future date.

Nafion and FID flow not required on users setup. Closed lines not in use.

Over all flow (make up + flow via GC column) to MS approx. 5ml/min. Pressure in software set to 3psi for operational use.

Adjusted "OXY" needle valve on Orchid to give approx. 10ml/min of oxygen added to main carrier flow. Pressure set on wall regulator to approx. 50psi (3.5bar) – All OK.

CO₂ pressure needs to be adjusted accordingly to give major beam response of 1.2e-8 for optimal tuning condition. It maybe advised for user to install CO₂ and/or O₂ vent valve to help flush gas.

To aim flush of CO₂ from system post-tuning, the He pressure can be increased, this will raise the He flow speed - reduce waiting time. He pressure set to 15psi via software advised to flush system.

Tuned system on CO₂ via V8 input – All OK.

Magnet move required to obtain optimum peak shape – All OK.

Stability good – All OK.

Unable to perform standard Ref Gas specs as unit has no ref gas assembly.

System OK to use for sampling – All OK.

Oxidised reaction tube successfully. Built Oxidation method so function can be run overnight via sample list.

Demonstrated to user how to use "Setup Multiple Batches" option to have delayed start to sample list batches I.E. The reaction tube oxidation can be carried out overnight automatically ready for use immediately the next morning.

Adjusted valve map to reflect in use plumbing setup. Only V8 active from Orchid unit.

Demonstrated to customer how to make up reaction tubes – All OK.

Installed new reaction tube into furnace. Connected to GC column output and water trap assembly.

Lined to Ion Source inlet with existing silica tubing.

11 – Installation Report

Client:	GEO-data Logging GmbH (Garbsen site)		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Replaced pig-tail vent for new to give extra length (this reduces the chance of atmosphere being drawn backwards into the MS).

System responds well. Test peaks come through with no issue – All OK.

There is no handshake connection from Sercon system to GC oven (Hewlett Packard 5890). It may be possible to make a cable up to auto-trigger the sample start time with method start via GC oven controls. The user will need to find out if this is possible from the GC oven outputs. A trigger cable can be made by Sercon upon request if needed. If this is required, 'handshake' option via Callisto timing windows (within Method) needs to be activated.

Users to perform manual injection samples with manual starts of Callisto software.

Glitch found in GC-IRMS software. Issue resolved by engineer – All OK.

Test sample carried out with customer samples. Customer happy with results on test samples.

Gave training to customer use of Callisto software and GC-IRMS software.

Gave training on Peak Shape scans, back ground scans and stability scans.

Gave training on method building, sample list generation, and running of batches, also delayed batches.

Due to the bespoke setup of system it is advised that the same engineer (David Harris) return to install the similar setup at the University of Hamburg site for the remainder of the upgrade/installation (IN1366). This will aim to be carried out in Jan 2026 due to availability of engineer, or if possible beforehand.

Advised user on shutdown of system when required. It is advised to leave the system under vacuum when not in use (e.g. over the Christmas period) as it is better for the pumps to be constantly active. Also, when not in use, for the Ion Source tuning to be left in "Standby" with a filament setting of 50µA.

It is advised to leave the furnace at 600C when not in use. If the furnace is not be used for longer periods it can be cooled down to < room temp.

Advise to use water trap at all times for all sample analysis to remove the chances of moisture entering the Ion Source.

Garbsen site system installed and ready for customer use.

Recommendations:

- Install vent valves to flush CO₂ and O₂ lines into Orchid system.
- He pressure set to 15psi via software advised to flush system.
- Purchase Nafion drier to use as water scrubber (to replace frozen CO₂ method).
- Advise to use water trap at all times for all sample analysis to remove the chances of moisture entering the source

Faults and Shortages:

Copper gaskets. (supplied by engineer via boot stock).

11 – Installation Report

Client:	GEO-data Logging GmbH (Garbsen site)		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366	Date:	07/07/2025

Follow up:	
N/A	
Engineer: David Harris	Date: 10 th October 2025
Signed: 	

12 – Installation Acceptance and Warranty Certificate

Client:	GEO-data Logging GmbH		
Quotation Number:	19232	Date:	03/07/2025
Job Number:	IN1366a	Date:	07/07/2025

Contact:	Heinrich Kreipe
System:	Electronics upgrade (2022), Turbo Pump upgrade, Orchid
Software:	Callisto v50.0.0, GC-IRMS v6.0.13
Engineer:	David Harris
Installation Date:	10 th October 2025

Warranty commences:	10 th October 2025
Warranty Expires:	10 th October 2026

Customer Acceptance:

Name: Heinrich Kreipe
 Signature: H. Kreipe
 Date: 10th October 2025

Notes:

N/A

Engineer's Signature:

On behalf of Sercon Limited

Name: David Harris
 Signature: [Signature]
 Date: 10th October 2025