Atmos Heating Jacket For Atmos Gas Cells

User Manual

2I-24651-3

Atmos Heating Jacket For Atmos Gas Cells

User Manual

2I-24651-3

Atmos Heating Jacket for Atmos Gas Cells P/N GS24651 Series

CONTENTS

1. Introduction

Thank you for purchasing a Specac product.

The Atmos Heating Jacket and its own dedicated 4000 Series Temperature Controller allows for a long pathlength Atmos gas cell to be used for applications where the gas to be analyzed needs to be maintained above ambient temperature and up to 200°C. Typical applications are for the study of the chemical reactions of gases at elevated temperatures and the study of combustion gases that can be directed into the Atmos gas cell.

There is an appropriate heating jacket and controller for each of the different pathlength and size of Atmos gas cells. These are:

P/N GS24651: Heating jacket and controller for A2.5 gas cell
P/N GS24652: Heating jacket and controller for A5 gas cell
P/N GS24653: Heating jacket and controller for A10 as Cell
P/N GS24654: Heating jacket and controller for A20 gas Cell

The Atmos heating jacket is designed to fit and close around the metal body of the Atmos gas cell.

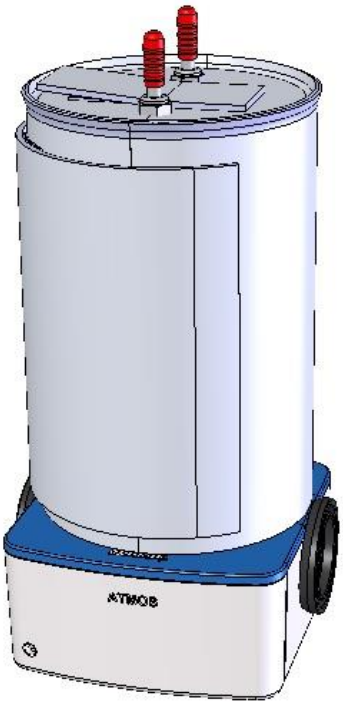
The heating jacket overall is constructed using two inner C-section metal clamping bodies that are hinged together with one of the C-sections fitted with heating cartridges. The inner heating jacket is covered by an outer heat resistant fabric based insulating body. The inner body makes direct metal to metal contact with the body of the gas cell.

When power is applied to the heating cartridges in the inner clamping body, heat is conducted quickly and evenly throughout the gas cell body itself. The surrounding outer insulating body fabric reduces heat losses ensuring efficient heat distribution throughout the gas cell with good temperature stability. An important aspect of even heat distribution throughout the gas cell environment from the top to bottom is to eliminate any local “cool spots” and prevents condensation forming on the internal mirrors and window surfaces. A controlling thermocouple located in the middle of the inner clamping body, indicates that a

temperature set for the gas cell body will show very little variation throughout the entire length of the gas cell.

The thermocouple lead connection is combined with the power cable lead attached to the inner heating jacket and the heating jacket is connected to the 4000 series temperature controller via the power cable lead using a six-way screw plug fixing.

Power to the Atmos heating jacket is supplied by a dedicated 4000 series temperature controller. A separate user instruction manual for the 4000 Series temperature controller is supplied for use with the Atmos heating jacket instructions.



Atmos Heating Jacket as fitted to an Atmos Gas Cell

2. Safety Considerations

List of Safety Symbols

Safety Symbol	Meaning
	General Caution. (Reference ISO 7000-0434B, 2004-01)
	Caution – Hot Surface. Reference IEC 60417-5041, 2002-10)
	Caution – Possibility of Electric Shock
	Indoor Use Only

Important! Before use of the Atmos heating jacket and controller with your own specific Atmos gas cell, ***please follow the safety advice for use of the Atmos gas cell itself as found from the Safety Considerations section in its own user instruction manual (2I-24602-3).***

Warning: When an Atmos gas cell is connected for to its dedicated 4000 Series temperature controller, the equipment must be used indoors only within an operational environment of between 5°C and 40°C.

In use of an Atmos gas cell with its own heating jacket for the study of gaseous/vapour sample types, there is an increased risk associated with operation at elevated temperatures up to 200°C. Parts of the gas cell system will become hot under such operating conditions and so there should be avoidance as much as possible for touching the equipment when the heating jacket is powered and hot.

Electrical Safety Class

The Atmos heating jacket and controller has been designed and tested in accordance with BS EN 61010-1 and 61010-2-010 and has been supplied in a safe condition. This accompanying instruction manual contains some information and warning notes, which must be followed by the user to ensure safe operation and retain the apparatus in a safe condition.

General Operational Safety Use

Warning: Users must follow appropriate safety protocols for the sample they are testing. Use of a fume cupboard is recommended for hazardous samples. Users must have appropriate training in spectroscopy and handling the samples being tested. A risk assessment is required when using a hazardous sample.

Warning: The Atmos A10 and A20 gas cells of the range are tall and relatively heavy and pose a stability risk when handling. Care should be taken when transporting them and fitting them into the spectrometer. During storage, conditions should be met to prevent them from falling over. It may be useful to store the gas cell in its original packaging for safe keeping.

Warning: If operating an Atmos gas cell at above ambient temperature measurement conditions in use with its own, dedicated heating jacket and controller system, ***do not*** carry the gas cell with the heating jacket attached. The outer

jacket sleeve insulation may slide away from the gas cell body, or it may be too slippery to hold. Fit the heating jacket components when the gas cell is near to or installed into the spectrometer system.

Warning: The maximum temperature of operation for the heating jacket itself is 210°C ***and should not be exceeded***. When the heating jacket has stabilised at this maximum setting, this provides for an internal gas temperature within the gas cell itself at around 200-210°C.

Warning: The appropriate Atmos heating jacket must be fitted to its dedicated size of Atmos gas cell ***before it is heated***.

Warning: Do not move or touch the heating jacket on the Atmos gas cell whilst it is operating above ambient temperature conditions. Metal surfaces of the gas cell and any gas flow connection tubing will get hot when the heating jacket is in use. These components should not be touched when the heating jacket is hot. Always check the ***actual temperature*** level of the heating jacket from the heating jacket controller system display and wait until the level has stabilised to ambient/room temperature conditions before touching or moving the Atmos gas cell.

Warning: Do not use any organic solvents and use a cloth dampened with water to clean the heating jacket. Allow the heating jacket to be at room temperature and disconnect the heating jacket from its temperature controller system before attempting any cleaning. ***Use a water dampened cloth when powered down only.***

Warning: The pressure of a gaseous environment within an enclosed system for a set volume increases with temperature. The Atmos gas cell must not exceed its rated pressure maximum (125psi) when heated and if being

operated under non-flow conditions. Specac advise fitting a pressure relief valve (P/N GS24160), along with appropriate open/close valve tap connections (P/N GS24161), or to monitor the pressure to prevent for any over-pressurisation to the system. (***Please check information found on pages 28 to 32 for Section 7), of the Atmos gas cell instruction manual 2I-24602-3.***

Important Notes For Safety In Operation

Avoid burns! Some parts of the Atmos gas cell and heating jacket will be hot and should not be handled or touched with bare hands when the heating jacket is operating and hot. (e.g. inlet and outlet tubing, the outer insulating jacket (**3**) surface and the top section (**20**) of the optical unit.) In normal operation at a 200°C setting, the temperature at the top section (**24**) of the optical unit box would be about 50°C, the inlet and outlet tubing would be at 200°C and the insulating jacket (**3**) would be circa 85°C; for an ambient temperature maximum of 40°C.

Do not remove the Atmos heating jacket from the gas cell when hot. If it is necessary to do so, then wear heat protective gloves and make sure the 4000 series temperature controller is switched off. Rest the heating jacket assembly on a bench with none of the metal parts in contact with the bench. (Use a heat protective surface such as layers of cloth.) Open both the insulating jacket (**3**) and inner heating jacket (**1**) to allow for faster cooling to return the Atmos heating jacket to room temperature conditions.

Note: *If the Atmos heating jacket is removed from the gas cell during the experiment for a period of more than 5 minutes,* ***turn the 4000 series temperature controller power switch to off*****.**

The Atmos heating jacket is fitted with a thermal fuse located in the inner metal heating jacket assembly (**1**). Should there be a failure of the thermocouple or if the heating jacket is misused, overheating will occur.

As a safety precaution the thermal fuse will blow to stop overheating (thermal run-away) of the Atmos heating jacket and gas cell when the temperature of the inner heating jacket (**1**) exceeds 210°C.

Warning: *In the event of a blown thermal fuse, the Atmos heating jacket with its 4000 Series temperature controller should be returned to Specac for repair. The* ***serial number*** *of the equipment will be required for reference.*

End of Lifetime Equipment Use

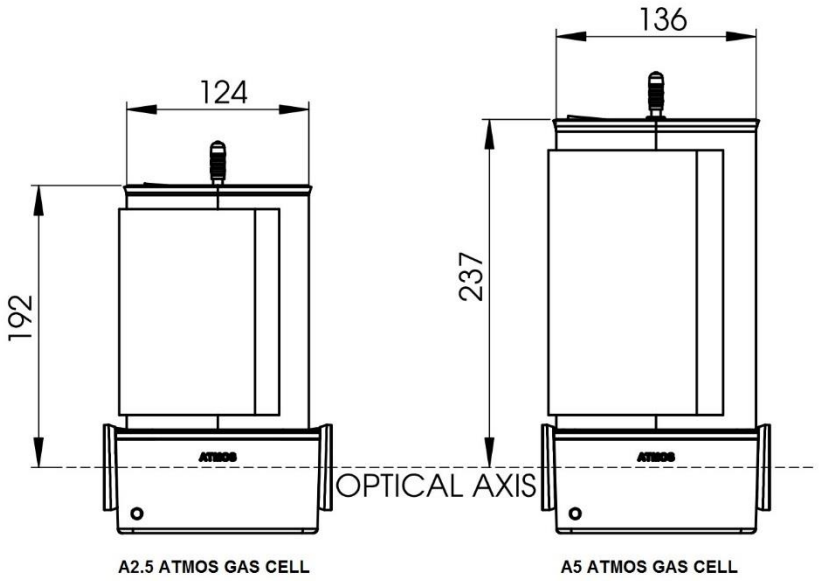
If or when the Atmos gas cell, its heating jacket system or any of the consumable items such as windows, seals or mirror parts have reached their limit of lifetime and need to be replaced, use appropriate WEEE and other local regulations for the safe disposal of electrical equipment and toxic chemicals.

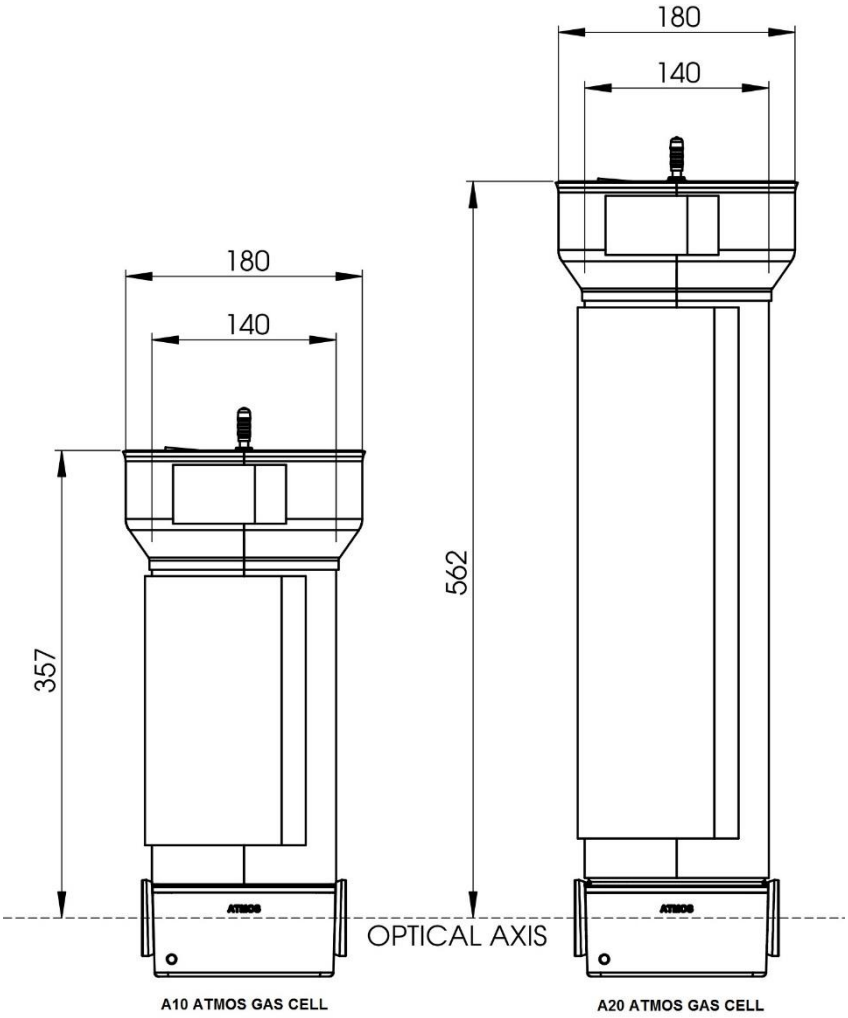
3. Specifications of Atmos Heating Jackets

The Atmos heating jacket and controller systems supplied under the part numbers GS24651 (for A2.5 gas cell), GS24652 (for A5 gas cell), GS24653 (for A10 gas cell) and GS24654 (for A20 gas cell), have the following specifications.

A table for the Atmos heating jackets with their dimensions and as comparative images for their size are shown below.

Atmos Heating Jacket	Height from Optical Axis (mm)	Jacket Outside Diameter (Maximum Diameter mm)
A2.5 Gas Cell	192	124 (124)
A5 Gas Cell	237	136 (136)
A10 Gas Cell	357	140 (180)
A20 Gas Cell	562	140 (180)





The images of the Atmos heating jackets as fitted to their corresponding size of Atmos gas cells have been shown for their overall height dimension from the optical axis (light beam) centerline reference.

Weight of Atmos Heating Jacket

Atmos Heating Jacket	Weight - Kilograms
GS24651 – A2.5 Gas Cell	0.4
GS24652 – A5 Gas Cell	0.85
GS24653 – A10 Gas Cell	1.5
GS24654 – A20 Gas Cell	2.8

Specifications of Atmos Heating Jackets GS24651, GS24652, GS24653 and GS24654

Operating Temperature range: ambient to 200°C.
Thermocouple: K Type (Chromel-Alumel).
Heating rate (metal body): 90 mins ambient to 200°C (Or: 2°C / min).
Heating rate (gas – air NTP): 90 min ambient to 200°C (Or: 2°C / min).
Stability time (gas – air NTP): 30 mins after cell reaching 200°C.
Cooling rate: 90 mins.
Voltage for operation: low voltage (30 volts).
Storage - temperature: 0 to 35°C.
Storage - humidity: 0 to 95%.

Specifications Pertaining to Use Configured with the Dedicated 4000 Series Temperature Controller

Temperature set steps: 1°C.
Temperature stability: ±1°C RMS.
Thermocouple accuracy: ±1.5°C at 200 °C.
Maximum power from controller: 600 Watts.
Maximum heating ramp rate: 10°C per min.

Specifications Pertaining to the Dedicated 4000 Series Temperature Controller

The 4000 series temperature controller is supplied for connection to a 220/230 volts AC 110volts AC or 100 volts AC mains supply depending on a country of operation. The output voltage supply for operation of the Atmos heating jacket is 30 volts DC.

The configuration for a 4000 series temperature controller for the specific mains voltage supply is tabulated below.

Voltage (Volts)	Frequency (Hertz)	Max Power (Watts)	Fuse Rating (Amperes)	Fuse Type
230	50	600	5	T
110	60	600	8	T

The insulation rating of external circuits (appropriate for single fault condition) = basic insulation and protective (earth) bonding.

The humidity levels for the operation range is from 0% to 95% relative humidity and non-condensing.

4. Checklist

On receipt of your Atmos heating jacket and 4000 series temperature controller system please check that the following have been supplied:

- Atmos heating jacket for appropriate A2.5, A5, A10 or A20 Atmos gas cell.
- 4000 Series temperature controller and mains power cable.
- USB memory stick that has user instruction manuals for the Atmos heating jacket and 4000 Series temperature controller.

The Atmos heating jacket and its dedicated 4000 series temperature controller are supplied as separate items. Carefully remove these items from their packaging and proceed to install as per instructions.

5. Fitting of the Heating Jacket

General Note

Depending on the sample compartment area and space available in the spectrometer, it may be advisable to fit an Atmos heating jacket to its appropriately sized Atmos gas cell ***prior*** to fitting the gas cell to a Lever-lock baseplate for installation into the spectrometer. (**See how to fit an Atmos gas cell to a Lever-lock baseplate from the Atmos gas cell user instruction manual 2I-24602-3**.)

Some spectrometer sample compartments may be too small and restrictive to allow for an opening and closing of the heated jacket parts. In addition, if there are any gas inlet/outlet pipework plumbing connections to be made to the Atmos gas cell (e.g. pressure gauge P/N GS24160, flow taps P/N GS24161 or gas temperature sensing thermocouple P/N GS24641), these may be more easily achievable with the Atmos heating jacket already fitted to the Atmos gas cell and when installed into the spectrometer sample compartment.

For explanation in fitting of an Atmos heating jacket, the A5 Atmos gas cell size has been used in figures/images as an example.

The Atmos Heating Jacket

The Atmos heating jacket is a twin jacket component assembly of parts. (An inner heating jacket assembly (**1**) and outer insulating jacket (**3**) - please see **Fig 1.**)

The ***inner heating jacket assembly*** (**1**) consists of two “C” section metal bodied parts that are hinged together allowing for the heating jacket to be opened and to fit around the metal body (**28**) of the Atmos gas cell. When fitted around the metal body (**28**), the hinged C-section parts of the inner heating jacket (**1**) are closed together and held securely shut by a tab clip bracket mechanism (**2**). The inner heating jacket assembly (**1**) has a K-type thermocouple fitted to one of the C section metal body parts to monitor and control the temperature of the

Atmos gas cell body (**28**) when being heated. The power lead cable is also fitted directly to the inner heating jacket assembly (**1**).

The **outer insulating jacket** (**3**) consists of a heat resistant fabric casing surrounding the metal inner heating jacket (**1**). When the inner heating jacket (**1**) is closed to fit around the Atmos gas cell metal body (**28**), the outer insulating jacket (**3**) can be placed to cover and envelop the heating jacket (**1**). The insulating jacket (**3**) is held securely in place using fabric flap tabs (**4**) affixed over Velcro fastening strips (**5**).

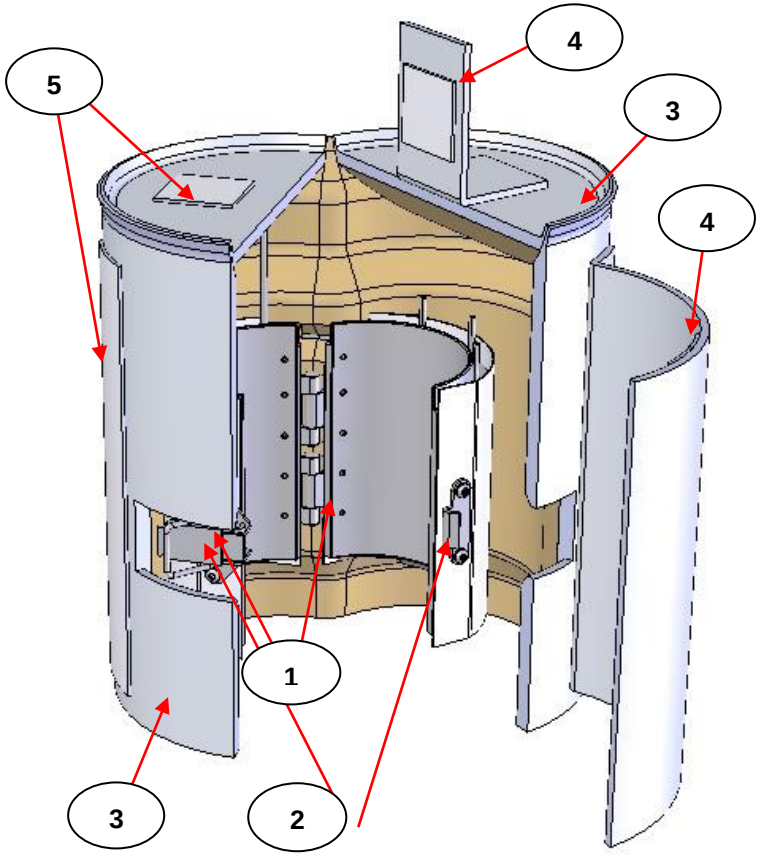


Fig 1. Atmos A5 Size Heating Jacket

Note: *The A2.5 and A5 size heating jacket assemblies have **one** tab clip bracket mechanism (**2**) for keeping the inner heating jacket **(1)** closed, whereas the larger A10 and A20 Atmos gas cell heating jackets (**1**) have **two** tab clip brackets (**2**) for closing.*

Fitting the Inner Heating Jacket (1) to the Atmos Gas Cell

Having removed the Atmos gas cell from any Lever-lock baseplate mount fixing, position the Atmos gas cell onto a level workspace area.

With the outer insulating jacket (**3**) removed, open the inner heating jacket assembly (**1**) (as seen in **Fig 1.**) by undoing the clip tab bracket (**2**).

Fig 2. shows a close-up detail of the tab clip bracket (**2**) fixing. To open the inner heating jacket (**1**), the tab (**6**) is pulled outwards to release the clip (**7**) from its catch (**8**) and then the two "C" section bodies can be hinged apart. To close and lock the inner heating jacket (**1**), bring the two "C" section bodies opening edges close together (**1**) and engage the clip (**7**) over the catch (**8**). Then push the tab (**6**) to pull the two hinged "C" section bodies (**1**) together for a tight close fit.

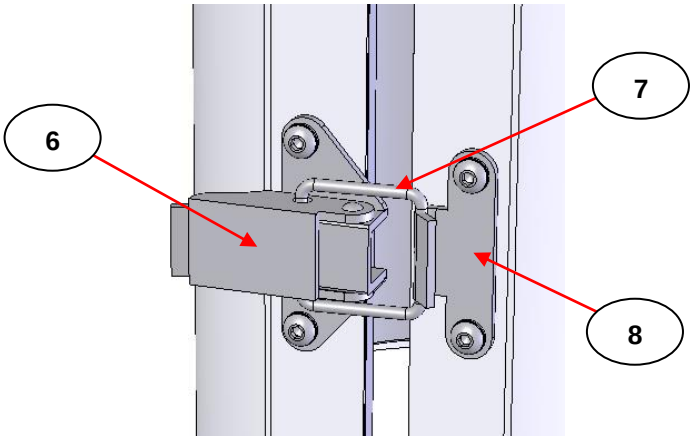


Fig 2. Tab Clip Bracket (2) on Inner Heating Jacket (1)

With the inner heating jacket (**1**) parts opened as wide as possible, carefully lift the heating jacket assembly (**1**) to lower over and surround the metal body (**28**) of the Atmos gas cell. The underside edge of the heating jacket assembly (**3**) should come to rest on the top surface of the lower screw fixing flange ring for the Atmos gas cell body (**28**). (See **Fig 3**.)

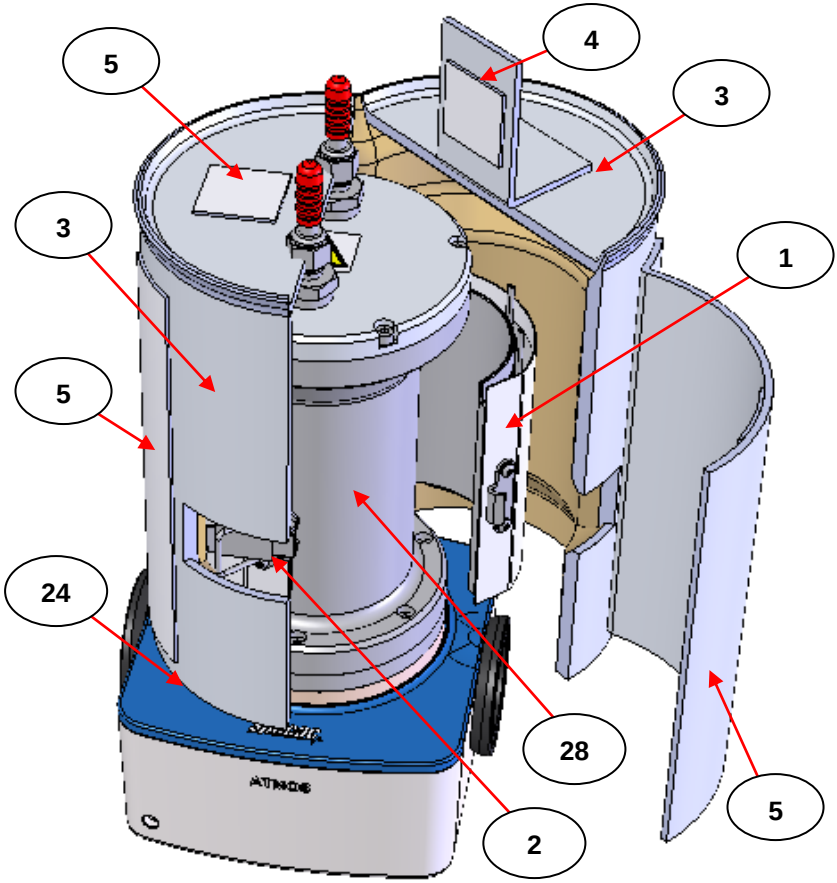


Fig 3. Opened Heating Jacket Positioned Over Atmos Gas Cell

Now close the inner heating jacket assembly (**1**) against the metal cell body (**28**) by bringing the two hinged “C” section bodies together and locking them shut with the tab clip bracket (**2**). The inner heating jacket (**1**) should now make a good, close, contacting fit with the metal body of the gas cell (**28**).

Warning! *Do not trap any leads for the power or thermocouple connections, or any insulation material within, under the inner heating jacket assembly (**1**) before closing it.*

Fitting the Outer Insulating Jacket (3)

Take the outer insulating jacket (**3**) fabric casing to cover over the closed heating jacket assembly (**1**) correctly. Affix the fabric flaps (**4**) at the top and side of the insulating jacket (**3**) to their corresponding Velcro strip pads (**5**) to keep the outer insulating jacket (**3**) securely closed. The underside edge of the outer insulating jacket (**3**) should come to rest on the top section (**24**) of the optical unit for the Atmos gas cell. (See **Fig 3**.)

The completed, correct fitting of the outer insulating jacket (**3**) to an Atmos A5 gas cell is shown as **Fig 4**.)

Fig 4. Heating Jacket Fitted To A5 Atmos Gas Cell

Preparing for Operation

With the Atmos heating jacket (**1**) and insulating jacket (**3**) correctly fitted and positioned over the Atmos gas cell, the whole gas cell and jacket assembly can now be fitted to a Lever-lock baseplate as installed in the spectrometer. **See how to fit an Atmos gas cell to a Lever-lock baseplate from the Atmos gas cell user instruction manual 2I-24602-3**.)

Make appropriate connections of the Atmos gas cell to any inlet and outlet tubing and/or pressure gauges and flow tap valve parts to be used.

After reading the user instruction manual supplied for the 4000 series temperature controller, connect the power and thermocouple cable from the heating jacket to the six-way plug socket at the rear of the temperature controller.

The Atmos heating jacket assembly (**1**) can now be powered for heating the Atmos gas cell, which can be used for gaseous/vapour spectral measurements at temperature settings from ambient to a maximum of 200°C.

First Time Use of An Atmos Gas Cell With Heating Jacket

After an Atmos gas cell has been installed into a spectrometer as fitted with its heating jacket and specific gas line connections have been made to the inlet (**12**) and outlet (**13**) gas line ports, the gas cell is ready to use. (See installation from the Atmos gas cell user instruction manual 2I-24602-3.)

Prior to a first use (after receipt from new), or after a prolonged period of storage, Specac recommend passing a flow of N_2 gas for 2 hours at 200°C to remove any adsorbed gas species that may be present.

Although the Atmos gas cell has been thoroughly cleaned during manufacture, some trace gas species may build up that are observable in the alkane CH stretching region of an IR spectrum when the gas cell is heated above 150°C during the first few uses. Providing a flow of N_2 gas will prevent this build up.

When cooling the Atmos gas cell from elevated temperatures, purge the gas cell with a flow of N_2 gas until the temperature is less than 50°C to minimise adsorption of any sample gases onto the metalwork. This cleaning procedure is essential for ***static*** (non-flowing) experiments as desorption of gasses can occur at elevated temperatures. For ***flow*** experiments this cleaning procedure may be considered less important if the flow rate is sufficient to remove desorbing gases faster than they can accumulate.

Note, it is advisable to purge the gas cell when recording a background to obtain the “cleanest” reference conditions. N_2 or any type of Infrared “inactive” gas would suffice, or even operating the gas cell under a vacuum.

Ideally, when not in use, the Atmos gas cell should be stored under inert conditions to prevent environmental contamination.

6. Operating Parameters for Heating Jackets

The Atmos Gas Cell Heating Jacket is provided with its own dedicated 4000 series temperature controller under the specific part numbers; GS24651 (A2.5 size gas cell), GS24652 (A5 size gas cell), GS24653 (A10 size gas cell) and GS24654 (A20 size gas cell).

A separate user instruction manual is supplied for operation of the 4000 series temperature controller which is used in conjunction with the user instruction manual for the Atmos heating jackets.

For operation of the Atmos gas cell heating jacket the operating parameters of the 4000 series temperature controller have been factory set as shown on the following pages. There are individual parameter listings for the four different sizes of heating jackets for the A2.5, A5, A10 and A20 gas cells.

Not all the displayable parameters can be changed but have been listed for reference purposes. If needing to change a parameter or autotune the controller for a specific temperature range of operation, certain parameter settings will be altered. The 4000 series temperature controller can be returned to its original factory settings by reprogramming with the original parameter values as listed.

Displayable Parameters for Atmos A2.5 Gas Cell Heating Jacket P/N GS24651 with WEST 6100+ (4000 Series) Controller

Parameter Display (In Green)	Parameter Name	Parameter Factory Set Value
FiLt	Input Filter Time Constant	3.0
OFFS	Process Variable Offset	0
PP␣␣	Primary (Heat) Output Power	0
Pb_P	Primary Output Proportional Band	0.75
ArSt	Automatic Reset (Integral Time Constant)	0.355
rAtE	Rate (Derivative Time Constant)	0.085
biAS	Manual Reset (Bias)	25
SPuL	Setpoint Upper Limit	210
SPLL	Setpoint Lower Limit	0
OPuL	Primary (Heat) Output Upper Power Limit	100
Ct I	Output 1 Cycle Time	16
PhAI	Process High Alarm	210
AHyI	Alarm 1 Hysteresis	1
PLA2	Process Low Alarm	0
AHy2	Alarm 2 Hysteresis	1
APt	Auto Pre-Tune enable/disable	diSA
PoEn	Manual Control select enable/disable	diSA
SPr	Setpoint Ramping enable/disable	EnAb
rP	Setpoint Ramp Rate Value	600
SP	SP Value	10
SLoc	Set-up Lock Code	10

Displayable Parameters for Atmos A5 Gas Cell Heating Jacket P/N GS24652 with WEST 6100+ (4000 Series) Controller

Parameter Display (In Green)	Parameter Name	Parameter Factory Set Value
FiLt	Input Filter Time Constant	3.0
OFFS	Process Variable Offset	0
PP␣␣	Primary (Heat) Output Power	0
Pb_P	Primary Output Proportional Band	7.2
ArSt	Automatic Reset (Integral Time Constant)	0.31
rAtE	Rate (Derivative Time Constant)	0.07
biAS	Manual Reset (Bias)	25
SPuL	Setpoint Upper Limit	210
SPLL	Setpoint Lower Limit	0
OPuL	Primary (Heat) Output Upper Power Limit	100
Ct l	Output 1 Cycle Time	16
PhAl	Process High Alarm	210
AHyl	Alarm 1 Hysteresis	1
PLA2	Process Low Alarm	0
AHy2	Alarm 2 Hysteresis	1
APt	Auto Pre-Tune enable/disable	diSA
PoEn	Manual Control select enable/disable	diSA
SPr	Setpoint Ramping enable/disable	EnAb
rP	Setpoint Ramp Rate Value	600
SP	SP Value	10
SLoc	Set-up Lock Code	10

Displayable Parameters for Atmos A10 Gas Cell Heating Jacket P/N GS24653 with WEST 6100+ (4000 Series) Controllers

Parameter Display (In Green)	Parameter Name	Parameter Factory Set Value
FiLt	Input Filter Time Constant	3.0
OFFS	Process Variable Offset	0
PP␣␣	Primary (Heat) Output Power	0
Pb_P	Primary Output Proportional Band	0.80
ArSt	Automatic Reset (Integral Time Constant)	0.255
rAtE	Rate (Derivative Time Constant)	0.06
biAS	Manual Reset (Bias)	25
SPuL	Setpoint Upper Limit	210
SPLL	Setpoint Lower Limit	0
OPuL	Primary (Heat) Output Upper Power Limit	100
Ct I	Output 1 Cycle Time	16
PhAl	Process High Alarm	210
AHyl	Alarm 1 Hysteresis	1
PLA2	Process Low Alarm	0
AHy2	Alarm 2 Hysteresis	1
APt	Auto Pre-Tune enable/disable	diSA
PoEn	Manual Control select enable/disable	diSA
SPr	Setpoint Ramping enable/disable	EnAb
rP	Setpoint Ramp Rate Value	600
SP	SP Value	10
SLoc	Set-up Lock Code	10

Displayable Parameters for Atmos A20 Gas Cell Heating Jacket P/N GS24654 with WEST 6100+ (4000 Series) Controllers

Parameter Display (In Green)	Parameter Name	Parameter Factory Set Value
FiLt	Input Filter Time Constant	3.0
OFFS	Process Variable Offset	0
PP␣␣	Primary (Heat) Output Power	0
Pb_P	Primary Output Proportional Band	1.5
ArSt	Automatic Reset (Integral Time Constant)	2.54
rAtE	Rate (Derivative Time Constant)	0.4
biAS	Manual Reset (Bias)	25
SPuL	Setpoint Upper Limit	210
SPLL	Setpoint Lower Limit	0
OPuL	Primary (Heat) Output Upper Power Limit	100
Ct l	Output 1 Cycle Time	16
PhAl	Process High Alarm	210
AHyl	Alarm 1 Hysteresis	1
PLA2	Process Low Alarm	0
AHy2	Alarm 2 Hysteresis	1
APt	Auto Pre-Tune enable/disable	diSA
PoEn	Manual Control select enable/disable	diSA
SPr	Setpoint Ramping enable/disable	EnAb
rP	Setpoint Ramp Rate Value	600
SP	SP Value	10
SLoc	Set-up Lock Code	10

7. Cleaning/Care of the Atmos Heating Jacket

After use of the Atmos gas cell fitted with a heating jacket it is recommended that the following procedures are adopted to properly care for the equipment.

Flush the Atmos gas cell with dry N_2 (Nitrogen) gas to remove any residual contaminants. If heated gases have been analyzed this will help to remove any condensed vapor on the components of the gas cell.

Note*: Specac recommend any N_2 gas flushing procedure be carried out for the Atmos gas cell and heating jacket whilst installed into the spectrometer and as the equipment is cooling down, before any removal of the heating jacket.*

If the Atmos gas cell has been operated at a temperature above ambient/room temperature, then it is recommended to flush through with N_2 gas whilst the gas cell is cooling down to room temperature before storage. N_2 gas can be flowed through if both the inlet (**15**) and outlet (**16**) valve taps (if fitted from P/N GS21621) are open and the valve tap to a flow line from any recommended gas line connectivity has been adopted. (See schematic **Fig 15**, page 35. of the Atmos gas cell user instruction manual 2I-24602-3.)

Removal of the Heating Jacket

When any N_2 gas flushing procedure has been completed and the Atmos gas cell and heating jacket are at room temperature, disconnect the heating jacket power cable from the rear of the 4000 series controller at the six-way plug socket.

Remove the Atmos gas cell and heating jacket equipment from the Lever-lock baseplate and away from the spectrometer.

Remove the outer insulating jacket (**3**) (loosen fabric flaps (**4**)) and then open the inner heating jacket (**1**) (undo tab clip bracket (**2**)), as wide as possible, to carefully lift the complete heating jacket assembly up and away from the Atmos gas cell.

Storage of Equipment

Before the Atmos heating jacket is to be stored away after use, it may be necessary to clean it. If so, do not use any organic solvents but wash with water alone with an appropriate cloth to clean both the inner heating jacket assembly (**1**) and outer insulating jacket fabric (**3**) parts. Allow the heating jacket parts to be at room temperature and disconnect the heating jacket assembly (**1**) from its temperature controller system before attempting any cleaning. ***Use a water dampened cloth when powered down only.***

If any parts of the Atmos gas cell such as the body, windows or mirrors require cleaning, then suitable solvents may be water, methanol, ethanol and acetone. When cleaning any of the mirrors (in the gas cell and in the optical unit) **always** use a very gentle soft lens tissue moistened with a suitable solvent and dab at the surfaces rather than wiping to minimize the risk of scratching and abrasion to the mirror surfaces.

Place the Atmos gas cell back into its protective carry case with or without its appropriate heating jacket as fitted. or into an appropriately sized dry storage cabinet such as the Specacabinet P/N GS19100 to do so. Similarly, the Atmos heating jacket can also be placed into a dry storage area, or back into the packaging from which it was provided.

By following this equipment care and storage procedures, the Atmos gas cell and its dedicated heating jacket will be ready for quick and easy installation the next time the equipment is to be used.

8. Spare Parts for Atmos Gas Cells and Heating Jackets

GS24627 ZnSe windows (pair) for Atmos gas cell.
GS24628 CaF2 windows (pair) for Atmos gas cell.

GS24625 Essential Spares Kit for Atmos A2.5 and A5 gas cells.
GS24626 Essential Spares Kit for Atmos A10 and A20 gas cells.

GS24160 Low or high pressure gauge kit.
GS24161 Inlet and outlet valve tap connections.
GS24641 Gas temperature sensing thermocouple assembly.

GS24638 Flat mirror alignment jig assembly for Atmos A2.5 gas cell.
GS24639 Flat mirror alignment jig assembly for Atmos A5 gas cell.
GS24640 Flat mirror alignment jig assembly for Atmos A10 and A20 gas cells.

GS10707 Purge bellows for optical unit of Atmos gas cells.
GS24629 Torque wrench and adapter fittings for use with Atmos gas cells.

GS24501 Laser alignment platform tool.

9. Atmos Heating Jackets Serial Number

The Atmos heating jacket and 4000 Series controller will be provided with a serial number for identification. The serial number can be found on the appliance label at the rear of the 4000 Series controller. It has a letter prefix followed by a five-figure number e.g. T12345.

Please use the table below to fill in the serial number information of the Atmos heating jacket and 4000 Series controller equipment received.

If you need to contact Specac for any issues regarding your Atmos heating jacket, it may be necessary to provide the serial number of the item to identify for replacement parts.

Atmos Heating Jacket Part Number and Description	**Serial Number**
P/N GS24651 – Atmos heating jacket and 4000 series controller for the A2.5 Atmos gas cell.	
P/N GS24652 – Atmos heating jacket and 4000 series controller for the A5 Atmos gas cell.	
P/N GS24653 – Atmos heating jacket and 4000 series controller for the A10 Atmos gas cell.	
P/N GS24654 – Atmos heating jacket and 4000 series controller for the A20 Atmos gas cell.	

Part Description for “Bubble” Numbered Items

(**1**) Inner heating jacket assembly.
(**2**) Tab clip bracket of inner heating jacket assembly.
(**3**) Outer insulating jacket assembly.
(**4**) Fabric flap fastening of insulating jacket assembly.
(**5**) Velcro strip for fabric flap fastenings (**4**).
(**6**) Tab handle of tab clip bracket (**2**).
(**7**) Clip part of tab clip bracket (**2**).
(**8**) Catch part of tab clip bracket (**2**).
(**24**) Top section of optical unit of Atmos gas cell.
(**28**) Atmos gas cell metal body assembly.

CE

Specac

Declaration of Conformity

According to

EMC Directive 2014/30/EU
LVD Directive 2014/35/EU
RoHS Directive 2011/65/EU with amendment EU 2015/863

Specac Ltd, Sciences and Innovation Centre, Halo Business Park, Cray Avenue, Orpington, Kent BR5 3FQ, United Kingdom, declare under our sole responsibility that the following products:

Product Name: Atmos Heating Gas Cell and Controller.
Model No. GS24651UK, GS24651EU, GS24652UK, GS24652EU, GS24653UK, GS24653EU, GS24654UK, GS24654EU, GS24651CN, GS24651JP, GS24651US, GS24652CN, GS24652JP, GS24652US, GS24653CN, GS24653JP, GS24653US, GS24654CN, GS24654JP, GS24654US. GS24602, GS24605, GS246010, GS246020.

Has been tested and found in conformity with the following European harmonized standards:

EN61326-1:2013	EMC Part 3-2: limits – Limits for harmonic current emissions. Limitation of voltage changes, voltage fluctuations and flicker in public LV supply systems. ESD immunity, Radiated Immunity, EFT/Burst, Surge, Conducted Immunity, Magnetic Field, Dips & interruptions.
EN61010-1:2010 EN61010-2-010:2014	LVD Safety requirement. Particular requirements for laboratory equipment for the heating of material.
EN63000:2018	RoHS technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Signed: Ian Gaskin Date: 12/07/19

Ian Gaskin
Engineering Manager

Specac Document Number: GS24651_CE_DoC_20190709 Date: 12/07/2019

RoHS 符合性声明

China RoHS 2.0 Declaration of Conformity

产品名称 (Product Name)： Atmos Heat Gas Cell & Temperature Controller

产品型号 (Product No.)：

GS24651UK, GS24651EU, GS24651CN, GS24651US,
GS24652UK, GS24652EU, GS24652CN, GS24652US,
GS24653UK, GS24653EU, GS24653CN, GS24653US,
GS24654UK, GS24654EU, GS24654CN, GS24654US,
GS24602, GS24605, GS246010, GS246020.

注册商标 (Trade Mark)：

制造商名称及地址(Company Address)：
Specac Ltd, Sciences & Innovation Centre, Halo Business Park, Cray Ave.
Orptington BR5 3FQ, UK

生产厂名称及地址(Production Factory Address)：
Specac Ltd, Sciences & Innovation Centre, Halo Business Park, Cray Ave.
Orptington BR5 3FQ, UK

Specac Ltd 特此声明，我公司所生产的以上产品，符合欧盟 Directive 2011/65/EU 及中国 GB/T 26572-2011《电子电气产品中限用物质的限量要求》的标准。产品中的各项限用物质含量，符合如下列表的要求，并遵循 SJ/T 11364-2014 的标识要求。
Specac Ltd hereby declares that the products listed above are compliant with requirements of EU Directive 2011/65/EU, China GB/T 26572-2011 and SJ/T 11364-2014. The products contain less than the limits stated below for the six restricted substances.

有害物质或元素名称 Restricted Substance	最高允许含量 Maximum Allowable Limit
铅(PB)	1000 ppm
汞(Hg)	1000 ppm
镉(Cd)	100 ppm
六价铬(Cr^{6+})	1000 ppm
多溴联苯(PBB)	1000 ppm
多溴二苯醚(PBDE)	1000 ppm

遵循标准 (Test Standard)：
中国 (China) ：GB/T 26572-2011, SJ/T 11364-2014,
欧盟 (EU) ： Directive 2011/65/EU

签字(Sign) _____ **日期**(Date): 12/07/19

Ian Gaskin
工程经理 (Engineering Manager)

ISED
Supplier's Declaration of Conformity

Manufacturer:	Specac Limited, Sciences and Innovation Centre, Halo Business Park, Cray Ave. Orpington, Kent, BR5 3FQ, UK
Trade Mark:	Specac
Product:	Atmos Heated Gas Cell and Temperature Controller
Model No.	GS24651UK, GS24651EU, GS24651CN, GS24651US GS24652UK, GS24652EU, GS24652CN, GS24652US GS24653UK, GS24653EU, GS24653CN, GS24653US GS24654UK, GS24654EU, GS24654CN, GS24654US GS24602, GS24605, GS246010, GS246020.
Test Applied Standard	ICES-003 (Issue 6, 19/01/2016). ANSI C63.4:2014
Test Report No.	GS24654_ICES_EMC_REP_20190514

This device complies with ICES-003 Issue 6 regulation for the evaluation of Class B of ISED Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

We, Specac Limited, have determined that the above named equipment has been shown to comply with the applicable ISED Standards and Regulations. Furthermore, we warrant that each unit of equipment marketed is identical to the unit tested and found acceptable with the standards. The records maintained continue to reflect the equipment being produced within the variation that can be expected due to quantity production and testing on a statistical basis.

Specac Limited (UK)

Sign _____ Date: 16/07/19

Ian Gaskin
Engineering Manager
Tel: +44 1689 892924
Email: ian.gaskin@specac.co.uk

Notes For Use Of Atmos Gas Cell

Worldwide Distribution

France
Eurolabo - Paris.
Tel.01 42 08 01 28
Fax 01 42 08 13 65
email: contact@eurolabo.fr

Germany
L.O.T. - Oriel GmbH & Co,
KG - Darmstadt
Tel: 06151 88060
Fax: 06151 880689
email:info@LOT-Oriel.de
Website: www.LOT-Oriel.com/de

Japan
Systems Engineering Inc. -Tokyo
Tel: 03 3946 4993
Fax: 03 3946 4983
email:systems-eng@systems-eng.co.jp
Website: www.systems-eng.co.jp

Spain
Teknokroma S.Coop C. Ltda
Barcelona
Tel: 93 674 8800
Fax: 93 675 2405
email: comercial@teknokroma.es

Switzerland
Portmann InstrumentsAG
Biel-Benken
Tel: 061 726 6555
Fax: 061 726 6550
email: info@portmann-instruments.ch
Website:www.portmann-instruments.ch

USA
SPECAC INC.
414 Commerce Drive
Suite 175,
Fort Washington,
PA 19034, USA
Tel: 215 793 4044
Fax: 215 793 4011

United Kingdom
Specac Ltd.
Science and Innovation Centre,
Halo Business Park,
Cray Avenue,
Orpington,
Kent BR5 3FQ
Tel:+44 (0) 1689 873134
Website: www.specac.com

Brilliant Spectroscopy™

www.specac.com

SPECAC INC.
414 Commerce Drive
Suite 175,
Fort Washington,
PA 19034, USA
Tel: 215 793 4044
Fax: 215 793 4011

SPECAC LTD.
Science and Innovation Centre,
Halo Business Park,
Cray Avenue,
Orpington,
Kent BR5 3FQ
Tel:+44 (0) 1689 873134