

# Discovery HP-TGA 75/750



## Site Preparation Guide

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Circulator



Power



Cooling



Gas



LN<sub>2</sub>



Fluid



Light



Hardware



Software



Temp



Lab



Customer

# Ideal Setup



## IDEAL PLACEMENT AND BENCH MEASUREMENTS

Select a location with adequate floor space and a rigid laboratory bench that is level and is in a vibration-free environment. For optimal performance, it is recommended that the instrument be placed by itself on a separate marble table.



Bench width: 61–183 cm (24–72 in)

Table width: 100 cm (39 in)

Bench depth: 76 cm (30 in)

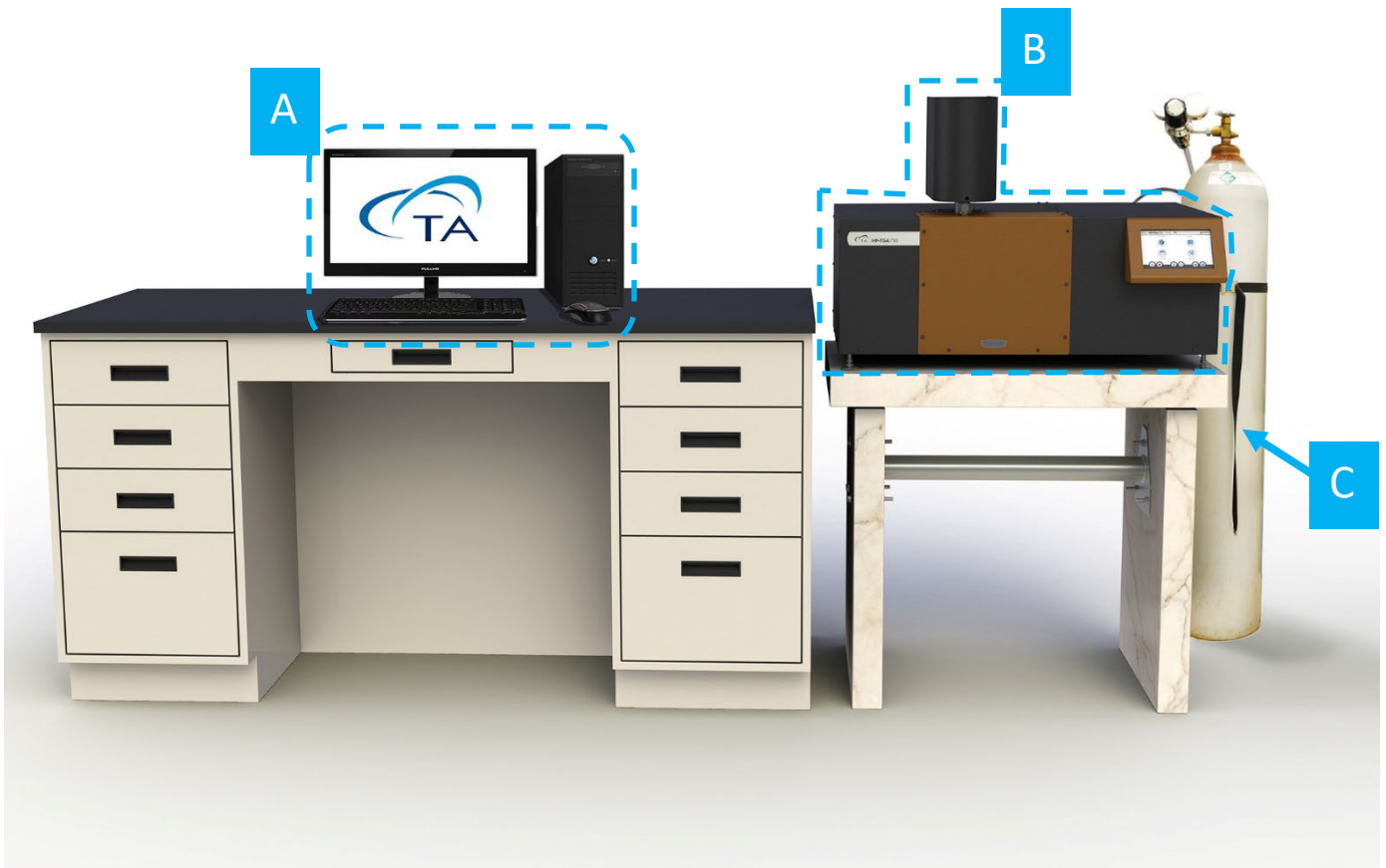
Table depth: 76 cm (30 in)

Distance from the wall: 30.5 cm (12 in) min.

# System Components



## MAIN SYSTEM COMPONENTS



A. Computer (Controller)

B. Instrument

C. Gas Tank

# Instrument Measurements



## MAIN INSTRUMENT



Height (Furnace Closed): 61 cm (24 in)

Height (Furnace Open): 72 cm (28 in)

Width: 86 cm (34 in)

Depth: 65 cm (25.6 in)

Weight: 60 kg (132 lbs)

# Utility Requirements



## POWER

- 115–230 VAC, 50/60 Hz, 1000 W
- Safety ground per local regulation



**Use power cords with plugs appropriate for your circuit.**



Supply voltages lower than indicated may result in a degradation of performance.



Ensure that the mains assigned do not also supply power to noise generating equipment nearby, such as motors, welders, transformers, etc.



An independent heavy GROUND wire must be provided through the power hookup.

Improper grounding may cause severe damage for which the supplier will not accept responsibility. All power strips must be fully grounded and carry the ground through to the sockets into which the computer is plugged.



If the instrument has lost power (due to a power outage, pulling out the power cable, etc.), all valves are automatically closed, and the furnace shut off. Therefore, the instrument itself is in a secure state. Opening the furnace VCR screw while there is no power to the instrument is not recommended, as there may still be high pressure gas inside the instrument, which would then be released uncontrolled to the laboratory atmosphere. If the gas used is toxic, opening the high-pressure furnace may cause harm to the operator.

# Utility Requirements



## GAS



**OXYGEN WARNING:** If excessive amounts of **hydrocarbons** are present in the HP-TGA, energetic combustion could occur, causing damage to the HP-TGA and possible injury to the operator. Oxygen supply lines valves, gauges, and regulators must be free from hydrocarbons and rated for oxygen service. If the inside of the tubing smells oily or has liquid or black carbon residue in it, hydrocarbons may be present. Remove the pressure housing and visually inspect the HP-TGA cell for oil or other organic contaminants. Immediately discontinue use if contamination (spilled samples, oily residue, oily smell, carbon black, etc) occurs. Check that all supply tubing connecting your HP-TGA to other devices (oxygen cylinder, gauges, valves, regulators) are 0.125 in. OD, are rated for high pressure service to 21 MPa gauge, and are free of hydrocarbons.



**HYDROGEN WARNING:** The Sax Safety Handbook, Dangerous Properties of Industrial Materials, indicates that the lower explosion limit (LEL) under ambient conditions for hydrogen is 4.1% in air. Care should be taken to keep the concentration in the produced gas well below this value.



**TOXIC GAS WARNING:** Carbon monoxide, hydrogen sulfide, nitrous oxide and sulfur dioxide are toxic gases. Under certain conditions Carbon dioxide can decompose to carbon monoxide. The customer is responsible for the proper treatment and disposal of the waste gas generated by and leaving the device through the waste gas outlet. Additionally special care must be taken, that the connection between measuring cell and oven is tightly closed and that a new gasket is used every time the connection is opened.



**EXPLOSIVE GAS MIXTURES WARNING:** Ethane, ethene (ethylene), hydrogen sulfide, methane, propane, propene are **flammable** and can explode in certain mixtures with oxidative gases like Oxygen and Air. Care must be taken that those mixtures are not generated by dosing those gases with oxygen or air either simultaneously nor in close succession. When switching between flammable and oxidizing gases in the HP-TGA, the gas system should be initially purged thoroughly with an inert gas before introducing the other gas.

# Utility Requirements



## GAS





Item	Requirement																								
Pressure at GAS Input	85 bar < p < 95 bar or max pressure from gas list <sup>(1)</sup>																								
Conditions	<ul style="list-style-type: none"> <li>• Must be dry</li> <li>• Must be free from oil, dirt, and water</li> </ul>																								
Gas connectors	Swagelock 1/8" connectors																								
Flow rate	100 mL/min																								
Regulator	<ul style="list-style-type: none"> <li>• Customer-supplied</li> <li>• Two-stage regulator with output range 0–1500 psig</li> </ul>																								
Sample Gas	<table border="1"> <thead> <tr> <th>Gas Type</th> <th>Conditions</th> </tr> </thead> <tbody> <tr> <td>Air, Argon, Krypton, Neon, Nitrogen</td> <td>Max pressure &lt; 80 bar Max temp &lt; 1100°C</td> </tr> <tr> <td>Carbon dioxide</td> <td>Max pressure &lt; 30 bar</td> </tr> <tr> <td>Carbon monoxide</td> <td>Oxygen-free Max pressure &lt; 35 bar</td> </tr> <tr> <td>Ethane</td> <td>Max pressure &lt; 30 bar Max temp &lt; 1000°C Oxygen-free</td> </tr> <tr> <td>Ethene (ethylene)</td> <td>Oxygen-free Max temp &lt; 1000°C Max pressure &lt; 30 bar</td> </tr> <tr> <td>Forming gas (5% hydrogen in nitrogen)</td> <td>Max temp &lt; 700°C</td> </tr> <tr> <td>Hydrogen</td> <td>Max temp &lt; 700°C</td> </tr> <tr> <td>Helium</td> <td>Max temp ~750°C</td> </tr> <tr> <td>Hydrogen sulfide</td> <td>≤ 3% concentration</td> </tr> <tr> <td>Nitrous oxide</td> <td>Max temp &lt; 450°C Max pressure &lt; 2 bar (exothermic deflagration above these limits)</td> </tr> <tr> <td>Oxygen</td> <td>Max temp &lt; 500°C Max pressure &lt; 10 bar Max sample size ≤ 10 mg</td> </tr> </tbody> </table>	Gas Type	Conditions	Air, Argon, Krypton, Neon, Nitrogen	Max pressure < 80 bar Max temp < 1100°C	Carbon dioxide	Max pressure < 30 bar	Carbon monoxide	Oxygen-free Max pressure < 35 bar	Ethane	Max pressure < 30 bar Max temp < 1000°C Oxygen-free	Ethene (ethylene)	Oxygen-free Max temp < 1000°C Max pressure < 30 bar	Forming gas (5% hydrogen in nitrogen)	Max temp < 700°C	Hydrogen	Max temp < 700°C	Helium	Max temp ~750°C	Hydrogen sulfide	≤ 3% concentration	Nitrous oxide	Max temp < 450°C Max pressure < 2 bar (exothermic deflagration above these limits)	Oxygen	Max temp < 500°C Max pressure < 10 bar Max sample size ≤ 10 mg
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# Utility Requirements

	Gas Type	Conditions
Sample Gas	Propane	Max pressure < 6 bar Max temp <1000°C Oxygen-free
	Propene (propylene)	Max pressure < 7 bar Oxygen-free Max temp < 1000°C
	Sulfur Dioxide	≤ 3% concentration
	Xenon	Max pressure < 50 bar (or RT >17°C)

-  The pressure 85 bar < p < 95 bar is optimal for the instrument to work up to 80 bar. Additionally, the MFCs are calibrated for an input pressure of this range. Gases used **MUST** be suitable for high pressure; refer to the gas list in this table to make sure you **do not exceed the given maximum pressure limits**.
-  Always close unused inlets with the supplied plug. Open gas inlet lines might cause leakage of the gas to the lab environment.
-  Customer is responsible for safe gas input pressure, safe gas handling and exhaust, and for safe gas switching (for example, from methane to nitrogen to oxygen instead of directly from methane to oxygen).
-  Ensure the residue from prior samples is burned off under air at 800°C (and pressure of interest) before running the sample under pure oxygen.

# Computer Requirements



## HARDWARE REQUIREMENTS

Item	Requirement
Processor	<ul style="list-style-type: none"><li>• Intel® Core™ i5 8400 or better</li><li>• 2.8 GHz with 9 MB L2 cache</li></ul>
Memory	≥ 16 GB RAM DDR4 2666 SDRAM
Hard drive	≥ 80 GB free space <ul style="list-style-type: none"><li>• 1.5 GB required for Full version of TRIOS</li><li>• 675 MB required for Lite version of TRIOS (without Online help)</li></ul>
DVD (optional)	≥ 48x CD-ROM or DVD (optional for installing TRIOS)
Screen resolution	Required: 1280 x 1024 with 24-bit colors Recommended: 1920 x 1080 with 24-bit colors
Graphic memory	128 MB
Screen (LCD) size	Required: 19" or greater Recommended: 24" wide screen







## SOFTWARE REQUIREMENTS

Item	Requirement
Operating System	<ul style="list-style-type: none"><li>• Windows 7, 8, 10 Ultimate, Enterprise &amp; Professional</li><li>• Home version not supported</li><li>• 64-bit version for TRIOS v4.5 and up</li></ul>
Service Pack	Microsoft Operating System Service Pack
Updates	Windows Operating System and associated Microsoft updates must be up to date
Network	<i>TA Instruments is not responsible for resolving issues associated with connections to your corporate network.</i>
Conflicts	<i>TA Instruments is not responsible for resolving hardware/software conflicts created by the addition of third-party hardware or software to the computer.</i>

# Site Preparation Checklist



## Discovery HP-TGA 75/750

	<p>Sufficient bench space for computer and marble table space for instrument:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Marble Table Length: 60 cm (24 in)</li> <li><input type="checkbox"/> Marble Table Depth: 76 cm (30 in)</li> </ul>
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Instrument power is 115–230 VAC, 50/60 Hz, 1000 W</li> </ul>
	<p>Purge gas:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Is dry and free of oil, dirt, and water</li> <li><input type="checkbox"/> Pressure regulator is present</li> <li><input type="checkbox"/> Meets the requirements as listed on page 8–9</li> <li><input type="checkbox"/> I have read and understand the <b>OXYGEN</b> warning</li> <li><input type="checkbox"/> I have read and understand the <b>HYDROGEN</b> warning</li> <li><input type="checkbox"/> I have read and understand the <b>TOXIC GAS</b> warning</li> <li><input type="checkbox"/> I have read and understand the <b>EXPLOSIVE GAS MIXTURES</b> warning</li> </ul>
	<ul style="list-style-type: none"> <li><input type="checkbox"/> The Customer assumes responsibility for any damage that occurs when the instrument is moved by someone other than a trained TA Instruments Service Representative.</li> </ul>

I hereby acknowledge that all utility requirements have been met per the checklist above and that they will be ready at the agreed time of installation.

**If all utility requirements are not met at the agreed time of installation, additional charges may be incurred for a return Service trip.**

\_\_\_\_\_  
*Customer* *DD* / *MM* / *YYYY*

\_\_\_\_\_  
*Company* *City* *State* *Country*

Please send a signed copy of the completed checklist to your local Service representative.

# TA Instruments Offices

For information on our latest products, contact information, and more, see our website at:  
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