TA Instruments Installation Requirements for the Thermal Discovery Series®

Notice

Thank you for ordering a Discovery Series thermal analysis system from TA Instruments. To ensure that installation of your system goes as smoothly as possible and has you ready to start evaluating your sample materials as quickly as possible, we are providing the attached installation information. It includes details regarding laboratory space, power, and auxiliary requirements, as well as configuration requirements for the controller (computer). Please review this information carefully and take any appropriate actions prior to the installation date. To avoid unnecessary delays, and/or additional charges, please ensure that the requirements specified in this document are met before your TA Instruments Service Representative arrives. Contact your local TA Instruments Representative if you have any questions.

To arrange for installation of your system, contact our U.S. Service Department (302-427-4050) or your local TA Instruments Service Representative.

Important: TA Instruments Manual Supplement

Please refer to the *TA Manual Supplement* to access the following important information supplemental to this document:

- TA Instruments Trademarks
- TA Instruments Patents
- Other Trademarks
- TA Instruments End-User License Agreement
- TA Instruments Offices

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Requirements for the Controller (Computer)

A thermal analysis system consists of one or more measurement instruments (e.g., DSC, TGA) and a computer configured with appropriate TA Instruments software (this latter combination is subsequently referred to as a controller). As a customer, you have two alternatives for configuring a controller. You can either purchase a computer from TA Instruments and have it configured by a TA Instruments Service representative, or you can purchase a suitable computer on your own and configure it at your site. In either case, the general requirements which follow are the same.

In situations where you are supplying the computer, it is assumed that you have reviewed these requirements and suitably prepared the controller prior to the scheduled system installation by the TA Instruments Service Representative. In fact, you will be required to provide hardcopy verification of your system setup before an installation visit will be scheduled. See “Obtaining Hardcopy System Verification For Windows” on page 6.

Before installing the TA Instruments software, you should ensure that the computer system meets the following specifications:

Description	Requirement
Operating system[1]	Supported Operating Systems: 32 and 64-bit versions of Windows Vista Business and Ultimate, and Windows 7, Windows 8, and Windows 10 Ultimate, Enterprise & Professional[2]
Processor	Intel® Core™ 2 Duo (2.93 GHz with 3 MB L2 cache) or better
Memory	≥4 GB RAM (8 GB RAM recommended)
Hard drive	≥80 GB free space on hard drive
DVD	≥48X CD-ROM or DVD
Screen resolution	1280 x 1024 (1920 x 1080 recommended) with >24-bit colors
Graphic memory	128 MB
Screen (LCD) size	19” or greater (24” wide screen recommended)

1. Install Microsoft Operating System Service Pack, Internet Explorer and/or Direct X (if required). If you don't have the required versions of these packages, they can be obtained through the Microsoft web site (at www.microsoft.com/downloads) or by using the Microsoft Windows Update mechanism (accessed through the Start menu or by accessing http://update.microsoft.com).
2. Home version of Windows 7, Windows 8, and/or Vista is not acceptable. Home version is missing certain functionality that is needed for optimized analyzer performance and efficiency.

The Microsoft components .NET Framework and Visual C++ are automatically installed as part of TRIOS V2.0 or higher and Advantage V4.7 or higher. The specific versions of these components vary depending on the software package installed. These components support the latest software development tools used in TRIOS/Advantage, as a result, software installation may take longer than in previous versions.

Additional Requirements for Discovery Thermal Series

Description	Required
Network card	One Ethernet 10 Base T/100 Base TX network card required for communication with the instrument.
Additional Ethernet card	A second Ethernet card is only required if you plan on having the instruments set up on a local network and want to connect the computer to the company network.
Ethernet router	10 Base T/100BaseTX Ethernet router
Ethernet cabling	EIA-568B Category 5 UTP
Client-server protocol	DHCP or static
Additional networking components for Windows®	Network services: file & printer and Vista sharing for Microsoft networks, client for Microsoft Networks, and internet protocol (TCP/IP).
TCP/IP ports used	TCP: 5432, 8080, 8081 UDP: 5050, 5056

Additional Requirements for Instrument Control

Description	Required
User log-in capability	While multiple users may still use the “Fast User Switching” function when running Windows, only one user at a time may use the TA Instruments TRIOS Instrument Control Software. This limit, which is applicable to most programs, is a result of hardware resources that are used by each of these programs.

Free Disk Space Required

To help you determine which components to install, we have provided the following table containing the approximate amount of free disk space required for installation of TRIOS software.

This amount is above that required for the operating system, plus the other software products supplied on the installation DVD. In addition, an extra 15 MB of free disk space is required during the install process (for temporary install files.)

Software	Instrument Control and Data Analysis	Full Installation (Thermal + Rheology)
TRIOS	~200 MB (Thermal only)	700 MB for the Full version or 400 MB for the Lite version (without Online Help)

Other Hardware Considerations

- The computer should be a new computer that is not already attached to other analytical instruments.
- Before the TA Instruments Service Representative will schedule a visit to install new instruments, please obtain a hard copy of the Windows® system summary as instructed below to verify that your system is adequate. Please fax this verification sheet along with your company identification and phone number to either TA Instruments Service at 302-427-4054, or to your local Service Representative.

Obtaining Hardcopy System Verification For Windows

1 Select **Programs** > **Accessories** > **System Tools** > **System Information** from the **Start** menu.

2 Verify **System Summary** is highlighted.

If you print out this summary from this step you will receive all system information (more than 50 pages). Follow the remaining steps to copy and print only summary information

3 Select **Edit** > **Select All** then **Edit** > **Copy**.

4 Open Notepad or another word processing program.

5 Select **Edit** > **Paste** then **File** > **Print**.

Other Software Considerations

- Peripherals (e.g., printer) must be from the known Windows operating system compatible list. (See Microsoft's Web site at http://www.microsoft.com/hwtest for the most current list.)
- TA Instruments is not responsible for resolving issues associated with connections to your corporate network. [See further information in the next section.]
- TA Instruments is not responsible for resolving hardware/software conflicts created by the addition of third party hardware or software to the computer.

System Configurations

TA Instruments Discovery Series® thermal analysis instruments communicate with the controller via TCP/IP. Each TA Instruments controller requires an Ethernet router for configuring a local network (i.e., controller, instrument(s), printer).

A second Ethernet card is only required if you plan on having the instruments set up on a local network and want to connect the computer to the company network. Your MIS/IT department should configure one of the Ethernet cards in the computer that you are supplying for communication with your in-house network and must also supply and install a second Ethernet card to be used with the Discovery Series instruments. Your TA Instruments Service Representative will configure the second Ethernet card during start-up of the system to communicate with the Discovery Series instruments.

Using this configuration, you can archive data to another computer on the network or print results on a network printer.

Requirements for Discovery Series® Instruments

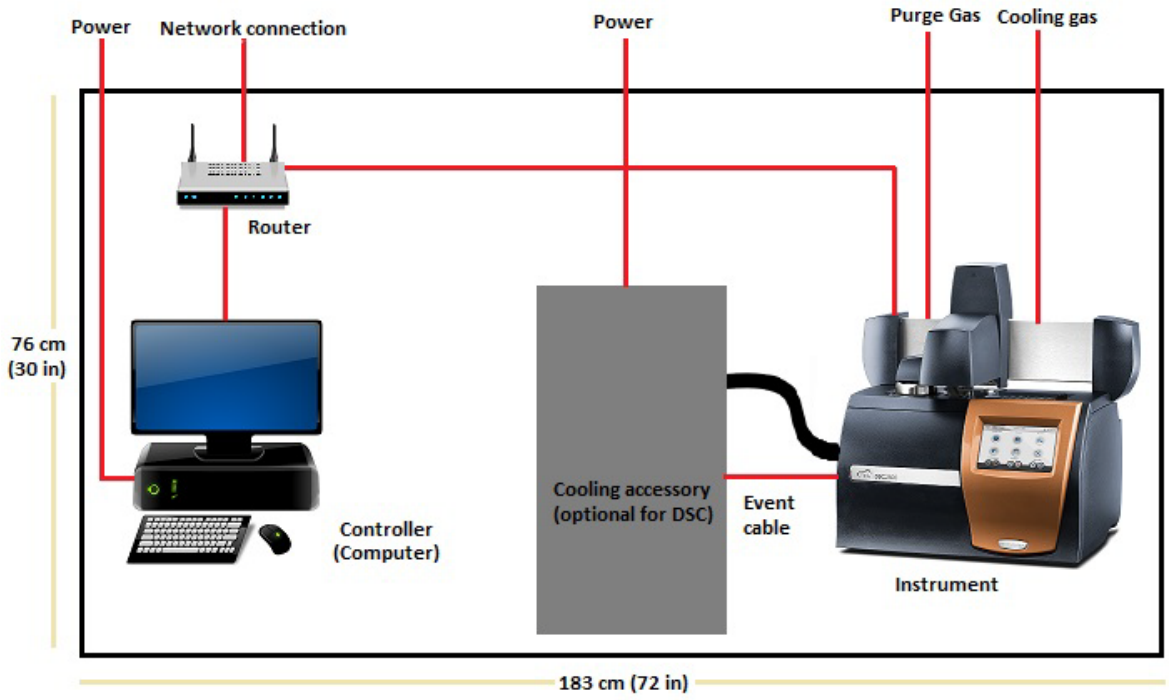
The following section summarizes laboratory requirements for the Discovery Series instruments.

Discovery Series Instrument & Accessory Placement

The Discovery Series base system consists of a controller computer, Discovery Series instrument, Discovery Common Cabinet for first generation Discovery instruments, and a cooling accessory. Select a location for the instrument with adequate floor space and a rigid laboratory bench that is level, has a minimum depth of 76 cm (30 in), and with a length of approximately 183 cm (72 in).

Discovery Series Instrument	Cooling Unit Accessory	Location of Cooling Unit
Discovery DSC	RCS90 and RCS40 RCS120 LN2P Finned cooler PCA (not applicable for DSC 25)	Table (separate from instrument) Floor Floor Placed on cell Table
Discovery TGA	Heat exchanger	Table/floor

Refer to the figure below for basic layout regarding Discovery Series component placement (DSC2500 shown).



Discovery DSC Specifications

Table 1 Discovery DSC Technical Specifications

Item	Discovery DSC	Discovery DSC Models 25/250/2500
Dimensions:	Depth 56 cm (22 in) Width 38 cm (15 in) Height 35.5 cm (14 in)	Depth 51 cm (20 in) Width 53 cm (21 in) Height 53 cm (21 in)
Weight (with Autosampler, AutoLid, and FACS):	22 kg (48 lbs)	32 kg (70 lbs)
Power:	Furnace: +/- 54 V (from Common Cabinet) System: 24 VDC	100–240 VAC, 50/60 Hz, 600 W Safety ground per local regulation
Laboratory conditions:	Temperature 15–35°C Relative humidity 5–80% (non-condensing) Installation Category II Pollution Degree 2 The degree of protection for this instrument according to IEC 529 to IP20. Maximum altitude 2000 m (6560 ft)	
Laboratory requirements:	Cell and base purge gas(es) pressure[1, 2] 100–140 kPa gauge (10–20 psig) Cooling gas (air) pressure for use with Finned Air Cooling System[1, 3] 170 kPa gauge (25 psig max) Cooling gas (nitrogen) pressure for use with RCS and LN2P[1, 3,] 170 kPa gauge (25 psig max)	

1. All gases must be dry and free of oil, dirt and water. The Purge Gas and Base Purge Gas are connected to the back of the instrument using 1/8-inch (O.D.) polyethylene tubing and compression fittings. The Cooling Gas is connected to the back of the instrument using ¼ inch (O.D.) polyethylene tubing and a compressional fitting. (The tubing and fittings are provided in the DSC accessory kit.) Acceptable cell purge gases include air, nitrogen, oxygen, argon, and helium. Dry nitrogen should be used as the base purge gas when an active cooler is used. Dry nitrogen should also be used as the cooling gas with the RCS and LN2P.
2. Gas delivery modules (GDM) are a standard feature. Typical purge gas flow rate to the cell is 50 mL/min with nitrogen.
3. Actual cooling gas and base purge gas flow rates are controlled by orifices installed in the DSC

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References to “Installation Category” and “Pollution Degree” in this document are defined in the safety standards to which this equipment has been evaluated. Refer to the Getting Started Guide for complete regulatory information.

Installation Category II: The local level power distribution system intended to power appliances, portable equipment, etc. with smaller transient overvoltages than installation category III. For mains supply the minimum and normal category is II.

Pollution Degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

Discovery TGA Specifications

Table 2 Discovery TGA Technical Specifications

Item/Area	Discovery TGA	Discovery TGA Models 55/550/5500
Dimensions:	Depth: 45 cm (17.8 in) Width: 42.5 cm (16.74) Height: 67 cm (26.4 in)	Depth: 56 cm (22 in) Width: 56 cm (22 in) Height: 61 cm (24 in)
Weight:	Instrument: 26 kg (57 lbs)	34 kg (76 lbs)
Power:	Furnace: +/- 54 V (from Common Cabinet) System: 24 VDC	100–240 VAC 47–63 Hz 1200 W
Laboratory conditions:	Temperature 15–35°C Relative humidity 5–80% (non-condensing) Installation Category II Pollution Degree 2 The degree of protection for this instrument according to IEC 529 to IP20. Maximum altitude 2000 m (6560 ft) Dust-free, vibration-free, sun-free, draft-free[1]	
Laboratory requirements:	Purge Gas(es) pressure[2, 3] 70–140 kPa gauge (10–20 psig) Cooling Gas (Air) pressure[2] 170 kPa gauge (25 psig) max	Purge gases: Helium, nitrogen, oxygen, air, argon Purge Gas flow rate: Up to 500 mL/min. Recommended flow rates are: • **Wire-wound furnace**: 60 mL/min for sample, 40 mL/min for balance • **EGA furnace**: 90 mL/min for sample, 10 mL/min for balance • I**R furnace**: 25 mL/min for sample, 10 mL/min for balance

1. Instrument should be located in a dust-free, vibration-free environment, preferably on the ground floor of the building (**a marble balance table is recommended for optimum performance**), away from pumps, motors, or other devices which produce vibrations, and away from exposure to direct sunlight and direct air drafts.
2. All gases must be dry and free of oil, dirt and water. The Purge Gas is connected to the back of the instrument using 1/8-inch (O.D.) polyethylene tubing and compression fittings. The Cooling Gas is connected to the back of the instrument using ¼ inch (O.D.) polyethylene tubing and a compressional fitting. (The tubing and fittings are provided in the TGA accessory kit.) Acceptable furnace purge gases include air, nitrogen, oxygen, argon, and helium.
3. Purge gases are required for the balance and furnace/sample areas. Balance purge gas should always be inert to protect the balance assembly. Gas Delivery Manifolds (GDM) are a standard feature of the Discovery instrument. Purge gas flow rates are 10 mL/min and 25 mL/min to the balance and furnace/sample areas respectively.

Atmospheric pressure fluctuation can disturb sensitive TGA measurements. Ventilation systems should operate air handlers continuously and efforts should be made to minimize short term pressure fluctuations due to opening doors. Vents that allow air to move between adjacent rooms through walls, doors, or ceilings will help minimize measurement noise.

Common Cabinet Specifications

NOTE: Not applicable for Discovery DSC25, DSC250, DSC2500 or Discovery TGA55, TGA550, TGA5500.

Table 3 Common Cabinet Technical Specifications

Dimensions:	Depth 46 cm (18 in) Width 28 cm (11 in) Height 69 cm (27 in)
Weight:	With one universal power supply: 18 kg (40 lbs) With two universal power supplies: 23 kg (51 lbs)
Power:	90 to 264 VAC, 47 to 63 Hz, 12 amps maximum
Power outlet:	One or two 24 VDC, 6 amps maximum (transducer power) One or two ±54 V (transducer heater power)
Operating environment conditions:	Temperature: 15 to 35°C Relative humidity: 5 to 80% (non-condensing) Maximum altitude: 2000 m (6560 ft)

Dual Instrument Configuration

When operating two instruments from a single common cabinet (e.g., with two universal power supplies), the minimum input voltage required varies based on instrument configuration. Consult Table 4 below for requirements.

Table 4 Instrument Configuration and Input Voltage Requirements for Dual Instrument Control

Dual Instrument Configurations	**Minimum Input Voltage Requirements**
Discovery DSC/Discovery DSC	≥100 VAC
Discovery DSC/Discovery TGA	≥120 VAC
Discovery TGA/Discovery TGA	≥200 VAC

Requirements for Miscellaneous Thermal Analysis Accessories

Refrigerated Cooling System (RCS120, RCS90, RCS40) for use with DSC Instruments

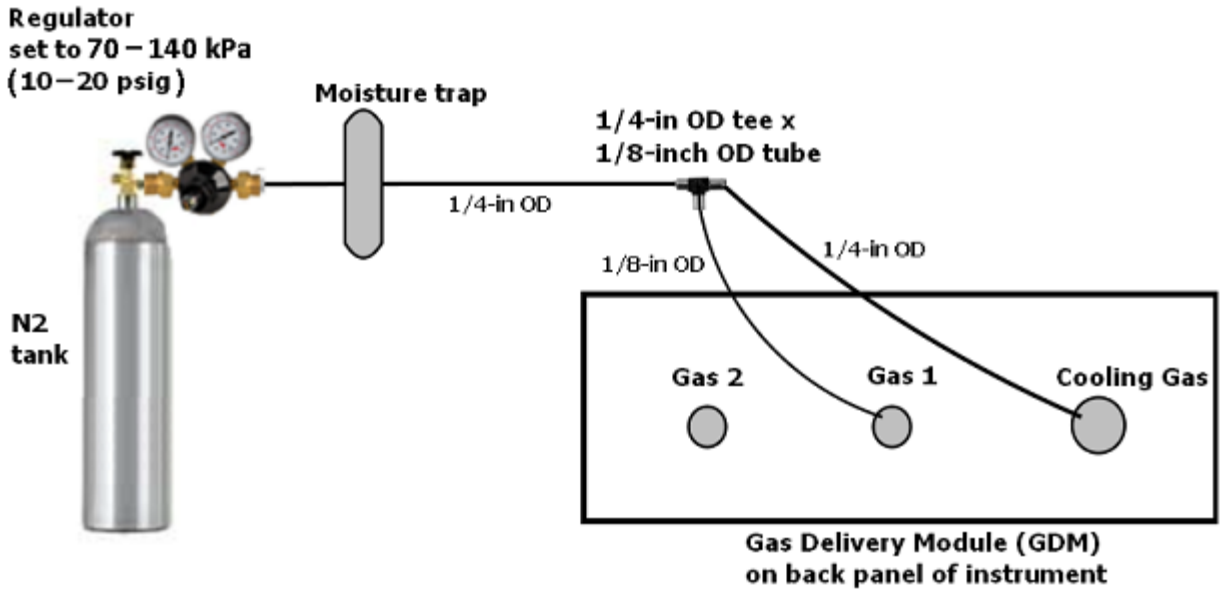
Specification	RCS120	RCS90	RCS40
Height Width Depth	88 cm (34.6) 35.6 cm (14.5) 56 cm (22 in)	46 cm (18 in) 26 cm (10 in) 51 cm (20 in)	26 cm (10 in) 26 cm (10 in) 51 cm (20 in)
Power requirements	230 VAC/8.5 A/50 Hz 230 VAC/7.5 A/60 Hz	120 VAC/12 A/60 Hz 220 VAC/6 A/50 Hz	120 VAC/6.25 A/60 Hz 220 VAC/4 A/50 Hz
Weight	102 kg (225 lbs)	47.7 kg (105 lbs)	24.8 kg (55 lbs)
Laboratory requirements	Same general environmental requirements as DSC. A base and cooling purge (nitrogen) is required in addition to the standard cell purge.		

If using an RCS as your cooling accessory, it is ideal to place the RCS90 and RCS40 on a table that is separate from your laboratory bench. If a table is not available, place the RCS on the laboratory bench to the right of first generation Discovery Series instruments and to the left of Discovery DSC25, DSC250, and DSC2500 instruments. The RCS120 must be kept on the floor.

Refer to the Refrigerated Cooling System Getting Started Guide for more information.

Below is a schematic showing you how to connect the gas plumbing lines to the instrument for the use of the RCS.

RCS Gas Plumbing Diagram



Description	Quantity
Regulator (not found in kit; see Note 1)	1
Moisture trap, P/N 200266.001 (not found in kit; see Note 1)	1
Legris 1/4-inch OD tee x 1/8-inch OD tube	1
Tubing, polyethylene, 1/8-inch OD x.030-inch width	15 ft
Tubing, Polyflame, 1/4-inch OD x.040-inch width	25 ft

Note:

1 Using the pressure range specified—70-140 kPa gauge (10-20 psig)—adjust the regulator pressure until the **Base purge** flow rate (viewable from the TRIOS software Control Panel) reads 300 mL/min.

The regulator and moisture trap can be purchased from TA Instruments; the rest of the items are located in the Discovery DSC Accessory Kit that is shipped with the instrument.

2 Use **99.999%** pure nitrogen or LN boil-off gas to reduce moisture

3 A new or recently serviced and calibrated regulator is recommended.

4 Do not use Tygon® tubing due to its high moisture permeability.

5 Make sure that the tubing is cut cleanly and squarely on the ends.

6 Leak check all tubing.

7 Use moisture trap, PN 200266.001, to prevent moisture buildup.

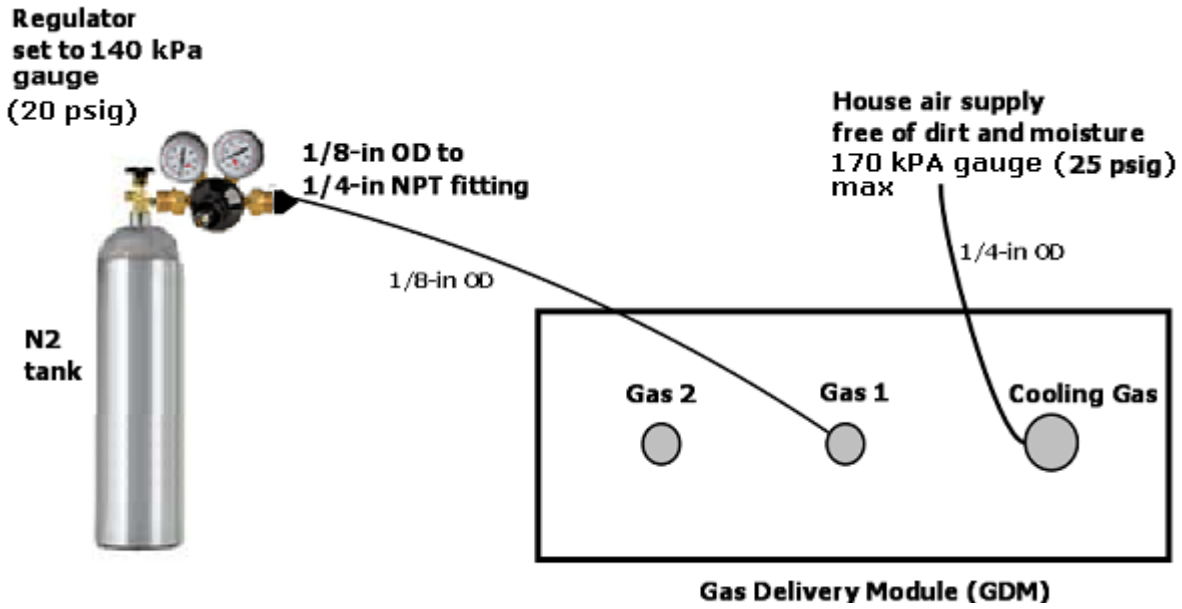
Finned Air Cooling System (FACS) for use with DSC Instruments

This section provides the laboratory requirements for the FACS and a schematic detailing how to connect the gas plumbing lines to the instrument for use with the FACS.

Laboratory requirements:

- Same general environmental requirements as DSC.
- Cooling gas (air) maximum pressure for use with the FACS: 170 kPa gauge (25 psig)

FACS Gas Plumbing Diagram



Description	Quantity
Regulator (not found in kit; see Note 1)	1
Legris 1/8-inch OD tube to 1/4-inch male NPT (NPT=American pipe thread)	1
Tubing, polyethylene, 1/8-inch OD x.030-inch width	15 ft
Tubing, Polyflame, 1/4-inch OD x.040-inch width	25 ft

NOTES:

- The regulator can be purchased from TA Instruments; the rest of the items are located in the Discovery DSC Accessory Kit that is shipped with the instrument.
- FACS uses cool gas constantly; therefore, clean house air should be used. A filter is recommended.
- Use standard grade nitrogen.
- A new or recently serviced and calibrated regulator is recommended.
- Make sure that the tubing is cut cleanly and squarely on the ends.
- Leak check all tubing.

Liquid Nitrogen Pump (LN2P) for use with DSC Instruments

This section provides the laboratory requirements and technical specifications for the LN2P, and a schematic detailing how to connect the gas plumbing lines to the instrument for use with the LN2P.

Laboratory requirements:

- Same general environmental requirements as DSC; Helium gas recommended for cell purge via the GAS 2 port.
- Cooling gas (Nitrogen or LN boil-off) maximum pressure for use with the LN2P: 170 kPa gauge (25 psig)
- Low pressure LN2 dewar.

LN2P Specifications

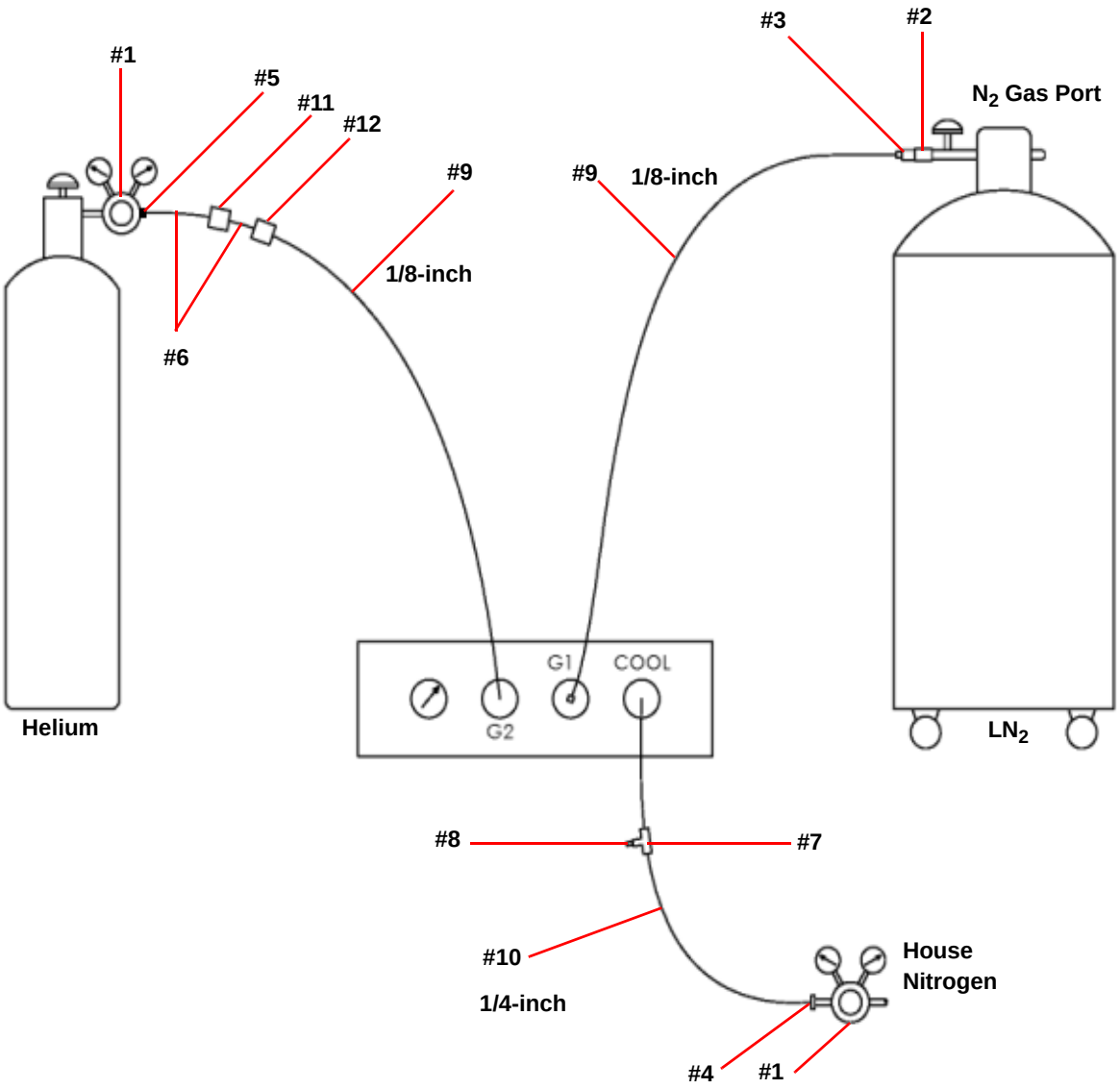
Table 5 LN2P Technical Specifications

Dimensions	Depth 86 cm (34 in) Width 86 cm (34 in) Height 107 cm (42 in)
Weight	50 kg (110 lbs) empty 92.5 kg (204 lbs) full

Power requirements:

- 24VDC using universal power supply (refer to the Discovery LN2P Getting Started Guide).

LN2P Gas Plumbing Diagram



Item	Quantity	Description	Part Number
1	2	Regulator, Concoa #212-2301-01-580	200245.001
2	1	Adapter 1/2 Tube x 1/2 AN	280350.001
3	1	Reduce Union Tube Fitting 1/2 x 1/8-inch Tube OD	200140.004
4	1	Legris #3175-56-14 1/4 OD Tube to 1/4 Male NPT	270141.002
5	1	Legris #3175-53-14 1/8 OD Tube to 1/4 Male NPT	270141.004
6	1	Legris Plug-in Reducer 1/8 OD x 1/4 OD	200176.001
7	1	Legris #3104-56-53 Tee 1/4 x 1/8 Tube	271648.001
8	1	Legris #3126-53-00 Plug 1/8 OD	271647.002
9	15 ft	Tubing NEXPOLY FR LLDPE 1/8-inch OD	200864.001
10	25 ft	Tubing POLYFLAME 1/4-inch OD	200866.001
11	1	Gas Dryer	200266.001
12	1	Purge Gas Purifier	970425.901

Notes:

- Items 1, 11, and 12 are available as parts on the Item Master Price List
- Items 2, 3 & 8 are in the LN2P Accessory Kit (972398.901)
- Items 4–7, 9 & 10 are in the Discovery DSC Accessory Kit (972012.901)
- Remove 1/8 tubing from G1 & Tee, then plug with item 8 before attaching item 9.
- Use new or recently serviced and calibrated regulators.
- Do not use Tygon due to its high moisture permeability.
- Make sure that the tubing is cut cleanly and squarely on the ends. Use of the Legris Tubing Cutter #3000-71-00 is recommended.
- Leak check all tubing.
- Use 99.999% pure Helium to reduce moisture buildup in the cell.
- Use the gas dryer, PN 200266.001, to pre-dry and indicate unsatisfactory moisture levels.
- Use the purge gas purifier, PN 970425.901, to achieve a dewpoint of –180°C.

Photocalorimeter Accessory (PCA) for use with DSC Instruments

Not applicable to DSC 25.

Dimensions	Height: 15 cm (6 in) Width: 28 cm (11 in) Depth: 44 cm (17 in)
Weight	9.4 kg (21 lbs)
Power Requirements	90–132 VAC (3.5 A 180–246 VAC (2.0 A) 47–63 Hz Autorange selectable
Laboratory requirements	Same general environmental requirements as Discovery DSC.

Discovery Mass Spectrometer for use with TGA Instruments

Table 6 MS Technical Specifications

Instrument compatibility	Discovery TGA first generation TGA55, TGA550, TGA5500 Q Series TGA
Dimensions (not including capillary)	Depth 61.5 cm (24 in) Width 26 cm (10 in) Height 41 cm (16 in)
Weight	28 kg (62 lbs)
Power Power adapter Pump inlet Backing pump Turbo pump Heaters Mains inlet All fuses	 240 VAC / 2A, 100 VAC / 5A, 50/60Hz 24VDC, 2.5A 24VDC, 3.15AT 5.0AT 8.0AT 6.3 AT 250 VAC 5x20 mm Ceramic Fast Acting
Laboratory conditions	Temperature 15–35°C Relative humidity 5–80% (non-condensing) Installation Category II Pollution Degree 2 The degree of protection for this instrument according to IEC 529 to IP20. Maximum altitude 2000 m (6560 ft) Dust-free, vibration-free, sun-free, draft-free[1]
Laboratory requirements (High Pressure MS, only)	Purge gas pressure 7–14 kPa gauge (1–2 psig)[2]

1. Instrument should be located in a dust-free, vibration-free environment, preferably on the ground floor of the building, away from pumps, motors, or other devices which produce vibrations, and away from exposure to direct sunlight and direct air drafts.
2. The purge gas should be dry and free of oil, dirt and water. The Purge Gas is connected to the back of the instrument using a ¼ inch (O.D.) compression fitting. Acceptable purge gases include nitrogen or argon.

TA Instruments Offices

For information on our latest products, contact information, and more, see our web site at:
http://www.tainstruments.com

TA Instruments — Waters LLC
Corporate Headquarters
159 Lukens Drive
New Castle, DE 19720
USA

Telephone: 302-427-4000
Fax: 302-427-4001
Email: info@tainstruments.com