MCA
Mechanical Cooling Accessory

Q Series™
Getting Started Guide

Revision B
Issued February 2004

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Notes, Cautions, and Warnings

This manual uses NOTES, CAUTIONS, and WARNINGS to emphasize important and critical instructions.

A NOTE highlights important information about equipment or procedures.

A CAUTION emphasizes a procedure that may damage equipment or cause loss of data if not followed correctly.

A WARNING indicates a procedure that may be hazardous to the operator or to the environment if not followed correctly.

Safety

CAUTION: The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

Electrical Safety

You must unplug the instrument before doing any maintenance or repair work; voltages as high as 120/240 Vac are present in this system.

WARNING: High voltages are present in this instrument. Maintenance and repair of internal parts must be performed only by TA Instruments or other qualified service personnel.

Lifting the Accessory

The MCA is a heavy accessory. In order to avoid injury, particularly to the back, please follow this advice:

WARNING: Use two people to lift and/or carry the accessory or roll it from place to place. The accessory is too heavy for one person to handle safely.

Thermal Safety

During an experiment, the cooling head can become very cold to the touch.

WARNING: Do not put your hands up inside the cooling head.

Cleaning the Instrument

See Chapter 2 for recommended cleaning and maintenance of the TGA instrument.

CAUTION: Before using any cleaning or decontamination method except those recommended by TA Instruments, please check with TA Instruments to make sure that the proposed method will not damage the equipment.

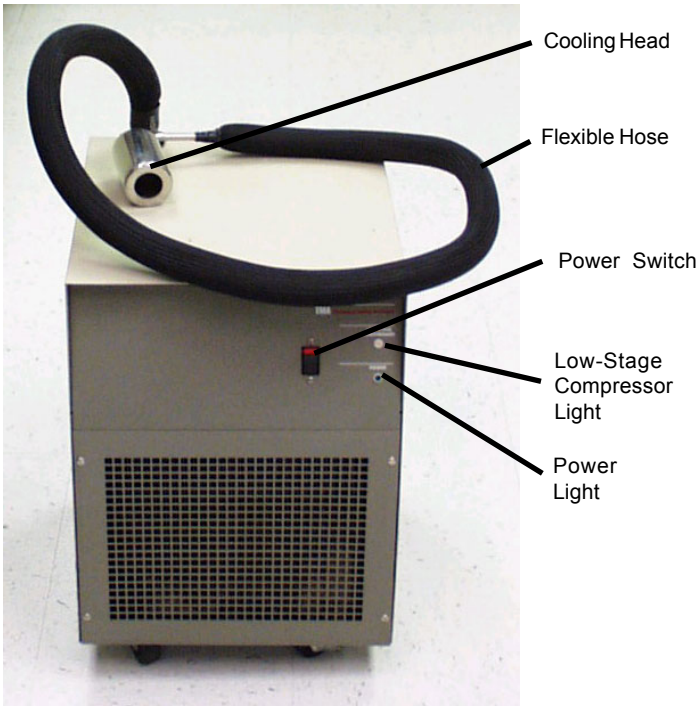
Chapter 1

Introducing the Mechanical Cooling Accessory

Overview

The Mechanical Cooling Accessory (PN 944300.901 and 944300.902) is designed to provide you with a source of continuous cooling for the TMA, while eliminating the need for liquid nitrogen or dry ice. It is a portable, freestanding refrigeration system that can be placed on the floor under a lab bench to conserve counter space. The MCA has a two-stage compressor system that operates in a cascade fashion (first one compressor turns on, then the other compressor joins in). Refrigerant is carried from the unit through an insulated coaxial hose to the cooling head. The features of the MCA include the following:

- flexible head hose
- runs continuously, without supervision or maintenance
- temperature control through the instrument control program.



Specifications

The tables found below contain the technical specifications for the MCA.

Mechanical Cooling Accessory Specifications

Item	Values	
Size	Height Width Diameter	53 cm (21 in.) 38 cm (15 in.) 46 cm (18 in.)
Weight (shipping weight)	110 lbs	
Power US model PN 944300.901 Export model PN 944300.902	 115 Vac, 60 Hz, 10.5 A 230 Vac, 50 Hz, 5.0 A	
Compressors	1/4 horsepower each (cascaded)	
Hose	Length Diameter Minimum Bend Radius	1.65 m (65 in.) 2.86 cm (1.13 in.) 7.62 cm (3 in.)

Temperature Specifications

Item	Values
Air temperature for operation	18 to 25 °C
Minimum temperature	–70 °C
Maximum cooling head temperature	400 °C

Installing the MCA

After unpacking the instrument, inspect the MCA to make sure that there is no damage to the unit, the cooling hose and head, or to the electrical cords.

Choosing a Location

Select a location for the Mechanical Cooling Accessory with the following specifications for optimum efficiency:

Room Temperature:	18 to 25 °C
Clearance:	Air intake grills need 13 to 15 cm (5 to 6 in) clearance in front and back. Lack of adequate cool air can cause the MCA to overheat or reduce its cooling efficiency.
Surroundings:	Do not place the unit in an area where warm air or dust will be drawn into the system (for example, avoid placing it behind mass spectrometers and diffusion pumps).
Electricity:	PN 944300.901 -- 115 Vac, 60 Hz, 10.5 A PN 944300.902 -- 230 Vac, 50 Hz, 5.0 A

Setting Up the MCA

When using the Mechanical Cooling Accessory with the TMA, follow these steps:

1. Plug in the MCA power cord.
2. Place the cooling head (shown here) carefully into the TMA furnace reservoir.

NOTE: Take care not to stretch or bend the hose and cooling head beyond its limits. The hose becomes very rigid when cold, be sure to position it so that the hose is as straight as possible and does not exert pressure on the furnace.

CAUTION: The cooling head gets very cold, to –100°C, when the MCA is operating; use extreme caution and do not handle it or skin damage could occur.

3. Switch the power on and allow the MCA to operate for at least 10 minutes before beginning a TMA experiment. You must allow enough time for both compressors to be fully operational in order to produce cooling action.

NOTE: If you turn the unit off, it must remain OFF for at least 10 minutes before you switch it back ON again.

The MCA compressor activity is indicated by the two lights on the front panel (see figure to right):

- **Power light**—lights when the power switch is ON, indicating that the first compressor is activated.
- **Low-stage compressor light**—comes on 2 to 3 minutes later when the second compressor is activated.

Chapter 2

Use, Maintenance, & Diagnostics

Setting Up an Experiment

1. Set up and turn on the MCA as directed on page 9.

2. Select the TMA Q400 using the Q Series™ Explorer.

3. **Important:** Select **Tools/Instrument Preferences** from the menu and click on the **TMA Page**. Check the box "MCA attached." This will give you better temperature control because different instrument control parameters will be used.

4. Set up and run your TMA experiment as usual. See the online help in the instrument control program for information.

WARNING: Do not exceed 400 °C with the MCA cooling head installed in the furnace. You could cause damage to the instrument or release coolant, which could breakdown to form a poisonous gas.

Maintaining the MCA

The primary maintenance procedures described in this section are the customer's responsibility. Any further maintenance should be performed by a representative of TA Instruments or other qualified service personnel. Do not attempt to service the MCA yourself. Do not try to remove the instrument covers. Contact your TA Instruments representative for service.

Consult the online documentation installed with the instrument control software for further information.

WARNING: Because of the high voltages in this instrument, untrained personnel must not attempt to test or repair any electrical circuits.

Cleaning

Keep the front and rear grills clear and clean from dust and debris by periodic vacuuming to avoid the loss of cooling efficiency. If the debris buildup is extreme, brushing may be needed to adequately clean the grill.

Diagnostic Troubleshooting

The following are suggestions that may help you get your Mechanical Cooling Accessory running properly.

Problem: MCA will not start.

Suggestions:

1. Check the power cord and the plug to ensure that they are not damaged or frayed.

2. Check the power source to make sure that the correct voltage is being applied. The voltage should match that indicated on the serial number tag.

3. Check for a clicking sound. Look through the grill to see if the fan is turning. If the fan is running, but the compressor will not start, and a clicking sound is heard, turn the power off and wait ten minutes before restarting.

Problem: MCA will not cool.

Suggestions:

1. Make sure that the instrument is away from the walls and that the grills are not blocked. Air must flow freely into the MCA.

2. Make sure that the room temperature is not excessive.

If the suggestions above do not solve your problem, or if other problems exist, contact your TA Instruments representative.

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