

# Agilent Low Thermal Mass (LTM) Series II System for Gas Chromatography

## Overview

Agilent Low Thermal Mass (LTM) technology addresses the demand for greater productivity required for many gas chromatography (GC) applications. This technology uses an LTM column module combining a fused silica capillary column with heating and temperature-sensing components wound around it. The LTM Series II system is designed to work with the LTM column module components to heat and cool the column very efficiently for significantly shorter analytical cycle times compared to conventional air bath GC oven techniques involving much higher thermal mass.

The Agilent LTM Series II system (except external power supply) is built into a replacement Agilent 7890/8890 GC System oven door, which is mounted as an add-on to a 7890/8890 GC. The LTM Series II system is neither available nor supported for operation with an Agilent 5890 GC, 6850 GC, 6890 GC, 8860 GC, or other GCs.

The LTM Series II system takes LTM technology to the next level via integrated control directly by the 7890/8890 GC and Agilent GC and GC/MS data systems as well as improvements to ease LTM column installation. Support for constant flow mode and real-time display of temperatures and flows/pressures is available via the 7890/8890 GC display and Agilent data systems.

## Temperature control

- **LTM column module heating:** direct resistive heating using a ceramic-insulated heating wire.
- **Temperature sensing:** high-precision temperature sensor combined with capillary GC column.
- **Temperature accuracy:** each column module is factory calibrated to heat within 0.1 °C of a reference; real-time error fluctuations between temperature setpoint and column module temperature are typically less than 1 °C over the entire temperature range at a programming rate of 120 °C/min.
- **Operating temperature:** 4 °C above ambient to the maximum operating temperature of the GC capillary column; maximum programmable temperature is 400 °C.
- **Maximum LTM column length:** 30 m
- **Maximum temperature ramp rate:** 700 °C/min (achievable ramp rate is dependent on column dimensions and configuration).
- **Negative temperature ramping:** uses heating to achieve a controlled cooling rate that is slower than the convection cooling rate.
- Simultaneous, synchronous operation of one to two 5-inch format column modules can be operated simultaneously with different temperature programs. The operation of multiple modules requires a matching number of fan brackets and transfer line modules.
- An 8890 GC can only support (one or two) LTM 5-inch format column modules.

- Simultaneous operation of two methods may require a second external power supply. Simultaneous use of two 30 m 5-inch format LTM columns requires two power supplies.
- Asynchronous operation is not allowed.
- Up to two external power supplies maximum allowed per LTM Series II system. The use of two power supplies will allow a maximum of two 5-inch modules to be run. The 8890 GC version of the LTM II does not support 3-inch modules.
- 7890A GC requires firmware revision A.01.12.1 or higher. The 8890 GC requires firmware revision 2.0.2.8 or higher.

## 7890/8890 GC configuration with LTM Series II System

The 7890/8890 GC allows up to 10 communications channels for various GC and LTM Series II components. The following is an example 7890/8890 GC configuration (dual SSL/dual FID with Aux EPC) and an LTM Series II system:

- Two (one for each inlet)
- Four (two for each detector)
- **Note:** DFPD requires three channels
- One (one for each PCM or Aux EPC module)
- One (one LTM Series II electronics module, for one or two 5-in format LTM column modules)
- One (one for an optional second electronics LTM Series II Power PCB and power supply)

In this example, nine total GC communication channels are used.

Dimensions and Average Weight of LTM Series II Replacement Door	
Height	36.8 cm (14.5 in)
Width	43.2 cm (17.0 in)
Depth	25.4 cm (10.0 in); unit project 18.4 cm (7.2 in) forward from original door with modules installed
Average Weight	6.7 kg (14.7 lb)

Dimensions and Average Weight of LTM Series II External Power Supply	
Height	4.6 cm (1.8 in)
Width	8.5 cm (3.3 in)
Depth	21 cm (8.3 in); allow 5 cm (2 in) in front and behind for cable and line cord connections
Average Weight	1.1 kg (2.4 lb)

Environmental Conditions	
Ambient Operating Temperature	15 to 35 °C
Ambient Operating Humidity	5 to 85% (noncondensing)
Storage Extremes	-30 to 70 °C
Line Voltage Requirements	100 to 240 V, ±10%

## Safety and regulatory certifications

Conforms to the following safety standards:

- Canadian Standards Association (CSA): C22.2 No. 61010-1
- International Electromechanical Commission (IEC): 61010-1, 61010-2-010, 61010-2-081
- EuroNorm (EN): 61010-1
- Nationally Recognized Test Laboratory (NRTL): ANSI/UL US 61010-1.

Conforms to the following standards on electromagnetic compatibility (EMC) and radio frequency interference (RFI):

- IEC/EN 61326-1
- ICES-001/NMB-001
- AS/NZS CISPR 11

Conforms to the following standard for the restriction of hazardous substances:

- EN 50581

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