

QUADRUPOLE MASS SPECTROMETER

- M-070QA-TDF
- M-101QA-TDF
- M-101/201QA-TDM
- M-401QA-MU/G

VACUUM COMPONENTS



Quadruple mass spectrometers that meet the need for sensitive analysis and low outgassing which were specifically designed to be controlled by PCs

Quadruple mass spectrometers (transducer type)

M-070QA-TDF, M-101QA-TDF, M-101/201QA-TDM



Overview

Quadruple mass spectrometers are widely used in the gas analysis involved with thin film manufacturing equipment, furnaces, accelerators, etc.

Quadruple mass spectrometers being used with these applications require low outgassing and sensitive analysis.

The quadruple mass spectrometers M-101QA-TDF and M-101/201QA-TDM suit these applications. They are highly sensitive with a high level of functionality, have low outgassing, and are specifically designed to be controlled via PCs.

The M-070QA-TDF is a low-priced quadruple mass spectrometer that best-suits the monitoring of residual gasses in various types of vacuum equipments. It can be used in controlling the vacuum quality of production equipment and as a gas analyzer in research and development.

Features

1. High sensitivity

- A secondary electron multiplier is used as the detector (M-101/201QA-TDM).

2. Low outgassing analyzer tube

- Utilizes a low outgassing ion source.
- Degassing function included (*1)

3. Superior basic performance

- Supports sophisticated analysis.
- Detailed settings for ionization voltage and emission current (*1).
- Wide dynamic range

*1: This function not included in the M-070QA-TDF.

4. QUADVISION 3

- Both Japanese/English versions of easy to operate control software
- Windows-compliant
- Multi control (Up to 8 units in parallel)
- Measurement data can be converted to CSV format.

5. Many I/O functions provided as standard

- Automatic measurement signal
- Analog signal input
- Set point output

Selection guide

Application field	M-070QA-TDF	M-101QA-TDF	M-101QA-TDM	M-201QA-TDM
Residual gas monitoring in PVD process equipment	◎	◎	◎	○
Residual gas monitoring in CVD process equipment	△	△	△	△
Residual gas monitoring in etching equipment	△	△	△	△
Residual gas monitoring in vacuum equipment	◎	◎	◎	○
Residual gas analysis in ultra-high vacuum equipment	△	△	◎	○
Vacuum gas monitoring in accelerators	○	○	◎	○
Inorganic gas analysis	○	○	◎	○
Outgassing analysis in thermobalances	○	○	○	◎
Thermal desorption gas analysis	○	○	○	◎
Trace gas analysis	△	△	○	◎
PFC gas analysis	△	△	○	○
R&D	○	○	◎	◎

◎ : Best, ○ : Good, △ : Contact us.

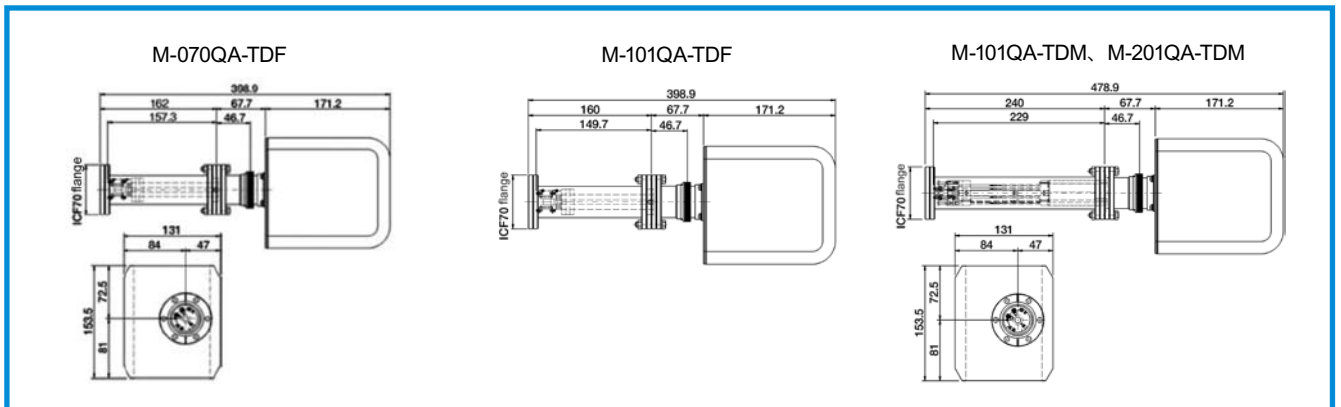
The table above shows quadruple mass spectrometers recommended for general use. If you are considering using one for an application other than given above please contact our sales division.

Specifications

Model name		Standard model		High-sensitivity model		
		M-070QA-TDF	M-101QA-TDF	M-101QA-TDM	M-201QA-TDM	
Basic performance	Measurable range of mass numbers	1 ~ 70amu		1 ~ 100amu		
	Resolution	M/ Δ M ≥ 2M				
	Sensitivity (N ₂)	FC	1.5 × 10 ⁻⁶ A/Pa or more	7.0 × 10 ⁻⁶ A/Pa or more	2.5 × 10 ⁻⁶ A/Pa or more	1.8 × 10 ⁻⁶ A/Pa or more
		SEM	—		2.5A/Pa or more	1.8A/Pa or more
	Minimum detectable partial pressure	6.7 × 10 ⁻⁹ Pa or less	5.0 × 10 ⁻¹⁰ Pa or less	1.0 × 10 ⁻¹² Pa or less		
	Operating pressure	1.3 × 10 ⁻² Pa or less				
Dynamic range	6 digits		7 digits			
Specifications	Detector	FC	○	○	○	○
		EM	—	—	○	○
	Ion source	Cage type (Option: Box type *1)		Cage type (Option: Box type *1)		
	Filament	Two yttria-coated iridium filaments		Two yttria-coated iridium filaments (Option: Tungsten *1)		
	Baking temperature	250 °C (analyzer tube only)				
	Degassing function	—		Electron bombardment		
	Connection flange	φ 70ICF				
	Rated input voltage	AC100V ~ AC240V				
	Maximum power consumption	60W		90W		
	Mass	Analyzer tube	1.5kg	1.4kg	1.6kg	
		Controller	2.1kg	2.2kg		
	Communication interface	RS-232C/485				
	Standard software	QUADVISION3				
RoHS/CE	Compliant					
Applications	Residual gas monitoring in PVD equipment and various types of vacuum equipment			Residual gas monitoring in PVD equipment, accelerators, and various types of vacuum equipment		
	Leak testing of PVD equipment and various types of vacuum equipment			Inorganic gas analysis, thermal desorption gas analysis, etc.		

*1: For the optional specifications, please contact us separately.

Dimensional outline drawing



Quadruple mass spectrometers

M-401QA-MU/G



Overview

Quadruple mass spectrometers of high performance and a high level of functionality that can measure mass numbers up to 410 amu

The M-401QA-MGSY/MUSY can measure ten times faster (than our previous models) with general usage.

Features

1. High-speed measurements. (M- 401QA-MGSY/ MUSY)

Data of $M/e = 1$ to 400 obtained in just one second.

2. Two types of ion sources

Supports both UHV (cage) and gas introduction (box) types.

3. Highly sensitive (M- 401QA-MGHY/ MUHY)

8 digits of dynamic range.

4. Analyzer tube with low outgassing

Utilizes low outgassing ion source.
Degassing function included

Selection guide

Application field	M-401QA-MUHY	M-401QA-MGHY	M-401QA-MUSY	M-401QA-MGSY
Residual gas analysis in ultra-high vacuum equipment	◎	○	◎	○
Vacuum gas monitoring in accelerators	◎	○	◎	○
Inorganic gas analysis	◎	◎	◎	◎
Outgassing analysis in thermobalances	◎	◎	◎	◎
Thermal desorption gas analysis	◎	◎	◎	◎
Trace gas analysis	◎	◎	◎	◎
PFC gas analysis	◎	◎	◎	◎
R&D	◎	◎	◎	◎

◎ : Best, ○ : Good, △ : Contact us.

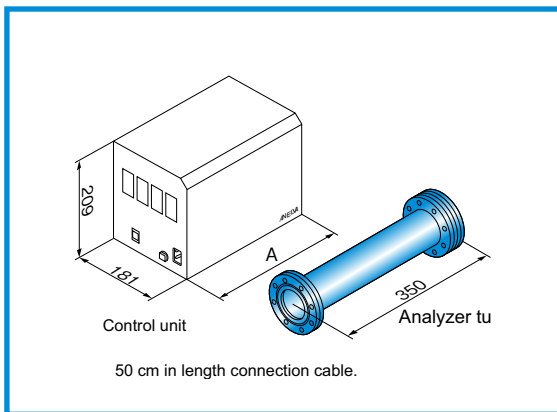
The table above shows quadruple mass spectrometers recommended for general use. If you are considering using one for an application other than given above please contact our sales division.

Specifications

Model name		High-sensitivity measurement		High-speed measurement		
		M-401QA-MGHY	M-401QA-MUHY	M-401QA-MGSY	M-401QA-MUSY	
Basic performance	Mass number	1 ~ 410amu				
	Resolution	$M/\Delta M \geq 2M$				
	N ₂ sensitivity	FC	4.0×10^{-7} A/Pa	4.0×10^{-6} A/Pa	—	—
		SEM	4.0×10^{-1} A/Pa	4.0A/Pa	4.0×10^{-1} A/Pa	4.0A/Pa
	Minimum detectable partial pressure	$\leq 1.0 \times 10^{-12}$ Pa		$\leq 5.0 \times 10^{-12}$ Pa		
	Maximum operating pressure	1.3×10^{-2} Pa or less				
	Dynamic range	8 digits	7 digits	7 digits		
(At high speed)	-	-	5 digits			
Specifications	Ion source	Gas introduction type (Box type)	UHV type (Cage type)	Gas introduction type (Box type)	UHV type (Cage type)	
	Filament	Y203 Note (1)				
	Baking temperature	300°C (Analyzer tube only)				
	Degassing function	Ion source heater	Electron bombardment	Ion source heater	Electron bombardment	
	Sweep rate	10mSec/amu ~		1mSec/amu ~		
	Connection flange	ϕ 114ICF				
	Rated input voltage	AC100V ~ AC240V				
	Maximum power consumption	300W				
	Mass	Analyzer tube	5.1Kg			
		Controller	5.7Kg			
	Communication interface	RS-485/USB				
	Standard software	QUADVISION				
RoHS/CE	Compliant					
Applications	Thermal analysis, thermal desorption analysis, outgassing analysis, GC-MS for inorganic gases, high-speed scan measurements, etc.					

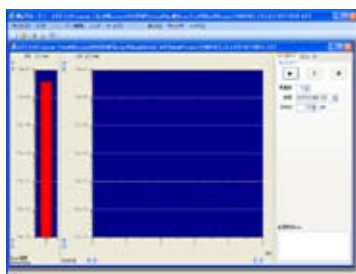
Note (1): Please contact us if optional filament materials are required.

Dimensional outline drawing

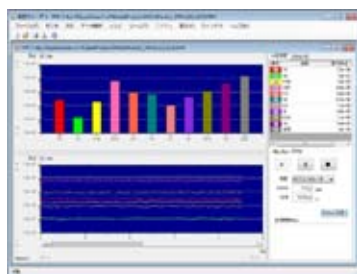


QUADVISION 3

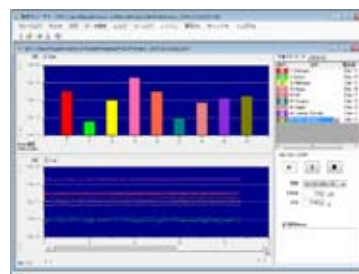
Easy measurements via simple operation



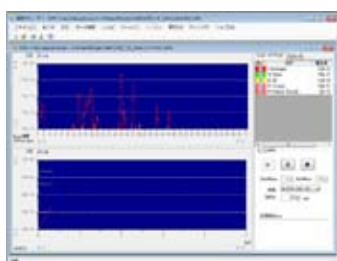
Leak test



Partial pressure measurement



Multiple ion detection



Mass peak analog/bar



Recipe/sequence measurement

Details of QUADVISION 3

Applicable quadruple mass spectrometers	M-070QA-TDF, M-101/201QA series M-401QA series	Included as standard: RS-232C/485 for communication
Measurement mode	Multiple ion detection (SIM)	Trend monitor of mass numbers with up to 16 channels
	Mass peak monitor (MPM)	Continuous measurement of mass spectra within a specified range
	Leak test (LT)	Leak test using a specified mass number
	Partial pressure measurement (PPM)	Partial pressure measurement of 10 fixed components (H ₂ , He, CH ₄ , H ₂ O, CO, N ₂ , HC, O ₂ , Ar, CO ₂ , and total pressure)
Other functions	Recipe function	
	Area calculation	
	Adjustment mode (Mass number calibration, waveform adjustment)	
	Conversion of saved data into CSV format	
	Status check	
	Automatic measurement, analog input (0 to 10 V), set point output	
	Reading of pressure	Pressure values can be loaded into QUADVISION 3 via RS-232C communication. *2
Option	Reading of temperature	Temperature values can be loaded into QUADVISION 3 via RS-232C communication. *3
	NIST conversion	Saved data can be converted to a format searchable in the NIST library.
Personal computer specifications	OS	Windows XP, 7
	Interface	RS-232C/485 port

Note

* 1: For the M-070QA-TDF and M-101/201QA-TDM/F only.

* 2: Reading the pressure requires our specific vacuum gauge and cable.

* 3: Reading the temperature requires our specific temperature controller and cable.

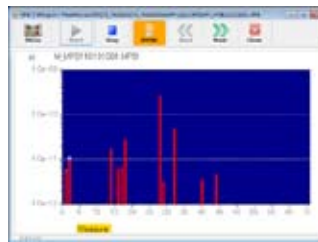
QUADVISION 3 Mobile

Simplified mobile software of QUADVISION 3
Easy and handy operation and measurements via touch panel

- Easy and handy operation of partial pressure control and leak tests
- Operation via touch panel
- Wireless (Bluetooth) measurements also supported.



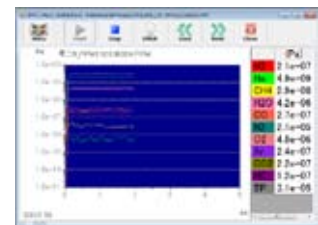
Menu screen



Measurement screen



Chart screen



Trend screen

H2	2.3e-07	N2	2.1e-05
He	8.1e-09	O2	4.9e-06
CH4	4.4e-08	Ar	2.3e-07
H2O	4.1e-06	CO2	1.8e-07
CO	3.0e-07	HC	1.3e-07
		TP	3.1e-05

Numerical value screen

H2	He	CH4	H2O	CO	
N2	O2	Ar	CO2	HC	TP

EMSA: [input field]
 Send Value: [input field]
 AUTO LOCK: [input field]

Parameter screen

Depending on the application screen switching is supported

Details of QUADVISION 3 Mobile

Applicable quadruple mass spectrometers	M-070QA-TDM, M-101/201TDM series
Communication specifications	Wireless specifications: Bluetooth Wired specifications: RS-232C
Measurement mode	Multiple ion detection (SIM) Mass peak monitor (MPM) Leak test (LT) Partial pressure measurement (PPM)
Other functions	Operation with a touch panel Set point output (Note 1) Recipe function Status check function Data saving function (Note 2)
PC specifications	OS: Windows XP, 7 Interface: RS-232C, Bluetooth

Note 1: Set points are output from the controller of the quadruple mass spectrometer.

Note 2: Saved data can be reloaded and processed using the QUADVISION 3 software.

Note 3: No adjustment mode available. The QUADVISION 3 software needs to be used to make any necessary adjustments.

System

Quadruple mass spectrometer that can be used for various types of analysis through retrofitting it with other equipment:

Compact gas analysis system M-070/101/201/401GA-D series



Simplified gas analysis system that utilizes a differential pump

- Incorporation of a pump system (TMP + MP) enables the analysis of gasses at pressures not within the normal operating range of a quadruple mass spectrometer, such as processing pressure or atmospheric pressure.
- Depending on the application a quadruple mass spectrometer or gas introduction system, etc. can be retrofitted.

Applications

Residue analysis in various types of vacuum equipment
 Process gas analysis
 Inorganic gas analysis
 Thermal desorption spectrometry
 Gas analysis for research and development

Ordering information

Product code	Trade name		Remarks
	Model name	Product name	
20110	M-401QA-MGSY	Quadruple mass spectrometer (gas introduction type ion source)	Gas introduction type (box type), high-speed sweep, Y203-FIL
20111	M-401QA-MUSY	Quadruple mass spectrometer (UHV type ion source)	UHV type (cage type), high-speed sweep, Y203-FIL
20012	M-401QA-MGHY	Quadruple mass spectrometer (gas introduction type ion source)	Gas introduction type (box type), high sensitivity, Y203-FIL
20013	M-401QA-MUHY	Quadruple mass spectrometer (UHV type ion source/Y203)	UHV type (cage type), high sensitivity, Y203-FIL
20090	M-201QA-TDM (W)	Quadruple mass spectrometer	200 amu, M type, W-FIL, an AC adapter included, no communication cable *
20091	M-201QA-TDM (Y)	Quadruple mass spectrometer	200 amu, M type, Y-FIL, an AC adapter included, no communication cable *
20092	M-101QA-TDM (W)	Quadruple mass spectrometer	100 amu, M type, W-FIL, an AC adapter included, no communication cable *
20093	M-101QA-TDM (Y)	Quadruple mass spectrometer	100 amu, M type, Y-FIL, an AC adapter included, no communication cable *
20094	M-101QA-TDF (W)	Quadruple mass spectrometer	100 amu, F type, W-FIL, an AC adapter included, no communication cable *
20095	M-101QA-TDF (Y)	Quadruple mass spectrometer	100 amu, F type, Y-FIL, an AC adapter included, no communication cable *
20190	M-201QA-TDM (Re)	Quadruple mass spectrometer (box type ion source)	200 amu, M type, Re-FIL, a box type ion source, an AC adapter included, no communication cable *
20191	M-101QA-TDM (Re)	Quadruple mass spectrometer (box type ion source)	100 amu, M type, Re-FIL, a box type ion source, an AC adapter included, no communication cable *
20096	M-070QA-TDF	Quadruple mass spectrometer	Configuration: An analyzer tube, a controller, an AC adapter, and software (QUADVISION)
20493		Ion source for M-070	For maintenance
20290		RS-232C cable for quadruple mass spectrometer (1.5 m)	
20291		RS-232C cable for quadruple mass spectrometer (3 m)	
20292		RS-232C cable for quadruple mass spectrometer (5 m)	
20293		RS-232C cable for quadruple mass spectrometer (10 m)	
20296		RS-485 cable for quadruple mass spectrometer (5 m)	RS-485 cable (5 m) + Y cable
20297		RS-485 cable for quadruple mass spectrometer (10 m)	RS-485 cable (10 m) + Y cable
20298		RS-485 cable for quadruple mass spectrometer (15 m)	RS-485 cable (15 m) + Y cable
		RS-232C conversion	
	PARANI-SD1000	Serial number BLUETOOTH conversion adapter	BLUETOOTH specifications of QUADVISION3 MOBILE
20299		RS-485 cable for quadruple mass spectrometer (20 m)	RS-485 cable (20 m) + Y cable
20390		RS-485 card	
20391		RS-485 board	
20392	COM-1PD (USB) H	COM-1PD (USB) H USB-RS485 converter	
20395		AC adapter extension cable (5 m)	For M-101/201QA: The AC adaptor cable extension can also be used with the 070.
20396		AC adapter extension cable (10 m)	For M-101/201QA: The AC adaptor cable extension can also be used with the 070.
20397		AC adapter extension cable (15 m)	For M-101/201QA: The AC adaptor cable extension can also be used with the 070.
20398		AC adapter extension cable (20 m)	For M-101/201QA: The AC adaptor cable extension can also be used with the 070.
20418		NIST library data conversion software for M-QA	For M-100/200/400QA
20490	TD-W-FIL	W filament for quadruple mass spectrometer	For M-101/201
20491	TD-Y-FIL	Y filament for quadruple mass spectrometer	For M-101/201
20492	TD-Re-FIL	Re filament for quadruple mass spectrometer (for box type ion source)	For M-101/201
20130	401G-Y203-FIL	QMS401-FILAMENT-Y203 GAS INTRODUCTION TYPE	
20131	401U-Y203-FIL	QMS401-FILAMENT-Y203 UHV TYPE	
30111	V-040LV-MMI	DN40 manual L-shape valve MSB	Protective valve for M-101/201

Canon ANELVA Corporation is constantly improving, its products, hence specifications are subject to change without notice.

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