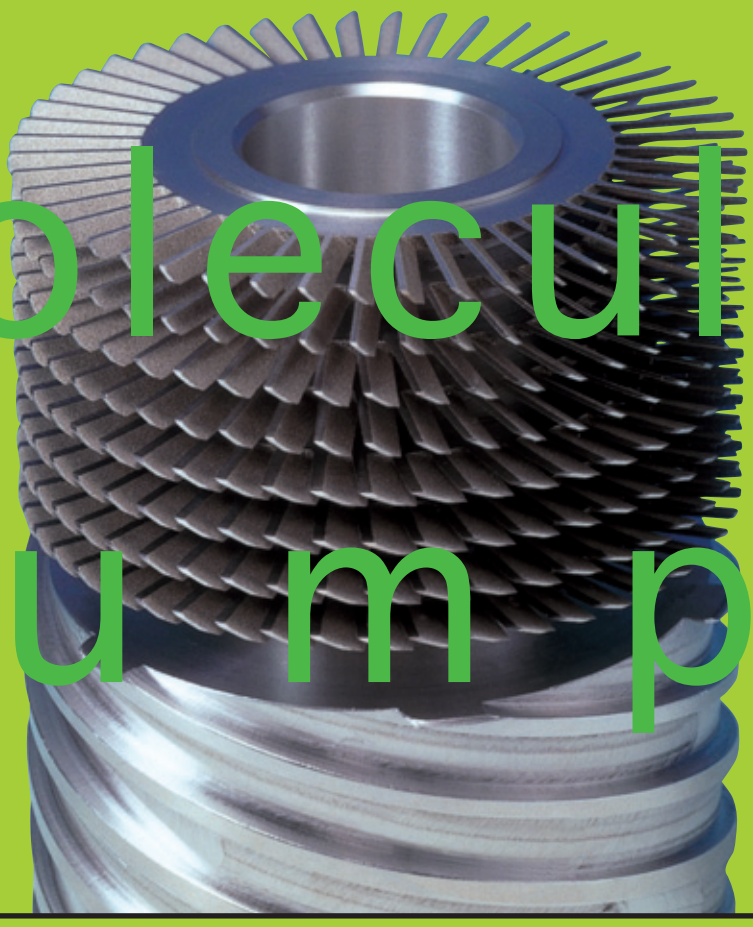
02-TGM-E-10

OSAKA VACUUM

Turbo Molecular Pumps



Magnetically Levitated Compound Molecular Pumps

Osaka Vacuum, Ltd.

Magnetically Levitated Compound Molecular Pumps

Characteristics of Magnetically Levitated Compound Molecular Pumps

- **Wide pressure range pumping**
- **High throughput**
- **Durable structure for air inrush**
- **Rotational speed control**
  Permits proper pump performance for each process
- **Model coupling free**
  Common digital controller compatible in all models.
  ※ Equipped with automatic calibration (automatically adjusting sensor)
- **Maintenance call**
  Gives advance warning for preventive maintenance when a failure is likely to happen.
  ※ Continues operating. If a failure does occur, the pump displays an alert and shuts down.
- **Variety of special specifications**
  You can choose from various special specifications to match your applications.
  e.g. By-product resistant, Ultra-low vibration, Ultra high vacuum, Radiation-hardened

Any orientation Compact size	Maintenance free Oil free pumping	Self-diagnostic function Failure history memory
Energy-saving Vibration free (Featuring UFRC) ※Unbalance Force Rejection Control	Serial communication (RC232C Serial interface) ※You can choose RS485.	Conforms to recognized safety standard NRTL SEMI-S2 CE

TMP service support center

Tel support　Field support　Maintenance　Local stock

Japan

■Nabari Factory TMP Service Group
1300-81 Yabata, Nabari, Mie 518-0605, Japan
Tel：+81-595-64-1162　Fax：+81-595-64-1163

U.S.A.

■Osaka Vacuum U.S.A., Inc.
48000 Fremont Blvd, Fremont, CA 94538 U.S.A.
Tel：+1-510-770-0100　Fax：+1-510-770-0104

■Ebara Technologies Inc.
51 Main Avenue, Sacramento, CA 95838 USA
Tel：+1-916-920-5451　Fax：+1-916-830-1900

Europe

■EBARA Precision Machinery Europe GmbH
2 Cochrane Square Brucefield Industrial Estate Livingston EH54 9DR, UK
Tel：+44(0)1506 460232　Fax：+44(0)1506 460222

China

■Shanghai Osaka Vacuum, Ltd.
South A,T52-4-1F,No.1510,Chuanqiao Rd.,Pudong,Shanghai 201206 P. R. China
Tel：+86-21-5031-1522　Fax：+86-21-5031-1523

Korea

■Seoul office(sales)
Leaders Bldg., 274-4, Seohyun-Dong, Bundang-ku, Seongnam-Si, Gyeonggi-Do 463-824 Korea
Tel：+82-31-707-0002　Fax：+82-31-707-3339

■Shin Won Tech. Co., Ltd.(maintenance)
#12LT 36Bl Namdong Industry Area, Namdong-Ku, Inchon 450-100 Korea
Tel：+82-32-814-6331　Fax：+82-32-814-7301

Taiwan

■Cutes Corporation
2-22 Nan Yuan Road, Chung Li City 32063 Taiwan, R.O.C.
Tel：+886-3-452-6161　Fax：+886-3-451-1347

Osaka Vacuum, Ltd.

Magnetically Levitated Compound Molecular Pumps

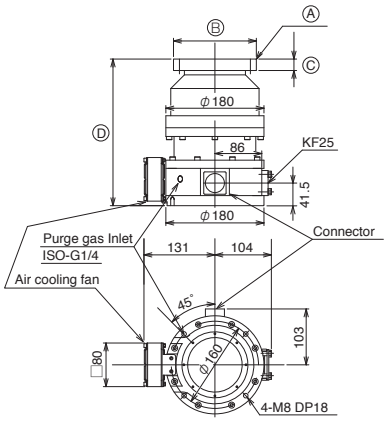
TG390M

■Any orientation ■Compact size ■Energy-saving
■Quick starts and stops ■Maintenance call ■Vibration free ※Featuring UFRC
■Model coupling free ■Automatic calibration
■High throughput ■Rotational speed control
■Serial communication ※RC232C Serial interface（You can choose RS485.）
■Safety standards certification for NRTL SEMI-S2 CE

Drawing of Outside dimension

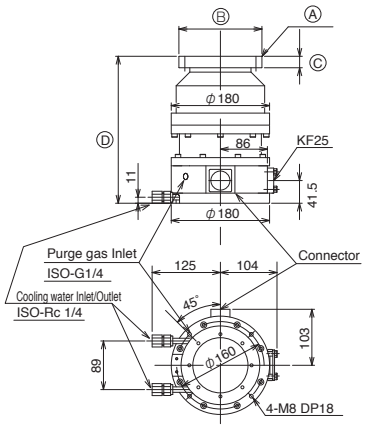
●The inlet flange bolt holes are symmetrical around the center line.

Air cooling



Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG100	φ185	15	263
CF100	φ152	21	269
ISO-B100	φ165	12	260

Water cooling

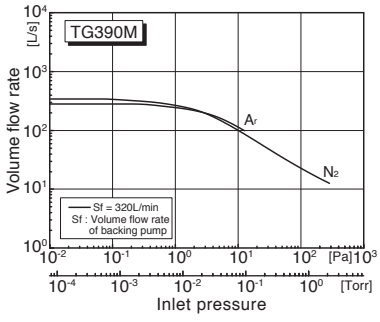


Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG100	φ185	15	263
CF100	φ152	21	269
ISO-B100	φ165	12	260

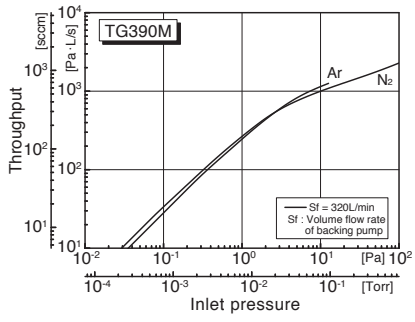
※Dimensions are standard.

Performance curve

Volume flowrate



Gas throughput



Specifications

			VG100	ISO-B100	CF100
Flange	Inlet				
	Outlet		KF25		
Volume flow rate	N_2	L/s	340		
	N_2 (with protective screen)	L/s	320		
	H_2	L/s	290		
Max. compression ratio	N_2		1×10^8		
	H_2		4.5×10^3		
Base pressure	VG・ISO-B / CF	Pa	$<1\times10^{-6}$ / $<1\times10^{-7}$		
		(Torr)	($<7.5\times10^{-9}$ / $<7.5\times10^{-10}$)		
Max. throughput※1	N_2	sccm	2000		
Startup time		min	2-3		
Shutdown time		min	4-5		
Max. backing pressure		Pa(Torr)	400(3)		
Recommended backing vacuum pump		L/min	≧160		
Weight	VG･ISO-B / CF･Corrosive resistant type	kg	14 / 17		
Turbo Controller			TC010MA		

※1：In case of the backing vacuum pump of 320L/min.

●Ambient temperature for use
The ambient temperature range to assure reaching the ultimate pressure is 10～23℃. The permissible ambient temperature is 10～32℃ for air cooling type and 10～40℃ for water cooling type. The maximum temperature for the cooling water which assures the ultimate pressure is 30℃ and the permissible temperature range for cooling water is 10～35℃.

●Corresponding gases
Depending on the gas to be evacuated, some may damage the pump. Please contact us for details on corresponding gases.

Standard set

Pump+Turbo Controller+Output Cable （5 meters）+Fan Connector（only for water-cooling type）

◆Option
Baking heater, Automatic slow leak valve, Purge gas inlet connector, Precision needle valve, Flanges and Fittings

Magnetically Levitated Compound Molecular Pumps

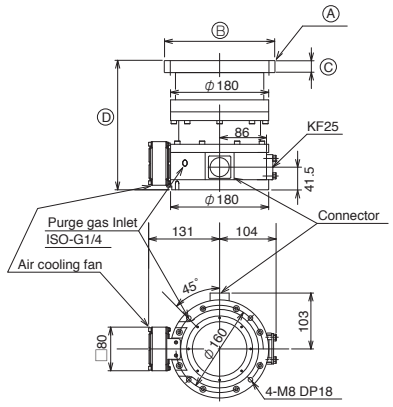
TG420M

■Any orientation ■Compact size ■Energy-saving
■Quick starts and stops ■Maintenance call ■Vibration free ※Featuring UFRC
■Model coupling free ■Automatic calibration
■High throughput ■Rotational speed control
■Serial communication ※RC232C Serial interface（You can choose RS485.）
■Safety standards certification for NRTL SEMI-S2 CE

Drawing of Outside dimension

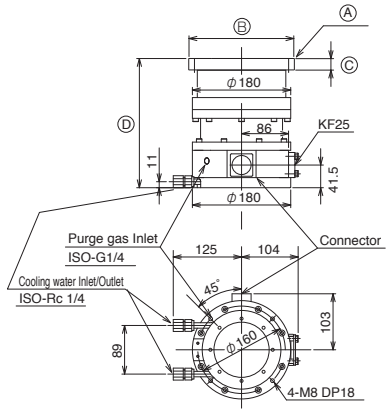
●The inlet flange bolt holes are symmetrical around the center line.

Air cooling



Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG150	φ235	16	225
CF160	φ203	22	230
ISO-B160	φ225	16	230

Water cooling

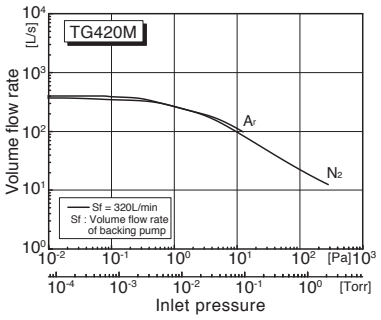


Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG150	φ235	16	225
CF160	φ203	22	230
ISO-B160	φ225	16	230

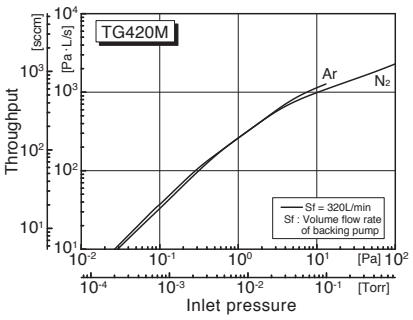
※Dimensions are standard.

Performance curve

Volume flowrate



Gas throughput



Specifications

			VG150	ISO-B160	CF160
Flange	Inlet				
	Outlet		KF25		
Volume flow rate	N_2	L/s	400		
	N_2 (with protective screen)	L/s	370		
	H_2	L/s	300		
Max. compression ratio	N_2		1×10^8		
	H_2		4.5×10^3		
Base pressure	VG・ISO-B / CF	Pa	$<1\times10^{-6}$ / $<1\times10^{-7}$		
		(Torr)	($<7.5\times10^{-9}$ / $<7.5\times10^{-10}$)		
Max. throughput※1	N_2	sccm	2000		
Startup time		min	2-3		
Shutdown time		min	4-5		
Max. backing pressure		Pa(Torr)	400(3)		
Recommended backing vacuum pump		L/min	≧160		
Weight	VG･ISO-B / CF･Corrosive resistant type	kg	14 / 17		
Turbo Controller			TC010MA		

※1：In case of the backing vacuum pump of 320L/min.

●Ambient temperature for use
The ambient temperature range to assure reaching the ultimate pressure is 10～23℃. The permissible ambient temperature is 10～32℃ for air cooling type and 10～40℃ for water cooling type. The maximum temperature for the cooling water which assures the ultimate pressure is 30℃ and the permissible temperature range for cooling water is 10～35℃.

●Corresponding gases
Depending on the gas to be evacuated, some may damage the pump. Please contact us for details on corresponding gases.

Standard set

Pump+Turbo Controller+Output Cable （5 meters）+Fan Connector（only for water-cooling type）

◆Option
Baking heater, Automatic slow leak valve, Purge gas inlet connector, Precision needle valve, Flanges and Fittings

Osaka Vacuum, Ltd.

Magnetically Levitated Compound Molecular Pumps

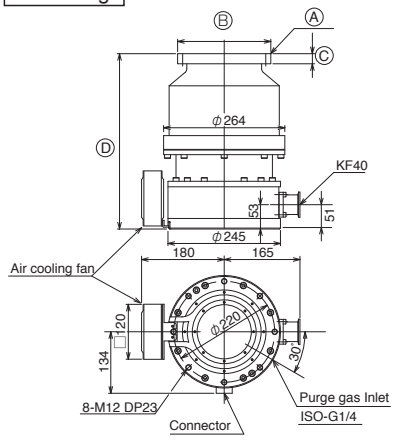
TG900M

- ■Any orientation ■Compact size ■Energy-saving
- ■Quick starts and stops ■Maintenance call ■Vibration free ※Featuring UFRC
- ■Model coupling free ■Automatic calibration
- ■High throughput ■Rotational speed control
- ■Serial communication ※RC232C Serial interface（You can choose RS485.）
- ■Safety standards certification for NRTL SEMI-S2 CE

Drawing of Outside dimension

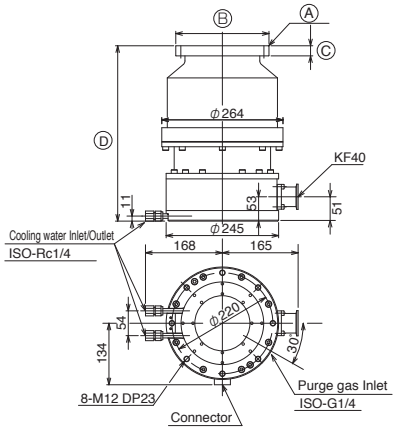
●The inlet flange bolt holes are symmetrical around the center line.

Air cooling



Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG150	ϕ235	16	376
CF160	ϕ203	22	382
ISO-B160	ϕ225	16	390

Water cooling

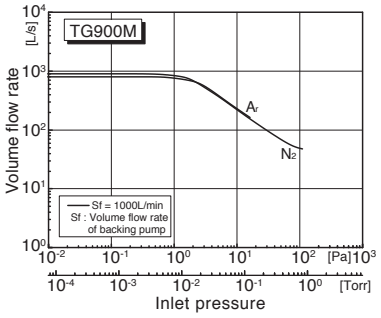


Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG150	ϕ235	16	376
CF160	ϕ203	22	382
ISO-B160	ϕ225	16	390

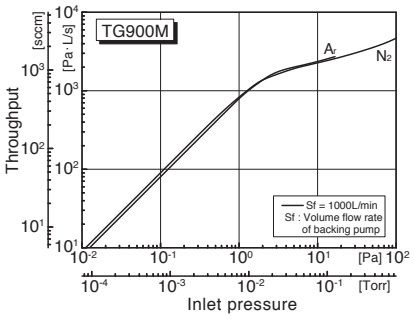
※Dimensions are standard.

Performance curve

Volume flowrate



Gas throughput



Specifications

Flange	Inlet			VG150	ISO-B160 / CF160
	Outlet			KF40	
Volume flow rate	N_2		L/s	900	
	N_2 (with protective screen)		L/s	860	
	H_2		L/s	1050	
Max. compression ratio	N_2			1×10^8	
	H_2			1.5×10^4	
Base pressure	VG・ISO-B / CF		Pa	$<1\times10^{-6}$ / $<1\times10^{-7}$	
			(Torr)	($<7.5\times10^{-9}$ / $<7.5\times10^{-10}$)	
Max. throughput※1	N_2		sccm	3000	
Startup time			min	4-5	
Shutdown time			min	4-5	
Max. backing pressure			Pa(Torr)	500(3.8)	
Recommended backing vacuum pump			L/min	≧250	
Weight	VG･ISO-B / CF･Corrosive resistant type		kg	34 / 42	
Turbo Controller				TC010MA	

※1：In case of the backing vacuum pump of 1000L/min.

●Ambient temperature for use
The ambient temperature range to assure reaching the ultimate pressure is 10～23℃. The permissible ambient temperature is 10～32℃ for air cooling type and 10～40℃ for water cooling type. The maximum temperature for the cooling water which assures the ultimate pressure is 30℃ and the permissible temperature range for cooling water is 10～35℃.

●Corresponding gases
Depending on the gas to be evacuated, some may damage the pump. Please contact us for details on corresponding gases.

Standard set

Pump+Turbo Controller+Output Cable（5 meters）+Fan Connector(only for water-cooling type)

◆Option

Baking heater, Automatic slow leak valve, Purge gas inlet connector, Precision needle valve, Flanges and Fittings

Magnetically Levitated Compound Molecular Pumps

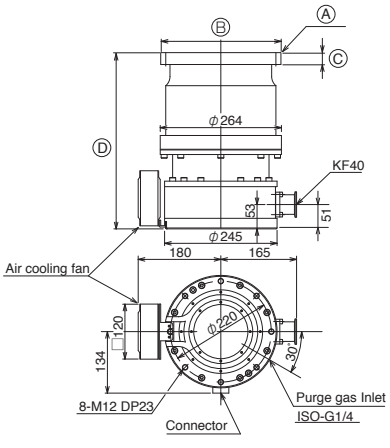
TG1300M

■Any orientation ■Compact size ■Energy-saving
■Quick starts and stops ■Maintenance call ■Vibration free ※Featuring UFRC
■Model coupling free ■Automatic calibration
■High throughput ■Rotational speed control
■Serial communication ※RC232C Serial interface（You can choose RS485.）
■Safety standards certification for NRTL SEMI-S2 CE

Drawing of Outside dimension

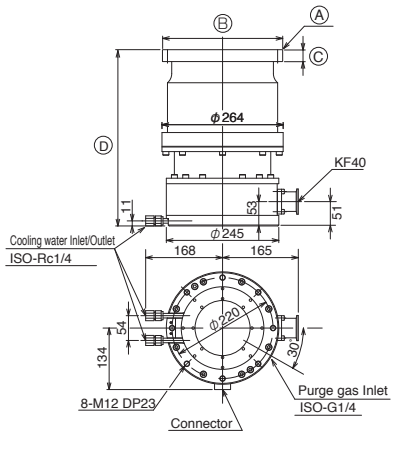
●The inlet flange bolt holes are symmetrical around the center line.

Air cooling



Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG200	φ300	16	324
CF200	φ253	25	385
ISO-B200	φ285	16	359

Water cooling

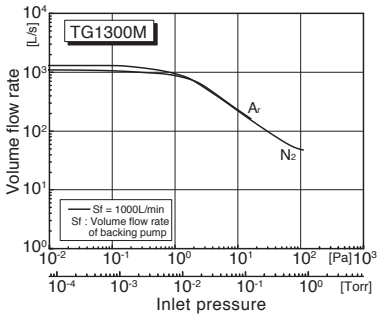


Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG200	φ300	16	324
CF200	φ253	25	385
ISO-B200	φ285	16	359

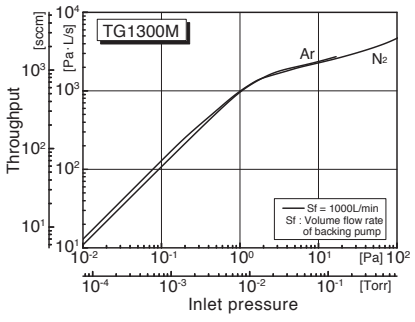
※Dimensions are standard.

Performance curve

Volume flowrate



Gas throughput



Specifications

Flange	Inlet			VG200 / ISO-B200 / CF200	
	Outlet			KF40	
Volume flow rate	N_2		L/s	1300	
	N_2 (with protective screen)		L/s	1230	
	H_2		L/s	1200	
Max. compression ratio	N_2			1×10^8	
	H_2			1.5×10^4	
Base pressure	VG・ISO-B / CF		Pa	$<1\times10^{-6}$ / $<1\times10^{-7}$	
			(Torr)	($<7.5\times10^{-9}$ / $<7.5\times10^{-10}$)	
Max. throughput※1	N_2		sccm	3000	
Startup time			min	4-5	
Shutdown time			min	4-5	
Max. backing pressure			Pa(Torr)	500(3.8)	
Recommended backing vacuum pump			L/min	≧250	
Weight	VG･ISO-B / CF･Corrosive resistant type		kg	34 / 42	
Turbo Controller				TC010MA	

※1：In case of the backing vacuum pump of 1000L/min.

●Ambient temperature for use
The ambient temperature range to assure reaching the ultimate pressure is 10～23℃. The permissible ambient temperature is 10～32℃ for air cooling type and 10～40℃ for water cooling type. The maximum temperature for the cooling water which assures the ultimate pressure is 30℃ and the permissible temperature range for cooling water is 10～35℃.

●Corresponding gases
Depending on the gas to be evacuated, some may damage the pump. Please contact us for details on corresponding gases.

Standard set

Pump+Turbo Controller+Output Cable （5 meters）+Fan Connector（only for water-cooling type）

◆Option
Baking heater, Automatic slow leak valve, Purge gas inlet connector, Precision needle valve, Flanges and Fittings

Osaka Vacuum, Ltd.

Magnetically Levitated Compound Molecular Pumps

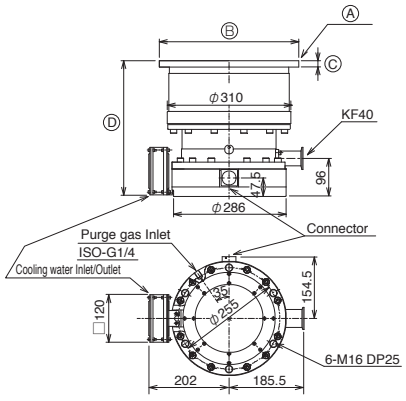
TG2400M

- ■Any orientation ■Compact size ■Energy-saving
- ■Quick starts and stops ■Maintenance call ■Vibration free ※Featuring UFRC
- ■Model coupling free ■Automatic calibration
- ■High throughput ■Rotational speed control
- ■Serial communication ※RC232C Serial interface（You can choose RS485.）
- ■Safety standards certification for NRTL SEMI-S2 CE

Drawing of Outside dimension

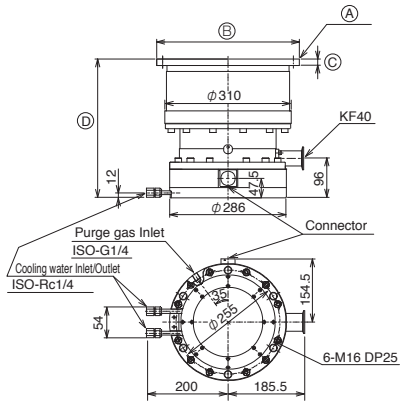
●The inlet flange bolt holes are symmetrical around the center line.

Air cooling



Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG250	ϕ350	16	340
ISO-B250	ϕ335	16	340

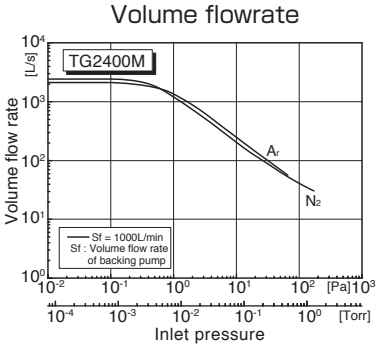
Water cooling

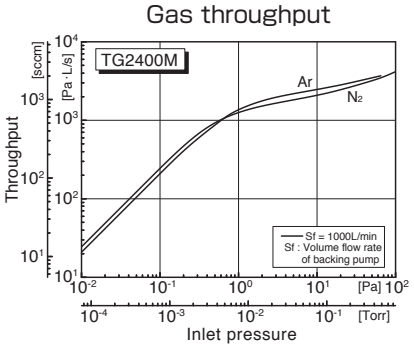


Ⓐ	Ⓑ	Ⓒ	Ⓓ
VG250	ϕ350	16	340
ISO-B250	ϕ335	16	340

※Dimensions are standard.

Performance curve





Specifications

Flange	Inlet		VG250	ISO-B250
	Outlet		KF40	
Volume flow rate	N_2	L/s	2400	
	N_2 (with protective screen)	L/s	2300	
	H_2	L/s	1100	
Max. compression ratio	N_2		1×10^8	
	H_2 Standard type / Corrosive resistant type		1.4×10^3 / 8.3×10^2	
Base pressure	VG・ISO-B	Pa	$<1\times10^{-6}$	
		(Torr)	$<7.5\times10^{-9}$	
Max. throughput※1	N_2	sccm	3000	
Startup time		min	4-5	
Shutdown time		min	4-5	
Max. backing pressure	Standard type / Corrosive resistant type	Pa(Torr)	200/150(1.5/1.1)	
Recommended backing vacuum pump		L/min	≧500	
Weight	Standard type / Corrosive resistant type	kg	45/54	
Turbo Controller			TC010MA	

※1：In case of the backing vacuum pump of 1000L/min.

●Ambient temperature for use
The ambient temperature range to assure reaching the ultimate pressure is 10～23℃. The permissible ambient temperature is 10～32℃ for air cooling type and 10～40℃ for water cooling type. The maximum temperature for the cooling water which assures the ultimate pressure is 30℃ and the permissible temperature range for cooling water is 10～35℃.

●Corresponding gases
Depending on the gas to be evacuated, some may damage the pump. Please contact us for details on corresponding gases.

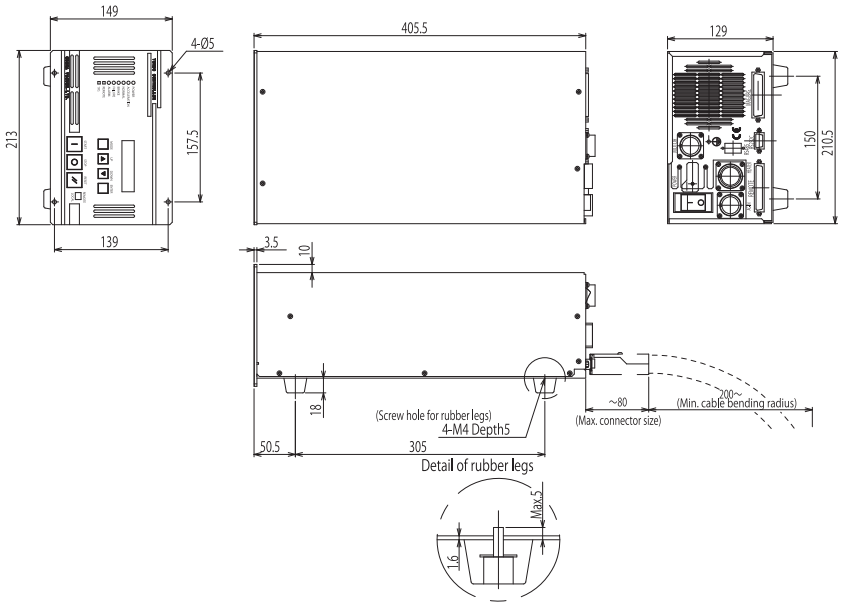
Standard set

Pump+Turbo Controller+Output Cable （5 meters）+Fan Connector（only for water-cooling type）

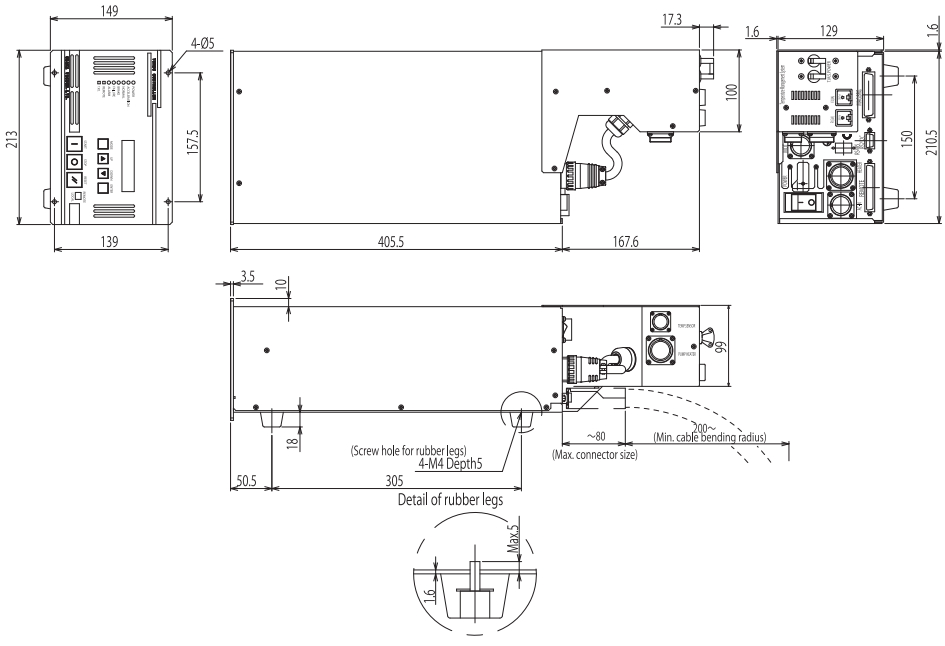
◆Option
Baking heater, Automatic slow leak valve, Purge gas inlet connector, Precision needle valve, Flanges and Fittings

Turbo Controller

TC010MA（Panel cut：132H×213.5W）



TC010MAT（Panel cut：132H×213.5W）
※build in T.M.S.



Power supply model	TC010MA (TC010MAT)		
Application pump	TG390M/420M	TG900M/1300M	TG2400M
Input Voltage （ACV）	200-240±10%		
Input Frequency（Hz）	50/60		
Input Phases	Single		
Input Powe※1 （VA）	700 (1000)	1200 (1600)	1200 (1700)
Rated Output Frequency（Hz）	680	560	520
Weight※1 （kg）	11 (12)		
Standard accessories	Input cable（5meters）: 1 / Remote connector: 1 / Instruction manual: 1 copy / Serial communication instruction manual: 1 copy		
Serial interface	RS232C（You can choose RS485.）		

※1：The figure in ( ) is the case of TC010MAT.　The controler for TG-MI series is TC010MAT
TC010MA･･･standerd,TG-MUseries,TG-MRseries,TG-MLseries　TC010MAT･･･ TG-MIseries

Radiation-hardened Magnetically Levitated Turbo Molecular Pump series

TG-MR

The TG-MR series was developed for use under a radiation environment.
They are hardened of endurance against radioactive rays.

Application:
■Accelerator, Research of nuclear fusion and other equipment .

Durability test
The gamma ray irradiation test with a cumulative absorbed dose of 50 MGy has been already conducted.

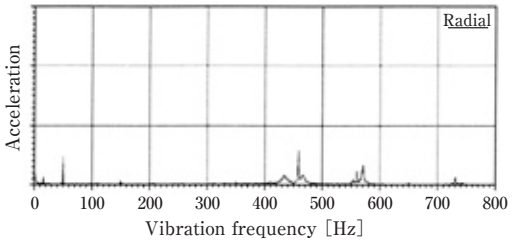
Ultra low vibration type Magnetically Levitated Turbo Molecular Pumps Series

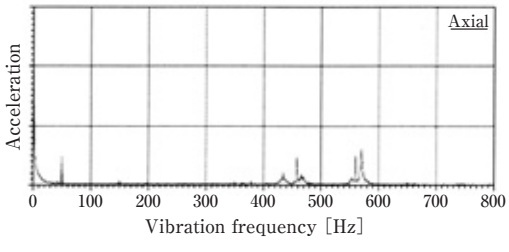
TG-ML

(340L/s - 1300L/s 4 Models)

The TG-ML series with its exceptional ultra low vibration was developed specifically to meet today's cutting edge challenge in EUV Lithography, Micro-machining(MEMS), CD linewidth measurement. SEM/TEM Electron Microscopy, XPS and the emerging Nano-tech analytical tools. Osaka's TG-ML Magnetically Suspended Turbo Molecular pump series, with a multiple order of magnitude in reduction of vibration, is the preferred solution and a key to the next generation tool design.

Applications:
■Next-generation semiconductor production equipment.
■Ultra High Resolution Electron Microscopy, Analytical Instruments, R &Ds
■E-Beam Lithography, EUV, XPS, CD linewidth tool, SEM/TEM





- Less than 1nm(o-p) measured by Radial & Axial acceleration!
- With external damprers, Less than 0.1nm(o-p) measured!

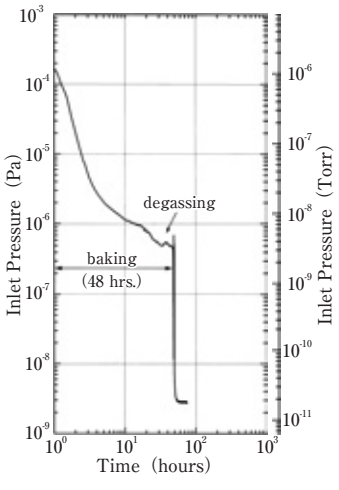
Ultra High Vacuum(UHV) Magnetically Levitated Turbo Molecular Pump series

TG-MU

(900 L/s - 1300 L/s 2 models)

The TG-MU series is designed to efficiently evacuate light gasses from High Vacuum up to Ultra High Vacuum region by reducing the materials' outgassing and improving the efficiency of the Hydrogen compression: 60000.
Base vacuum can be realized 10^{-9}Pa order (in the 10^{-11} torr) region within a short bake-out period.

Application :
■Analytical instruments, surface Analysis & UHV R&Ds
■UHV Semiconductor thin film process & MEMS R&Ds
■Energy Research , Accelerators , Nuclear fusion.., etc.



TG1300MU pumpdown curve

CASING	:SUS
FLANGE	:CF200
C.W.FLOW RATE	:1.5 L/min
C.W.TEMP	:20 degC
TEST DOME	:SUS
BACKING PUMP	:Roots Pump + Oil Sealed Rotary Pump
GAUGE	:EXTRACTOR GAUGE IE514

Specification (reference)

			TG900MR	TG1300MR
Flange	Inlet		Please contact us for details	
	Outlet			
Volume flow rate	N_2	L/s	900	1300
	N_2 (with protective screen)	L/s	860	1230
	H_2	L/s	1050	1200
Max. compression ratio	N_2		1×10^{8}	
	H_2		1.5×10^{4}	
Base pressure		Pa(Torr)	$<1\times10^{-6}$ ($<7.5\times10^{-9}$)	
Max. throughput※1	N_2	sccm	3000	
Startup time		min	4-5	
Shutdown time		min	4-5	
Max. backing pressure		Pa(Torr)	500(3.8)	
Recommended backing vacuum pump		L/min	≧250	
Weight		kg	34	
Turbo Controller			TC010MA	

※1：In case of the backing vacuum pump of 1000L/min.

Specifications

			TG390ML			TG420ML			TG900ML			TG1300ML		
Flange	Inlet		VG100	ISO-B100	CF100	VG150	ISO-B160	CF160	VG150	ISO-B160	CF160	VG200	ISO-B200	CF200
	Outlet		KF25						KF40					
Volume flow rate	N_2	L/s	340			400			900			1300		
	N_2 (with protective screen)	L/s	320			370			860			1230		
	H_2	L/s	290			300			1050			1200		
Max. compression ratio	N_2		1×10^{8}											
	H_2		4.5×10^{3}						1.5×10^{4}					
Base pressure	VG・ISO-B / CF	Pa(Torr)	$<1\times10^{-6}$ / $<1\times10^{-7}$ ($<7.5\times10^{-9}$ / $<7.5\times10^{-10}$)											
Max. throughput※1	N_2	sccm	2000						3000					
Startup time		min	2-3						4-5					
Shutdown time		min	4-5											
Max. backing pressure		Pa(Torr)	400(3)						500(3.8)					
Recommended backing vacuum pump		L/min	≧160						≧250					
Weight	VG・ISO-B / CF	kg	14/17						34/42					
Turbo Controller			TC010MA ※Please contact us about the specifications											

※1：In case of the backing pump of 320L/min(TG390/420MI), 1000L/min(TG900/1300MI)
※2：Dimension is same as a standard.Please refer to the pages of standards(P3～7).

Specifications

			TG900MU	TG1300MU
Flange	Inlet		CF160	CF200
	Outlet		KF40	
Volume flow rate	N_2	L/s	900	1300
	N_2 (with protective screen)	L/s	860	1230
	H_2	L/s	1050	1200
Max. compression ratio	N_2		1×10^{8}	
	H_2		6.0×10^{4}	
Base pressure		Pa(Torr)	$<1\times10^{-8}$ ($<7.5\times10^{-11}$)	
Max. throughput※1	N_2	sccm	3000	
Startup time		min	4-5	
Shutdown time		min	4-5	
Max. backing pressure		Pa(Torr)	500(3.8)	
Recommended backing vacuum pump		L/min	≧250	
Weight		kg	42	
Turbo Controller			TC010MA	

※1：In case of the backing vacuum pump of 1000L/min.
※2：Dimension is same as standard.Please refer to the pages of standards(P5～6).

Osaka Vacuum, Ltd.

Energy Efficient Heated Magnetically Levitated Turbo Molecular Pump series

TG-MI

(340 L/s - 2400 L/s　5 models)

The TG-MI series is designed to reduce the condensation rate of build-up inside Turbo molecular pump (TMP). Osaka's patented thermal insulation structure with Temperature management system (TMS) made effective.

Application：

■Semiconductor processes, LCD/TFT/MEMS manufacturing tools.
■Etching equipment in which by-products are generated.

The Solution for Built-up inside of TMP

Becase of the heat insulate structure and the heat which generated by the high-speed rotation of TMP's rotor in addition to built-in TMS, the inside of the TMP is heated up to 90℃ efficiently.

This structure gives you 3 benefits

1. Effectively reduce the built-up inside of TMP
2. Save energy for heating TMP
3. Reduce the heat damage for main parts like the rotor

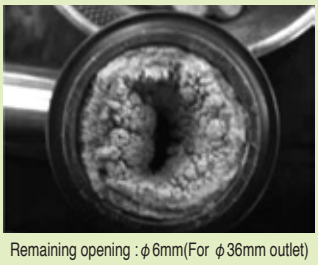
Case study for Dry etching process

Standard type

SGP stator B

Thickness of Built-up:More than 0.6mm

Outlet



Remaining opening : φ6mm(For φ36mm outlet)

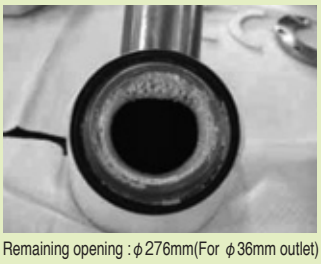
Huge built-up was deposited inside and outlet of TMP. This built-up caused some troubles on TMP.

TG-MI series

SGP stator B

Thickness of Built-up:0.2-0.3mm

Outlet



Remaining opening : φ276mm(For φ36mm outlet)

TG-MI's structure reduced built-up inside of TMP significantly. This is helpful for stable operation of your manufacturing line.

Specifications

			TG390MI		TG420MI		TG900MI		TG1300MI		TG2400MI	
Flange	Inlet		VG100	ISO-B100	VG150	ISO-B160	VG150	ISO-B160	VG200	ISO-B200	VG250	ISO-B250
	Outlet		KF25				KF40					
Volume flow rate	N_2	L/s	340		400		900		1300		2400	
	N_2 (with protective screen)	L/s	320		370		860		1230		2300	
	H_2	L/s	290		300		1050		1200		1100	
Max. compression ratio	N_2		1×10^8									
	H_2		4.5×10^3				1.5×10^4				8.3×10^2	
Base pressure		Pa(Torr)	$<1\times10^{-6}$ ($<7.5\times10^{-9}$)									
Max. throughput※1	N_2	sccm	2000				3000					
Startup time		min	2-3				4-5					
Shutdown time		min	4-5									
Max. backing pressure		Pa(Torr)	350(2.6)				500(3.8)				150(1.1)	
Recommended backing vacuum pump		L/min	≧160				≧250				≧500	
Weight		kg	18				42				56	
Turbo Controller			TC010MAT									

※1：In case of the backing pump of 320L/min(TG390/420MI), 1000L/min(TG900/1300/2400MI)
※2：The dimension is same as a standard specification.Please refer to the pages of standards(P3～7).

Introduction of the TMP pumping system

ST Series

◆ Line-up of basic sets (three models) in which a turbo molecular pump with a pumping speed of 50 to 350 L/s※1 is mounted.

ST-Compact

◆ Most compact type among the ST Series!
Further space saving is achieved with its desktop size!

※1：Grease lubrication TMP, TG-F Series

▶ ST Series

- The TMP pumping system where a number of pieces of equipment※2 necessary for high vacuum are compactly arranged. It can pump up to high vacuum with a simple operation!

※2：Turbo molecular pump, backing pump, vacuum piping, automatic slow leak valve, control unit
(Optional devices and apparatuses are available to match your needs.)

- Since it has casters, it can be easily moved.
- Mounted with a turbo molecular pump from the TG-F series which is resistant to disturbance!
(The pump can be moved while it is operating.)

▶ ST-Compact

STC70FR005

STC70FR013

TG70F Pumping System

- More compact ST series has come out!
- Mounted with high compression turbo molecular pump TG70F!
- One of two kinds of backing pump (diaphragm pump) can be selected to match for exhausting chamber!
- Space saving design of A4 laptop size!
- Most suitable for use as easy operating and portable pumping units for R&D!

Products Line-up

TG	420	M	※	B	A	B
❶	❷	❸	❹	❺	❻	❼

❶	Model	TG	: Compound Molecular Pumps
		TGkine	
❷	Size	Near Volume flow rate (N_2)	
❸	Bearing system	(Not written)	: Ball bearing (oil lubrication)
		F	: Ball bearing (grease lubrication)
		M	: Magnetically levitated
❹	Special Structure	(Not written)	: Standard type
			: Corrosive resistant type
		I	: Reaction by-product prevention
		L	: Ultra low vibration type
		R	: Radiation hardened type
		U	: Ultra high vacuum type
❺	Inlet Flange※1	C	: CF
		B	: ISO-B
		R	: ISO-R
		V	: VG
❻	Cooling system	A	: Air cooling
		N	: Natural air cooling
		W	: Water cooling
❼	Specification type	B※2	: Standard type
		C	: Corrosive resistant type

※1 Standard Flange
CF : JVIS 003 Bakeable Flanges : Dimensions-Knife-edge sealed type
ISO-B : ISO1609:1986 Vacuum technology - Flange dimensions (Bolted type)
ISO-R : ISO1609:1986 Vacuum technology - Flange dimensions (Clamped or rotatable type)
VG : JISB2290 :1998 Vacuum technology-Flange :dimensions (Vacuum flange with O-ring groove)
KF : ISO2861/1:1974 Vacuum technology - Quick-release couplings - Dimensions - Part 1 (Clamped type)
※2 Some models are not written

Cable for controller/TC010MA
(TG390M/420M/900M/1300M/2400M)

Cable model (Standard length : ※1 5m)	length	model
Output cable※2	3m	M3/TC010M/SS/C
	5m	M5/TC010M/SS/C
	7m	M7/TC010M/SS/C
	10m	M10/TC010M/SS/C
	15m	M15/TC010M/SS/C
	20m	M20/TC010M/SS/C
	25m	M25/TC010M/SS/C
	30m	※3

※1 Please contact us with the exception of standard length.
※2 Both of the controller side and the pump side are bifurcated, and the magnet bearing cable, motor cable and fan cable are integrated into one.
A optional cable is necessary for TG-MI. Please contact our staff for details.
※3 Non-standard item.

Type	Model	
	Standard	Corrosive resistant
TG390M	TG390MCAB	TG390MCAC
	TG390MBAB	TG390MBAC
	TG390MVAB	TG390MVAC
	TG390MCWB	TG390MCWC
	TG390MBWB	TG390MBWC
	TG390MVWB	TG390MVWC
TG390ML	TG390MLCAB	TG390MLCAC
	TG390MLBAB	TG390MLBAC
	TG390MLVAB	TG390MLVAC
	TG390MLCWB	TG390MLCWC
	TG390MLBWB	TG390MLBWC
	TG390MLVWB	TG390MLVWC
TG390MI		TG390MIBWC
		TG390MIVWC
TG420M	TG420MCAB	TG420MCAC
	TG420MBAB	TG420MBAC
	TG420MVAB	TG420MVAC
	TG420MCWB	TG420MCWC
	TG420MBWB	TG420MBWC
	TG420MVWB	TG420MVWC
TG420ML	TG420MLCAB	TG420MLCAC
	TG420MLBAB	TG420MLBAC
	TG420MLVAB	TG420MLVAC
	TG420MLCWB	TG420MLCWC
	TG420MLBWB	TG420MLBWC
	TG420MLVWB	TG420MLVWC
TG420MI		TG420MIBWC
		TG420MIVWC
TG900M	TG900MCAB	TG900MCAC
	TG900MBAB	TG900MBAC
	TG900MVAB	TG900MVAC
	TG900MCWB	TG900MCWC
	TG900MBWB	TG900MBWC
	TG900MVWB	TG900MVWC
TG900ML	TG900MLCAB	TG900MLCAC
	TG900MLBAB	TG900MLBAC
	TG900MLVAB	TG900MLVAC
	TG900MLCWB	TG900MLCWC
	TG900MLBWB	TG900MLBWC
	TG900MLVWB	TG900MLVWC
TG900MU	TG900MUCAB	
	TG900MUCWB	
TG900MI	TG900MIBWB	TG900MIBWC
	TG900MIVWB	TG900MIVWC
TG1300M	TG1300MCAB	TG1300MCAC
	TG1300MBAB	TG1300MBAC
	TG1300MVAB	TG1300MVAC
	TG1300MCWB	TG1300MCWC
	TG1300MBWB	TG1300MBWC
	TG1300MVWB	TG1300MVWC
TG1300ML	TG1300MLCAB	TG1300MLCAC
	TG1300MLBAB	TG1300MLBAC
	TG1300MLVAB	TG1300MLVAC
	TG1300MLCWB	TG1300MLCWC
	TG1300MLBWB	TG1300MLBWC
	TG1300MLVWB	TG1300MLVWC
TG1300MU	TG1300MUCAB	
	TG1300MUCWB	
TG1300MI	TG1300MIBWB	TG1300MIBWC
	TG1300MIVWB	TG1300MIVWC
TG2400M	TG2400MBAB	TG2400MBAC
	TG2400MVAB	TG2400MVAC
	TG2400MBWB	TG2400MBWC
	TG2400MVWB	TG2400MVWC
TG2400MI		TG2400MIBWC
		TG2400MIVWC

※Please contact us for models other than the above.

Series of Turbo Molecular Pumps

Compound Molecular Pumps (TG-F series)

◎ Grease-lubricated types with pumping speeds of 50～2400L/s.

◎ Any orientation and easy operation.

◎ Long life.

◎ Durable, compact, light-weight design.

◎ Models impervious to air inrush, quick shut down on venting are available.

Compound Molecular Pumps (TG series)

◎ Corrosive Resistant Type in 200～1300L/s.

◎ Standard Type & Corrosive Resistant Type in 1800～5500L/s.

Magnetically Levitated Compound Molecular Pumps with Integrated Control Unit (TG kine series)

◎ Standard Type & Corrosive Resistant Type in 2200L/s, 3300L/s, 4200L/s.

◎ Integrated controller/power supply, very compact footprint.

◎ Wide pressure range applications, capable of pumping at high throughput.

◎ High compression ratio, low Base pressure.

◎ Variable rotational speed control(110rps-450rps).

Safety To ensure proper usage of the products described in this catalogue, please make sure to read the instruction manual thoroughly prior to use.

Notice: Freight that is regulated by the Foreign Exchange and Foreign Trade Law may require official permission before shipment in accordance with the law.

URL http://www.osakavacuum.co.jp
e-mail info@osakavacuum.co.jp

Osaka Vacuum, Ltd.

■ Osaka Head office 3-3-13 Imabashi, Chuo-ku, Osaka 541-0042, Japan
Tel +81-6-6203-3981 Fax +81-6-6222-3645

■ Seoul office Leaders Bldg., 274-4, Seohyun-Dong, Bundang-ku, Seongnam-Si, Gyeonggi-Do 463-824, Korea
Tel +82-31-707-0002 Fax +82-31-707-3339

■ Tokyo Main office ■ Nabari factory
■ Nagoya office ■ Sakai factory
■ Shanghai office

Osaka Vacuum U.S.A., Inc. 48000 Fremont Blvd, Fremont, CA 94538, U.S.A.
Tel +1-510-770-0100 Fax +1-510-770-0104

Shanghai Osaka Vacuum, Ltd.

ISO9001 JQA-QMA1902 NABARI FACTORY

ISO14001 JQA-EMA5143

JAB CM009

Products of Osaka Vacuum

Turbo Molecular Pumps, Compound Molecular Pumps,
Magnetically Suspended Turbo Molecular Pumps,
Magnetically Suspended Compound Molecular Pumps,
Helical Grooved Vacuum pumps,
Turbo Molecular Pumping Units, Dry running Vacuum Pumps,
Oil-sealed Rotary Vacuum Pumps, Roots Vacuum Pumps,
Liquid-ring Vacuum Pumps, Ejectors,
Plasma Application Vacuum systems, Other Vacuum systems,
Vacuum Pumping Systems, Vacuum Parts, Vacuum Valves

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