ULVAC

Vacuum Components Portfolio

Components Business HQ ULVAC, Inc.
ULVAC CRYOGENICS, Inc.

Vol.11

■Pressure unit conversion table

Pa (N·m^{-2})	Torr (mmHg)	Bar	kg·cm^{-2}	Psi (lb·in^{-2})	atm	Water Column (15℃) m
1	7.500 62x10^{-3}	10^{-5}	1.019 72x10^{-5}	1.450 38x10^{-4}	9.869 23x10^{-6}	1.020 63x10^{-4}
133.322	1	1.333 22x10^{-3}	1.359 51x10^{-3}	1.933 68x10^{-2}	1.315 79x10^{-3}	1.360 73x10^{-2}
10^{5}	750.062	1	1.019 72	14.503 8	0.986 923	10.206 3
9.806 65x10^{4}	735.559	0.980 665	1	14.223 4	0.967 841	10.009 0
6.894 75x10^{3}	51.714 9	6.894 75x10^{-2}	7.030 69x10^{-2}	1	6.804 59x10^{-2}	0.703 702
1.013 25x10^{5}	760	1.013 25	1.033 23	14.696 0	1	10.341 6
9.797 82x10^{3}	73.489 7	9.797 82x10^{-2}	9.991 0x10^{-2}	1.421 06	9.669 70x10^{-2}	1

1 lb·in^{-2} = 144 lb·ft^{-2}, 1 short ton·ft^{-2} = 0.945 08 atm, psi: pound per square inch

■Flow rate unit conversion table

Pa·m^3·s^{-1}	Torr·L·s^{-1}	atm·cm^3·s^{-1}	mbar·L·s^{-1}	molecule·s^{-1}	sccm
1	7.500 62	9.869 23	10	2.651 65x10^{20}	5.921 540x10^{2}
0.133 322	1	1.315 79	1.333 22	3.535 23x10^{19}	78.947 4
0.101 325	0.76	1	1.013 25	2.686 78x10^{19}	60
0.1	0.750 062	0.986 923	1	2.651 65x10^{21}	59.215 40
3.771 24x10^{-21}	2.828 67x10^{-20}	3.721 92x10^{-20}	3.771 24x10^{-20}	1	2.233 15x10^{-18}
1.688 75x10^{-3}	1.266 67x10^{-2}	1.666 67x10^{-2}	1.688 75x10^{-2}	4.477 97x10^{17}	1

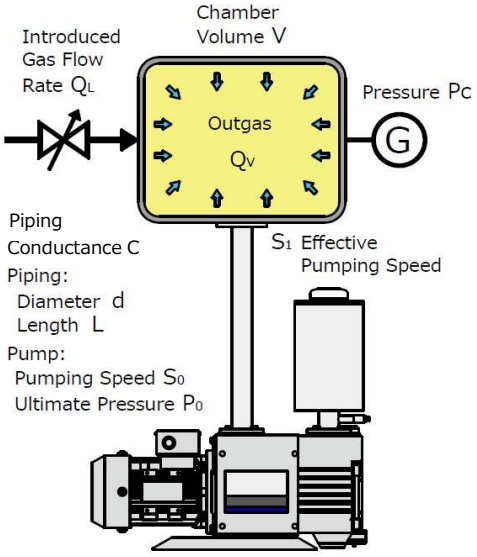
molecule is ideal gas (value of 0℃), sccm: standard cubic centimeter per minute

■Pumping speed and conductance unit conversion table

m^3·s^{-1}	L·s^{-1}	L·min^{-1}	cm^3·s^{-1}	m^3·hr^{-1}	ft^3·s^{-1}
1	10^{3}	6x10^{4}	10^{6}	3600	35.31
10^{-3}	1	60	10^{3}	3.6	3.531x10^{-2}
1.667x10^{-5}	1.667x10^{-2}	1	16.67	0.06	5.885x10^{-4}
10^{-6}	10^{-3}	0.06	1	3.6x10^{-3}	3.531x10^{-5}
2.778x10^{-4}	0.277 8	16.67	2.778x10^{2}	1	9.808x10^{-3}
2.832x10^{-2}	28.32	1.699x10^{3}	2.832x10^{4}	1.019 52x10^{2}	1

■Pumping speed calculation (viscous flow range)

Followings show how to calculate pumping speed in the range of viscous flow when using oil rotation vacuum pumps, dry vacuum pumps, mechanical booster pumps, etc. (Actual result could change from the calculated value depending on vacuum chamber, piping shape, contents in side chamber, leak rate, outgas, etc.)



(1) Pressure inside vacuum chamber "Pc" being maintained constant while introducing certain amount of gas "Q_L" is calculated by formula "A" below.

(2) Time "Δt" when pumping down a vacuum chamber with volume "V" from pressure "P1" to "P2" " is calculated by formula "B" below. To get more precise result, totalize all result after calculation by dividing pressure range in scope in narrow scope.

To get conductance "C" of pipe.
$C = 1349 \times d^4/L \times P_{AV}$

↓

To get effective pumping speed "S_1".
$S_1 = 1/(1/S_0+1/C)$

A ↓ B

To get pressure "Pc" of vacuum chamber.
$Pc = (Q_L+Q_V) / S_1+P_0$

To get pumping time "Δt".
$\Delta t = 2.3 \times V/S_1 \times \mathrm{Log}_{10}(P_1/P_2)$

V: Vacuum chamber volume (m^3)
L: Piping length (m)
d: Piping diameter (m)
Q_L: Introduced gas volume (Pa·m^3/sec)
Q_V: Outgas inside vacuum chamber (Pa·m3/sec)

S_0: Pumping speed (m^3/sec)
S_1: Effective pumping speed (m^3/sec)
P_{AV}: Average pressure inside piping (Pa)
P_0: Ultimate pressure of vacuum pump itself (Pa)
P_1 (Pa) > P_2 (Pa).

Pc: Pressure inside vacuum chamber (Pa)
C : Piping conductance (m^3/sec)
Δt : Pumping time (sec)

Contents

P.8 Vacuum Pump

P.45 Vacuum Valve

P.46 Vacuum Gauge

P.52 Process Gas Monitor (Residual Gas Analyzer)

P.56 Leak Detector

P.58 Power Supply (DC/RF)

P.66 EB Power Supply / EB Source

P.70 Deposition Controller

P.73 Thin Film Measurement

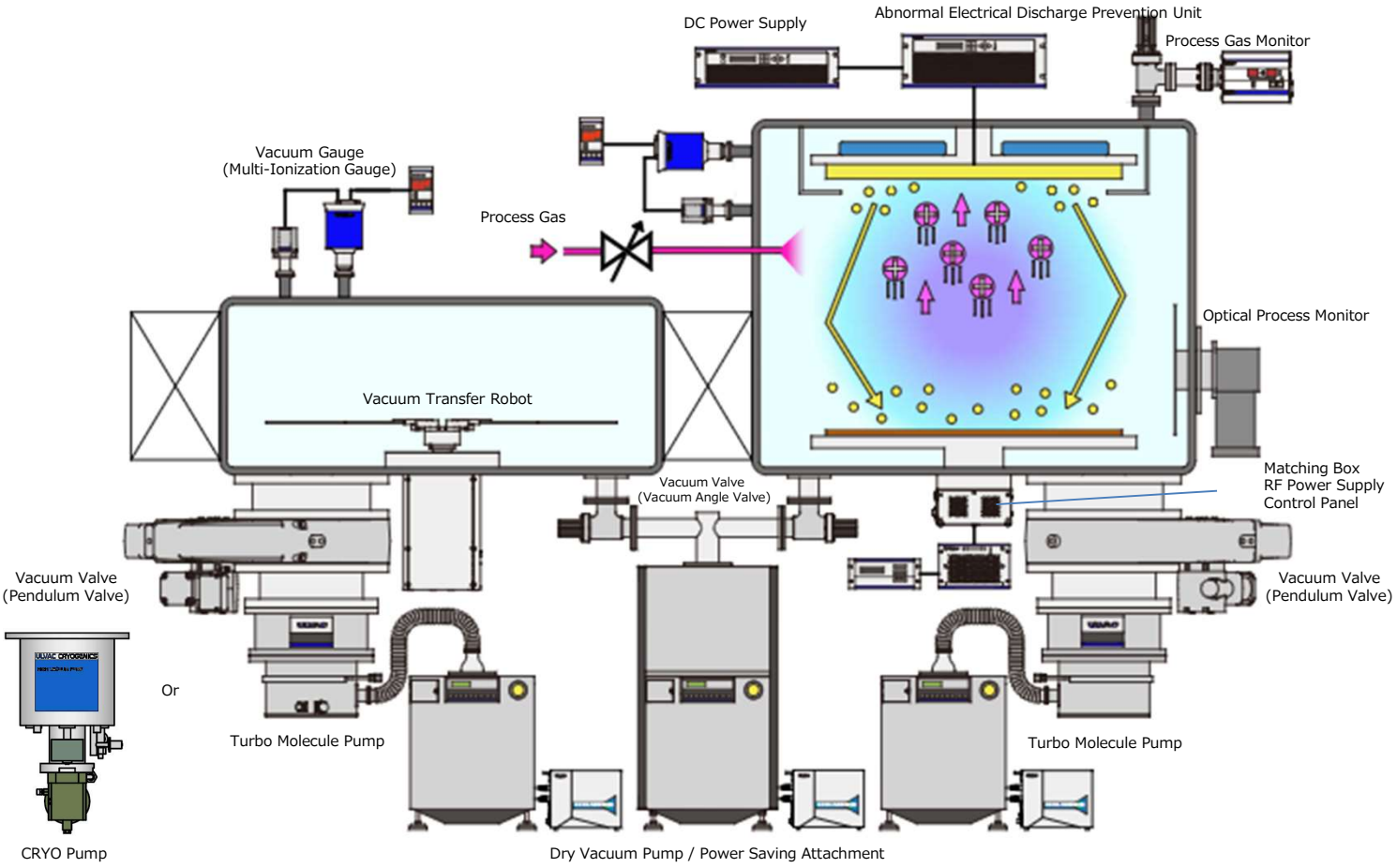
P.75 Accessories

P.77 Vacuum Transfer Robot

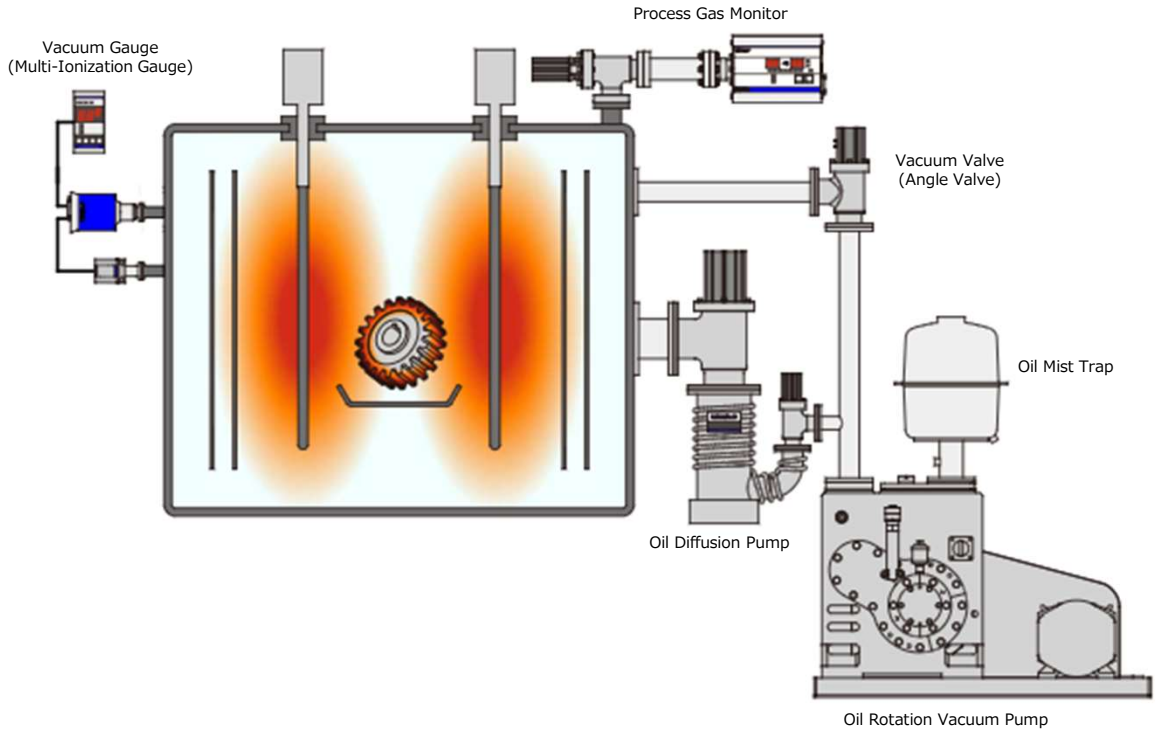
P.78 Cryogenic Equipment

Examples of Use in Vacuum Equipments

Sputtering Equipment

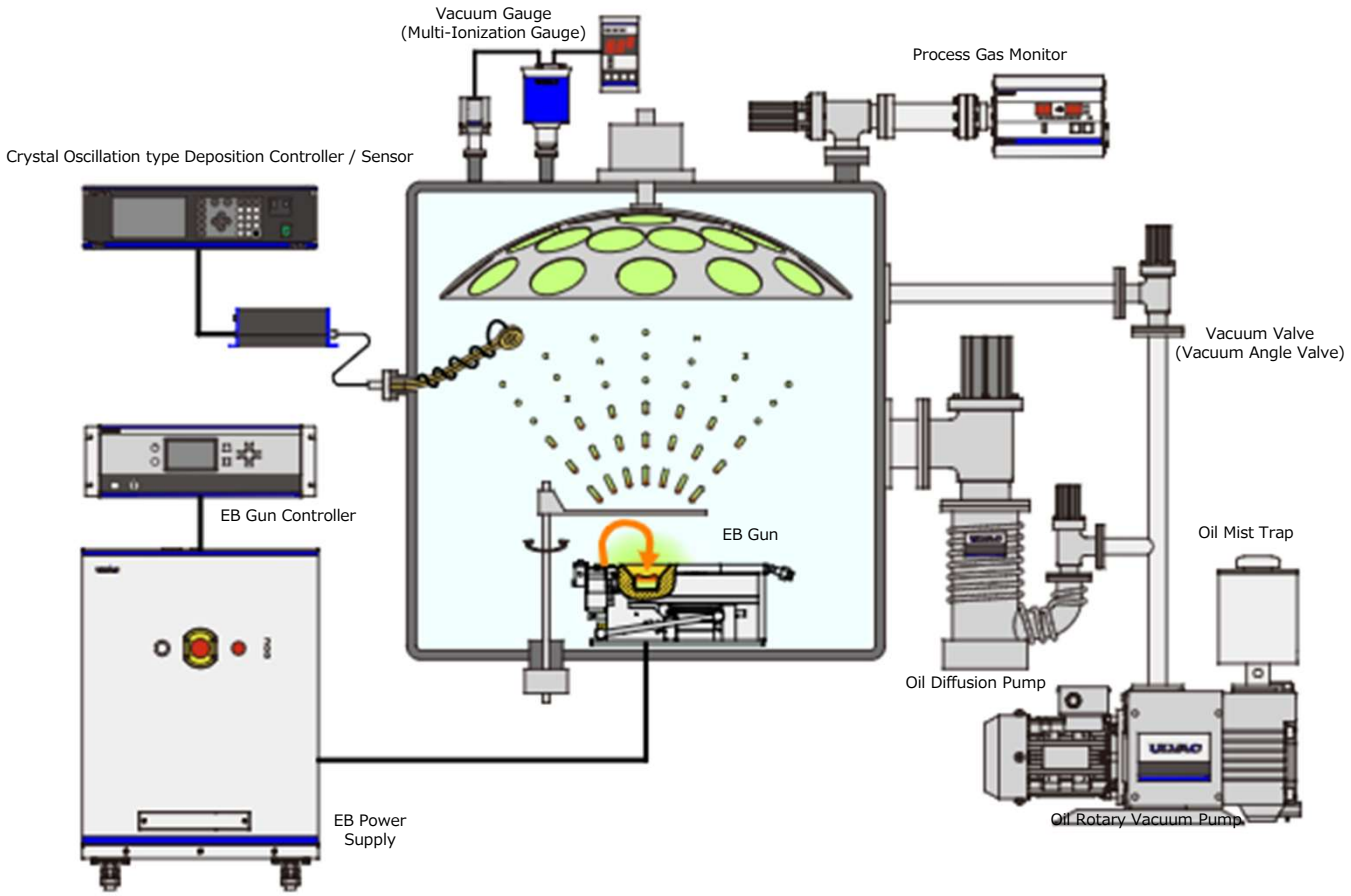


Vacuum Heat Treatment Furnace

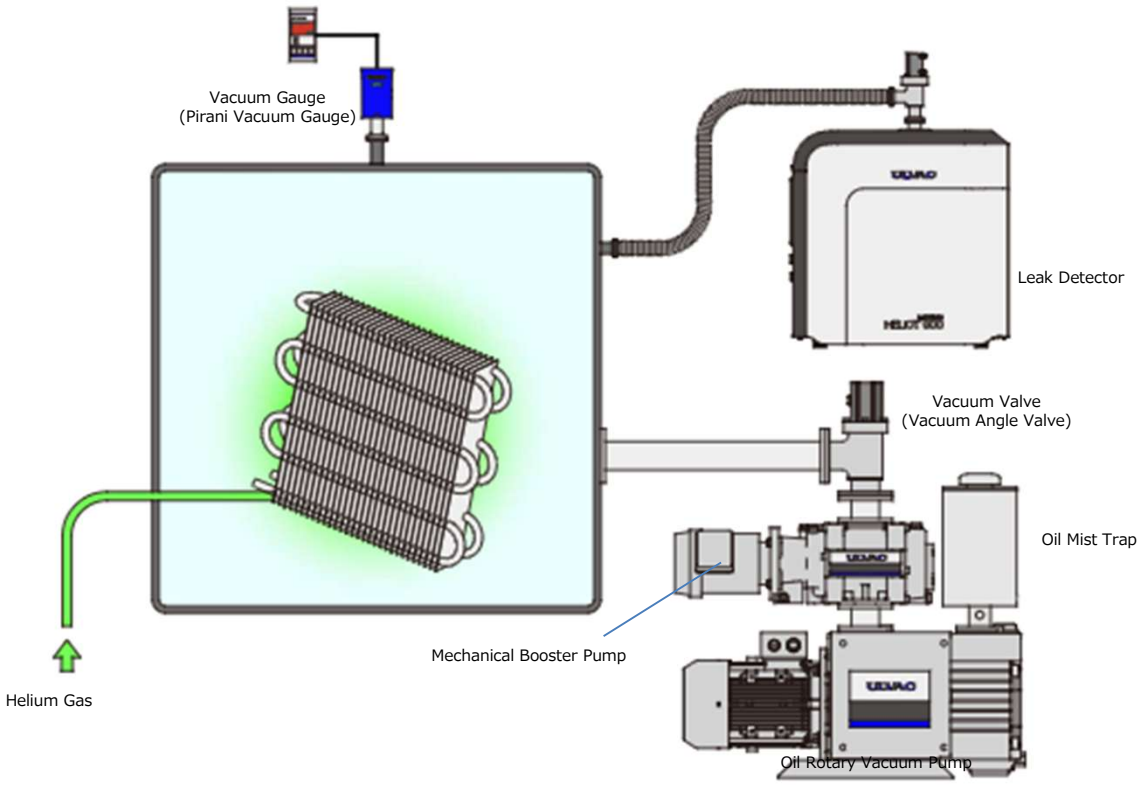


Examples of Use in Vacuum Equipments

Evaporation Equipment

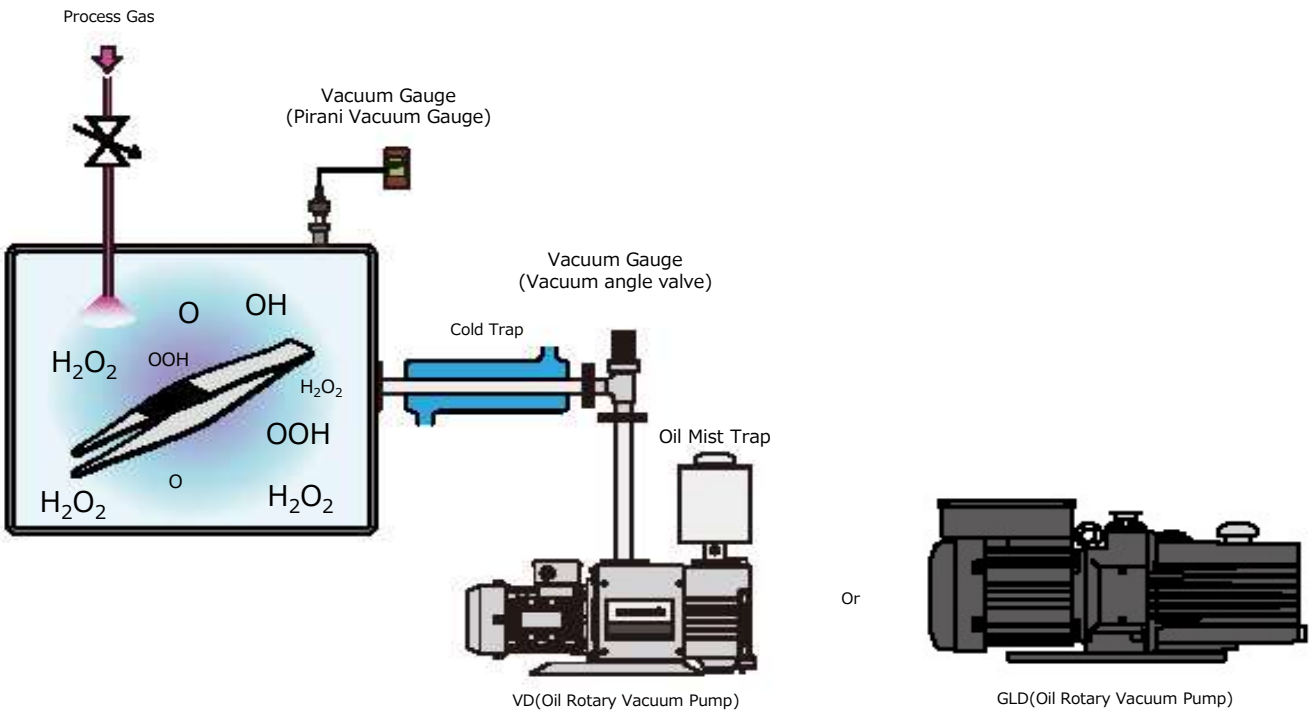


Leak Test System

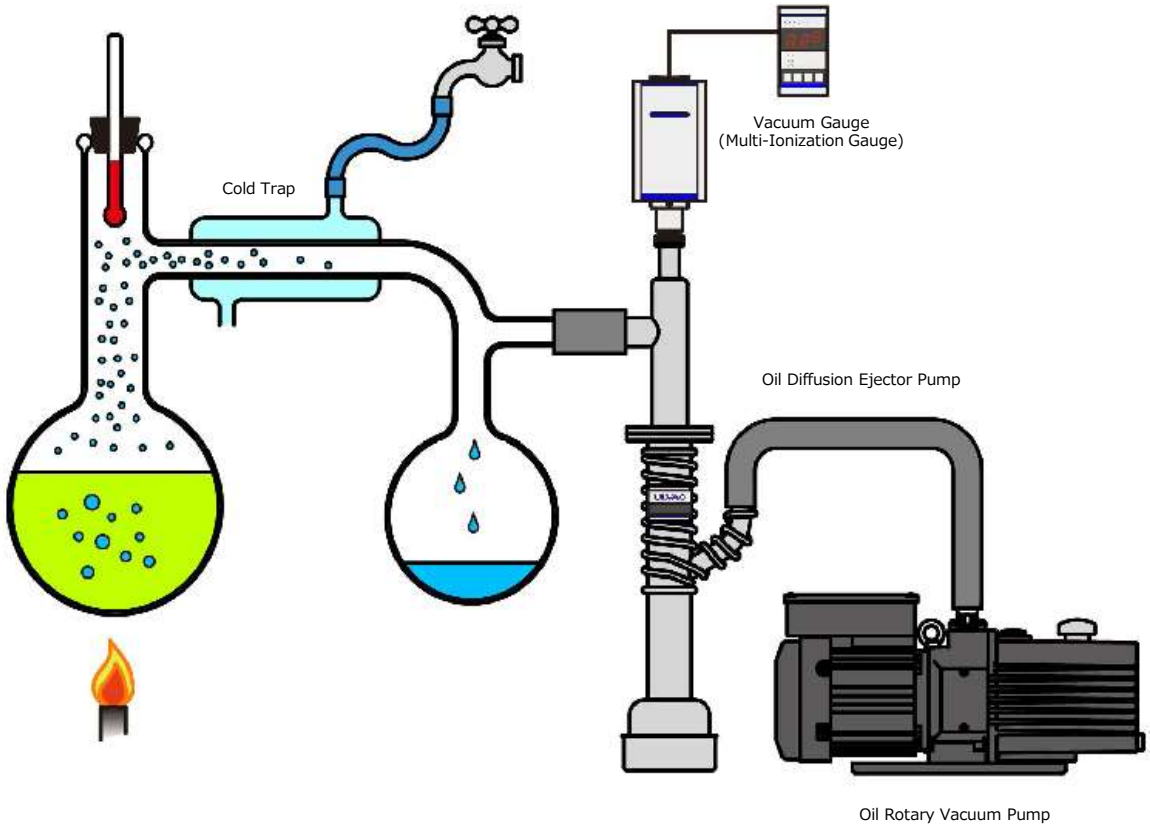


Examples of Use in Vacuum Equipments

Plasma sterilization

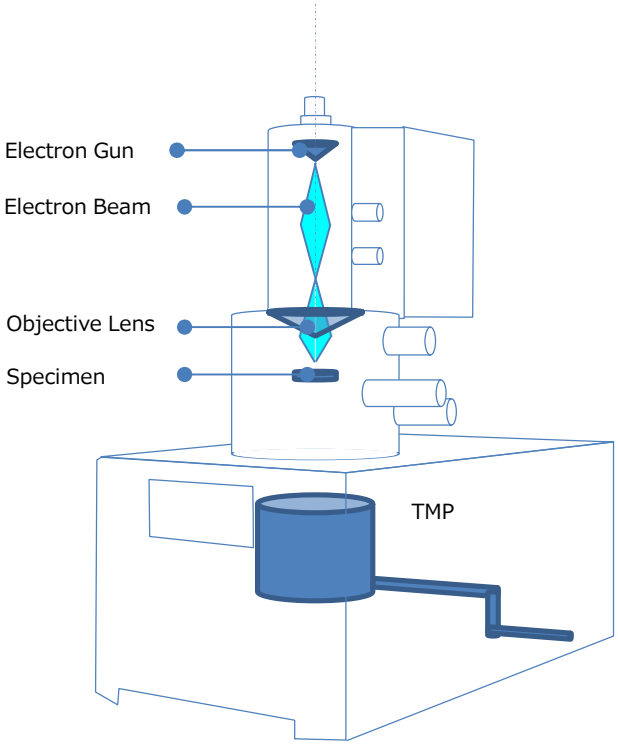


Vacuum Distillation Equipment

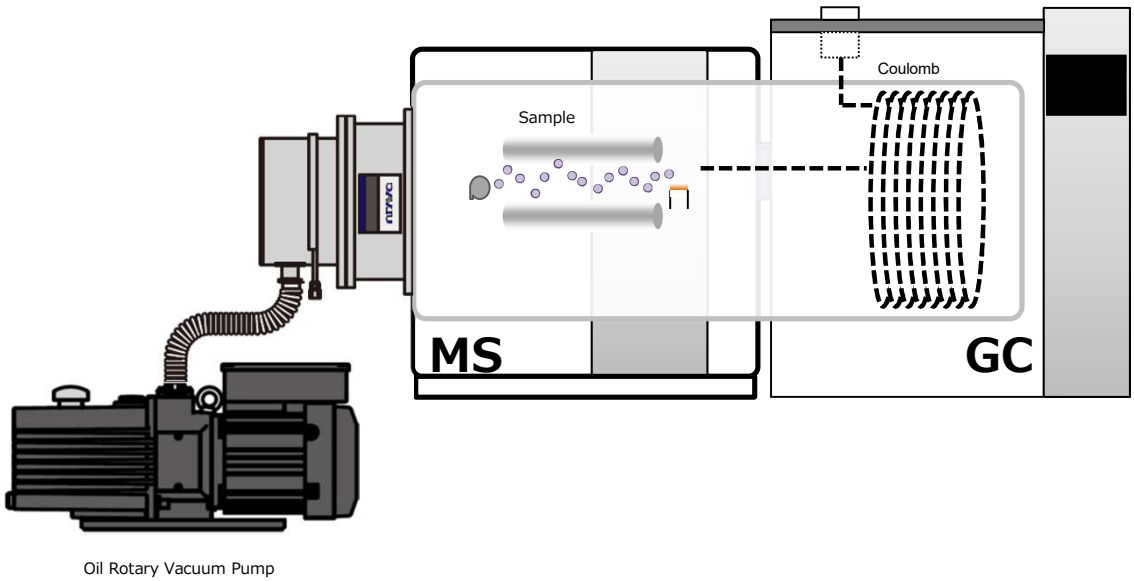


Examples of Use in Vacuum Equipments

Scanning Electron Microscope



Gas chromatography-mass spectrometry



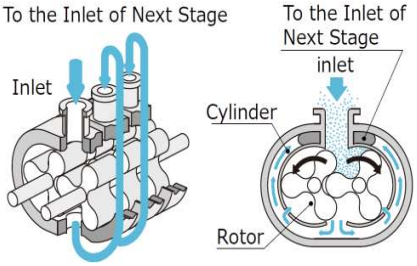
Oil Rotary Vacuum Pump

Selection Guide

Unit : Pa

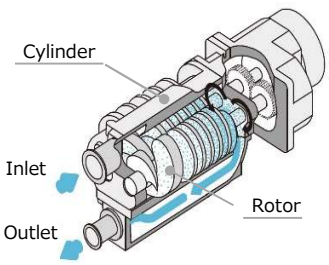
Product	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Dry Vacuum Pump														DAP		
														DA / DAT		
														DTC		
														DOP		
													DAU / DTU			
											DIS					
											GR					
										LR / HR / UR						
										LS						
										MS						
										CR						
									RDA							
Oil Rotary Vacuum Pump											VS					
											PKS					
										G						
										GLD						
										GHD						
										GCD						
										Gv						
										VD						
										PVD						
Mechanical Booster Pump										MBS / VMR						
										PMB Ver.D						
										PRC						
										PMB-C						
Turbo Molecular Pump			UTM-B													
				UTM-MI												
			UTM-MS													
Oil Diffusion Ejector Pump									PBL							
Oil Diffusion Pump							PFL									
					ULK											
Cryo Pump				CRYO-U												
Sputter Ion Pump		PST														

Dry vacuum pump Multi-stage roots type



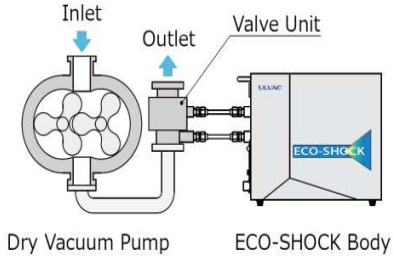
A clean pumping down because oil is not used in the working chamber. It is effective for CVD and etching processes as there are no oil which react to active gases.

Dry vacuum pump Screw type



Gas in the groove partitioned by rotor and cylinder is transferred according to the rotation of rotor.

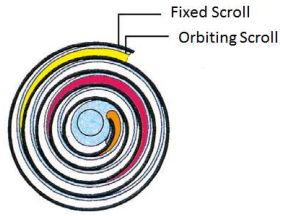
Power saving attachment for Dry vacuum pump



ECO-SHOCK is a revolutionary dry pump accessory that can dramatically reduce power consumption by attaching to the dry pump exhaust line.

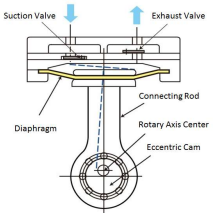
Selection Guide

Scroll Type Dry vacuum pump



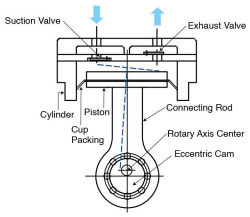
A dry vacuum pump that evacuates by a combination of spiral stator and rotor movements.

Diaphragm Type Dry vacuum pump



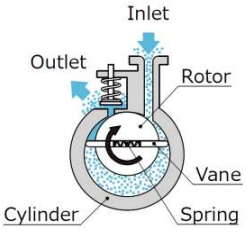
Consists of a diaphragm (membrane) and two valves.
The diaphragm is moved up and down or left and right to change the volume and perform intake and exhaust.

Rocking Piston Type Dry vacuum pump



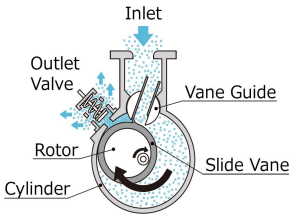
The piston inside the cylinder is reciprocated, and two valves are combined for intake and exhaust.

Oil rotary vacuum pump Rotary vane type



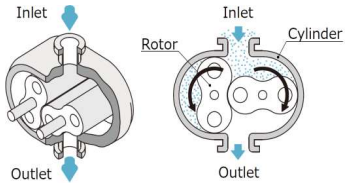
Low vibration and high compression efficiency. It is the pump which mostly used for industrial uses.

Oil rotary vacuum pump Rotary plunger type



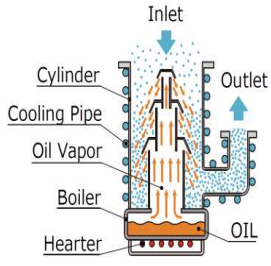
Robust and comparatively strong for foreign materials. Workable for long term with appropriate regular maintenance.

Mechanical booster pump Roots type



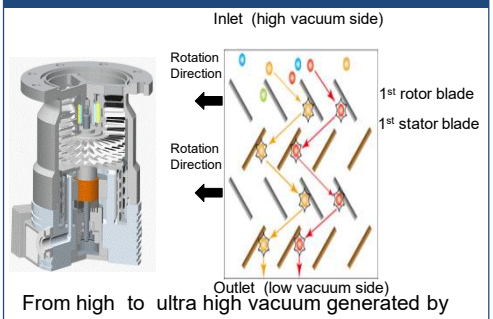
It is possible to accelerate pumping speed in the pressure range where pumping speed of dry vacuum pump and oil rotary vacuum pump decreases.

Oil diffusion pump



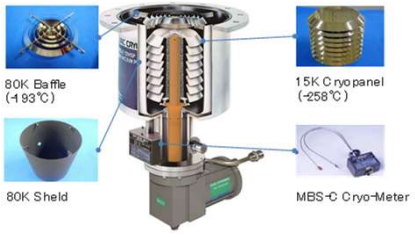
Exhaust gas using oil vapor injection. A high vacuum is created in combination with an oil rotary vacuum pump.

Turbo molecular pump



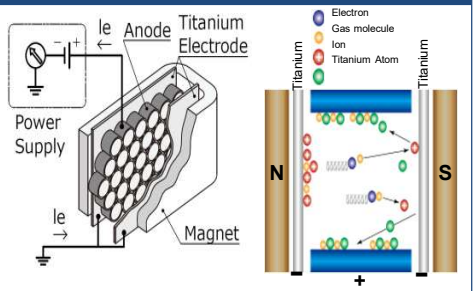
From high to ultra high vacuum generated by high speed rotating turbine blade with tend of thousands rpm. It is not a sorption type and possible to continue evacuation.

Cryo pump



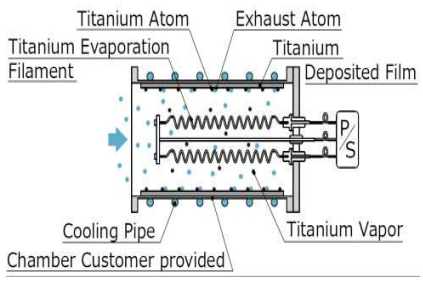
A cryo pump is vacuum pump that traps gases and vapors by condensing them on a cold surface.

Sputter ion pump



An ultra-high vacuum pump that uses the getter action of sputtered active titanium. The feature is that there is no rotating part.

Titanium getter pump



Gas molecules are adsorbed and exhausted by titanium which is activated by heating and evaporating titanium directly.

Selection Guide (Application Examples)

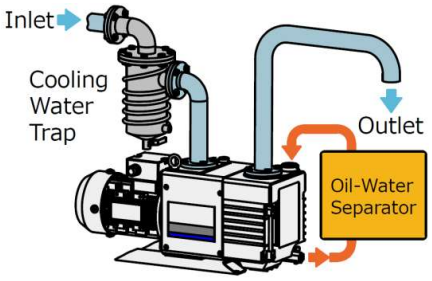
Vacuum pumps are also used for the following applications other than for the exhaust of gases such as for clean air.

✓✓✓: Highly recommended. ✓✓: Recommended. ✓: Usable depending on conditions.

Product	Model	Water vapor	Flammable gas	Dust	Sublimation gas
Dry Vacuum Pump	LR	✓✓	✓	✓✓	✓
	HR / UR	✓✓	✓	✓✓	✓✓✓
	LS	✓✓✓	✓		✓
	MS	✓✓✓	✓	✓✓✓	✓
	CR	✓✓	✓		
	GR	✓✓	✓	✓✓	✓
Oil Rotary Vacuum Pump	VD	✓✓	✓	✓✓	✓
	VS	✓✓	✓	✓✓	✓
	PVD	✓✓	✓		
	PKS	✓✓	✓	✓✓✓	✓

Example of water vapor evacuation and problems

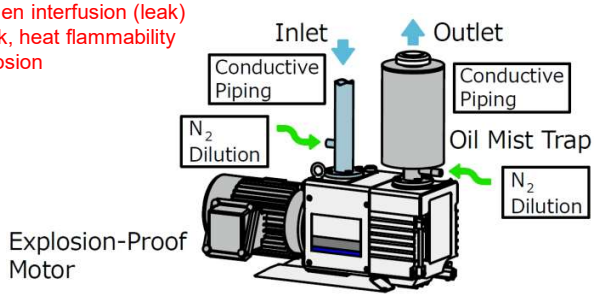
＜Problems＞
- Water condensation
- Oil deterioration



- Countermeasures in pumps: Oil rotation vacuum pump → Gas ballast valve, oil exchange, oil water separator.
  Dry vacuum pump → Gas ballast.
- Countermeasure in the Inlet port: Water cooling trap for the high temperature water vapor.
- Countermeasure in the Outlet port: Piping connection not to return water to pump.

Example of combustible gas evacuation and problems

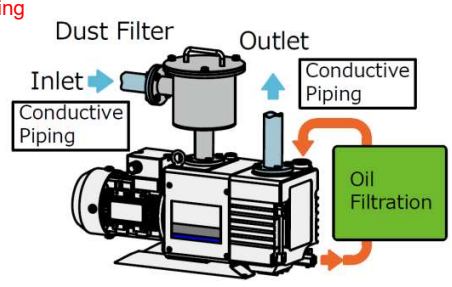
＜Problems＞
- Oxygen interfusion (leak)
- Spark, heat flammability
- Explosion



- Countermeasures in pumps: Oil rotation vacuum pump → Helium tight type, explosion-proof motor, electrostatic belt, oil mist trap (helium tight type).
  Dry vacuum pump → Model : GR
- Countermeasure in the Inlet port: Conductive piping, dilution with N2 purge.
- Countermeasure in the Outlet port: Conductive piping, dilution with N2 purge.

Example of dusty gas evacuation and problems

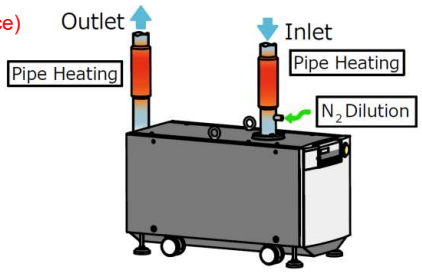
＜Problems＞
- Foreign matter gnawing
- Piping blockage



- Countermeasures in pumps: Oil rotation vacuum pump → Oil exchange, oil kind change, oil filtration.
  Dry vacuum pump → Purge gas from the Inlet port, gas ballast.
- Countermeasure in the inlet port: Dust trap.
- Countermeasure in the outlet port: Prevention of explosion by overpressure due to dust clogging.

Example of sublimation gas evacuation and problems

＜Problems＞
- Deposition of reactive product (solid substance)



- Countermeasures in pumps: High temperature type dry vacuum pump Model : UR + gas ballast gas (N2) introduction.
- Countermeasure in the Inlet port: Dilution gas introduction (N2 purge), heated piping.
- Countermeasure in the Outlet port: Heated piping.

What is sublimation gas…?

Sublimation gas changes from solid state to gas state without being in liquid state when it is cooled or compressed.
There are cases which make difficult to run vacuum pumps because many of sublimation gases generated during CVD and dry etching processes for electronic devices and displays manufacturing will change to solid material.

What is helium tight type…?

It is one of optional selections of oil rotation vacuum pump. This type is tested by the helium leak detector and has a leak tightness specification with $1x10^{-6}$ (Pa･m^3/s) or below.

Precaution of IE3 motor

Although IE3 motor is adopted due to top runner system, inrush current tends to become higher than conventional motor (IE1).
Especially for large pumps (5.5kW or more), inrush current value tends to be higher than conventional standard efficiency motor.
Accordingly, it may be necessary to review primary power supply equipment (circuit breaker or overload protection device), so please confirm power supply capacity when purchasing.

What is gas ballast…?

Gas ballast is a countermeasure when handling condensable gas such as water vapor, etc. Condensable gas is compressed through compression process inside oil vacuum pump, condensed and changed to liquid which mixes with vacuum pump oil. It is left inside in the case of dry vacuum pump. In order to prevent this, it is possible to let condensable gas exhaust without changing from air state to liquid state by opening gas ballast valve and introducing certain amount of air or nitrogen to the working chamber inside pump.

Notes

Diaphragm Type Model : DAP

A small, high performance, low noise, low vibration diaphragm type dry vacuum pump.

DAP-6D

Model			DAP-6D	DAP-12S	DAP-9D-DC24	DAP-18S-DC24
Maximum pumping speed	[m^3/h]	50Hz/60Hz	0.36 / 0.42	0.72 / 0.84	0.54	1.08
	[L/min]	50Hz/60Hz	6 / 7	12 / 14	9	18
	[CFM]	50Hz/60Hz	2.1 x 10-1 / 2.45 x 10-1	4.2 x 10-1 / 4.9 x 10-1	3.18 x 10-1	6.35 x 10-1
Ultimate pressure		[Pa]	6.65 x 10^3	24.0 x 10^3	6.65 x 10^3	24.0 x 10^3
		[Torr]	50	180	50	180
		[mbar]	66.5	240	66.5	240
Inlet port			Rc1/8			
Outlet port			Rc1/8			
Power supply [V]			Single phase 100 200 220 to 230		DC24V BrushlessDCMotor	
Motor [kW]			0.01		0.014	
Full load current [A]			0.5 (100V)		1.3	1.4
Weight [kg]			1.9		1.75	
Dimensions W x D x H [mm]			91 x 163 x 100.6		83.5 x 165 x 123.8	
Applicable standard			—		CE , TUV , cTUVus	

Diaphragm Type Model : DA/DAT

A small, high performance, low noise, low vibration diaphragm type dry vacuum pump.

DA-30D

DAT-50D

Model			DA-30D	DA-60S	DAT-50D	DAT-100S
Maximum pumping speed	[m^3/h]	50Hz/60Hz	1.8 / 2.16	3.6 / 4.32	3 / 3.3	6 / 6.6
	[L/min]	50Hz/60Hz	30 / 36	60 / 72	50 /55	100 / 110
	[CFM]	50Hz/60Hz	1.05 / 1.26	2.1 / 2.52	1.75 / 1.93	3.5 / 3.85
Ultimate pressure		[Pa]	6.7 x 10^3	2.13 x 10^3	3.3 x 10^3	13.3 x 10^3
		[Torr]	50	16	25	100
		[mbar]	67	21.3	33	133
Inlet port			O.D.φ9 × I.D.φ5 (Female Rc1/4)		O.D.φ12 × I.D.φ8.5 (Female Rc1/4)	
Outlet port			O.D.φ9 × I.D.φ5 (Female Rc1/4)		O.D.φ12 × I.D.φ8.5 (Female Rc1/4)	
Power supply [V]			Single phase 100 200 220			
Motor [kW]			0.2			
Full load current [A]			5.6 (100V , 50Hz) , 5.0 (100V , 60Hz)			
Weight [kg]			11			
Dimensions W x D x H [mm]			212 x 278 x 224.5		150 x 232 x 305	
Applicable standard			—		CE,TUV,cTUVus Compatible models*1	

*1) DAT-50DA (Three phase 200 to 220V) , DAT-100SA (Three phase 200 to 220V)

DA-20DC

DA-41D

Model			DA-20DC	DA-40SC	DA-41D	DA-81S
Maximum pumping speed	[m^3/h]	50Hz/60Hz	1.2 / 1.44	2.4 / 2.76	2.4 / 2.76	4.5 / 5.1
	[L/min]	50Hz/60Hz	20 / 24	40 / 46	40 / 46	75 / 85
	[CFM]	50Hz/60Hz	0.7 / 0.84	1.4 / 1.61	1.4 / 1.61	2.63 / 2.98
Ultimate pressure		[Pa]	5.33 x 10^3	19.9 x 10^3	3.3 x 10^3	13.3 x 10^3
		[Torr]	40	149	25	100
		[mbar]	53.3	199	33	133
Inlet port			O.D.φ9 × I.D.φ5 (Female Rc1/4)		O.D.φ12 × I.D.φ8 (Female G1/4)	
Outlet port			O.D.φ9 × I.D.φ5 (Female Rc1/4)		O.D.φ12 × I.D.φ8 (Female G1/4)	
Power supply [V]			Single phase 220		Single phase 220	
Motor [kW]			0.06		0.1	
Current [A]			0.8		1.2 (50Hz) , 1.25 (60Hz)	
Weight [kg]			7.2		10.3	
Dimensions W x D x H [mm]			118 x 242 x 178	128 x 242 x 178	157 x 336.5 x 217	181 x 336.5 x 217
Applicable standard			CE,TUV Compatible models*1		—	

*1) DA-20DA (Single phase 100V) , DA-20DB (Single phase 115V) , DA-20DC (Single phase 220V)
DA-40SA (Single phase 100V) , DA-40SB (Single phase 115V) , DA-40SC (Single phase 220V)

Diaphragm Type Model : DA

A small, high performance, low noise, low vibration diaphragm type dry vacuum pump.

DA-60D

DA-121DF

Model			DA-60D	DA-120S	DA-121DF	DA-241SF
Maximum pumping speed	[m^3/h]	50Hz/60Hz	3.6 / 4.32	7.2 / 8.64	7.2 / 8.7	14.4 / 15.6
	[L/min]	50Hz/60Hz	60 / 72	120 / 144	120 / 145	240 / 260
	[CFM]	50Hz/60Hz	2.1 / 2.52	4.2 / 5.04	4.2 / 5.08	8.4 / 9.1
Ultimate pressure		[Pa]	3.32 x 10^3	13.3 x 10^3	3.3 x 10^3	16 x 10^3
		[Torr]	25	100	25	120
		[mbar]	33.2	133	33	160
Inlet port			O.D.φ14 × I.D.φ9（Female G3/8）		O.D.φ16 × I.D.φ12（Female G1/2）	
Outlet port			O.D.φ14 × I.D.φ9（Female G3/8）		O.D.φ16 × I.D.φ12（Female G1/2）	
Power supply [V]			Single phase 220		Single phase 220 to 230	
Motor [kW]			0.2		0.4	
Full load current [A]			2.4		2.3 (50Hz) 2.6 (220V) / 2.5(230V (60Hz)	2.5 (220V) / 2.4(230V , 50Hz) 2.7 (220V) / 2.6(230V , 50Hz)
Weight [kg]			19		26	
Dimensions W x D x H [mm]			156 x 358 x 238	162 x 358 x 238	193.5 x 411 x 285	207 x 411 x 285
Applicable standard			—		CE,TUV,cTUVus Compatible models*1	

*1) DA-121DC (100V), DA-121DD (115V), DA-121DE (200V), DA-121DF (220 to 230V)
DA-241SC (100V), DA-241SD (115V), DA-241SE (200V), DA-241SF (220 to 230V) ※All single phase

Diaphragm Type Model : DAU/DTU

High vacuum type diaphragm type dry vacuum pump.

DAU-20D

Model			DAU-20D	DTU-20D (Chemical type)
Maximum pumping speed	[m^3/h]	50Hz/60Hz	1.2 / 1.38	
	[L/min]	50Hz/60Hz	20 / 23	
	[CFM]	50Hz/60Hz	0.7 / 0.8	
Ultimate pressure		[Pa]	200	
		[Torr]	1.5	
		[mbar]	2	
Inlet port			O.D.φ10 × I.D.φ6（Female Rc1/8）	
Outlet port			O.D.φ10 × I.D.φ6（Female Rc1/8）	
Power supply [V]			Single phase 220	
Motor [kW]			0.08	
Full load current [A]			0.7 / 0.72	
Weight [kg]			7.5	
Dimensions W x D x H [mm]			161 x 327 x 217	
Applicable standard			CE,TUV,cTUVus Compatible models*1	

*1) DAU-20A (100V), DAU-20B (115V), DAU-20C (200V), DAU-20D (220V), DAU-20E (230V), DTU-20A (100V), DTU-20B (115V)
DTU-20C (200V), DTU-20D (220V) , DTU-20E (230V) ※All single phase

Diaphragm Type Model : DTC

Chemical type diaphragm type dry vacuum pump.

DTC-22

DTC-60

Model			DTC-22B	DTC-41E	DTC-60
Maximum pumping speed	[m^3/h]	50Hz/60Hz	1.2 / 1.44	2.4 / 2.76	3.6 / 4.2
	[L/min]	50Hz/60Hz	20 / 24	40 / 46	60 / 70
	[CFM]	50Hz/60Hz	0.7 / 0.84	1.4 / 1.61	2.1 / 2.45
Ultimate pressure		[Pa]	1.0 x 10^3		
		[Torr]	7.5		
		[mbar]	10		
Inlet port			O.D.φ10 × I.D.φ6（Female G1/4）		O.D.φ14 × I.D.φ9 （Female G3/8）
Outlet port			O.D.φ10 × I.D.φ6 （Female G1/4）		O.D.φ14 × I.D.φ9 （Female G3/8）
Power supply [V]			Single phase 220	Single phase 220	Single phase 220
Motor [kW]			0.05	0.1	0.2
Full load current [A]			0.6 (50Hz) / 0.72 (60Hz)	1.1	2.0 (50Hz) / 2.1 (60Hz)
Weight [kg]			7.1	10.3	18
Dimensions W x D x H [mm]			142 x 288.5 x 202	155 x 336.5 x 217	158 x 340 x 242
Applicable standard			CE , TUV , cTUVus*1		

*1) DTC-22A (115V) , DTC-22B (220V) , DTC-22C (230V) , DTC-41A (100V) , DTC-41B (230V 50Hz) ※All single phase

Rocking Piston Type Model : DOP

A large displacement , compact size rocking piston type dry vacuum pump.

DOP-40D

DOP-181SD

DOP-301SB

Model			DOP-40D	DOP-80S	DOP-81SPF
Maximum pumping speed	[m^3/h]	50Hz/60Hz	2.4 / 2.64	4.8 / 5.28	5.1 / 6.0
	[L/min]	50Hz/60Hz	40 / 44	80 / 88	85 / 100
	[CFM]	50Hz/60Hz	1.4 / 1.61	2.8 / 3.08	2.975 / 3.5
Ultimate pressure [Maximum pressure]		[Pa]	1.2 x 10^3	5.33 x 10^3	[0.5 MPa]
		[Torr]	9	40	[3750 Torr]
		[mbar]	12	53.3	[500 mbar]
Inlet port			O.D.φ9 × I.D.φ5（Female Rc1/4）		
Outlet port			O.D.φ9 × I.D.φ5（Female Rc1/4）		
Power supply［V］			Single phase 220		Single phase 220 to 240
Motor [kW]			0.21		0.3
Full load current [A]			3.2 (100V , 50Hz) , 3.9 (100V , 60Hz)		2.6 (220V,50Hz)/3.0(220V,60Ha)
Weight [kg]			7		9
Dimensions W x D x H [mm]			160 x 270 x 179		168.5 x 288 x 181
Applicable standard			—		

Model			DOP-181SD	DOP-301SB	DOP-400SB	DOP-420SA
Maximum pumping speed	[m^3/h]	50Hz/60Hz	10.8 / 12	18 / 19.8	24 / 26.4	25.2 / 27.6
	[L/min]	50Hz/60Hz	180 / 200	300 / 330	400 / 440	420 / 460
	[CFM]	50Hz/60Hz	6.3 / 7	10.5 / 11.6	14 / 15.1	14.7 / 16.1
Ultimate pressure		[Pa]	10 x 10^3	8 x 10^3	12 x 10^3	17.3 x 10^3
		[Torr]	75	60	90	130
		[mbar]	100	80	120	173
Inlet port			Rc3/8	O.D.φ16 × I.D.φ12 (Female Rc1/2)	Adapted tubing O.D. dia.16 （Female Rc1/2）	O.D.φ26 × I.D.φ20 （Female Rc3/4）
Outlet port						
Power supply［V］(*2)			Single phase 220	Three phase 200 to 230	Three phase 200 (50Hz / 60Hz) to 220V (60Hz)	Three phase 200 (50Hz / 60Hz) to 220V (60Hz)
Motor [kW]			0.4			0.55
Full load current [A]			2.6 (60Hz)	2.5 (60Hz)	2.4 (200V , 50Hz) 2.8 (200V , 60Hz) 2.7 (220V , 60Hz)	3.5 (200V , 50Hz) 3.1 (200V , 60Hz) 3.2 (220V , 60Hz)
Weight [kg]			12	20	23	33
Dimensions W x D x H [mm]			172 x 266 x 235	315 x 443 x 231	316 x 434 x 231	310 x 523 x 253
Applicable standard			CE,TUV,cTUVus*1			CE,TUV

*1) DOP-181SB (Single phase 115V) , DOP-181SC (Single phase 200V) , DOP-181SD (Single phase 220V)
DOP-181SE (Three phase 200 to 200V) are compatible models too.

Scroll Type Model : DIS

A large displacement , compact size scroll type dry vacuum pump.

DIS-252

Model				DIS-90	DIS-252	DIS-501
Maximum pumping speed	[m^3/h]	50Hz/60Hz		5.4 / 6.48	12 / 14.4	30 / 36
	[L/min]	50Hz/60Hz		90 / 108	200 / 240	500 / 600
	[CFM]	50Hz/60Hz		2.52 / 3.01	7.0 / 8.4	14.0 / 16.8
Ultimate pressure		[Pa]		5.0	1.6	1.0
		[Torr]		3.75 x 10^{-2}	1.2 x 10^{-2}	7.5 x 10^{-3}
		[mbar]		5.0 x 10^{-2}	1.6 x 10^{-2}	1.0 x 10^{-2}
Inlet port				KF25		KF40
Outlet port				KF16		KF25
Power supply［V］	Single phase			100 115 200 230		
	Three phase			—	200 208 230 380 400 415 460	
Motor [kW]				0.15	0.4	0.6
Full load current [A]	Single phase	50Hz		2.6 (100V) , 1.3 (200V) 1.6 (230V)	4.8 (100V) , 2.6 (200V) 2.4 (230V)	8.5 (100V) , 4.3 (200V) 3.9 (230V)
		60Hz		2.1 (100V) , 2.2 (115V) 1.1 (200 , 230V)	4.8 (100V) , 4.3 (115V) 2.8 (200V) , 2.4 (230V)	10 (100V) , 8.6 (115V) 4.8 (200V) , 4 (230V)
	Three phase	50Hz		—	1.6 (200V) , 0.9 (380V) 0.9 (400V) , 1 (415V)	2.7 (200V) 1.57 (380V , 400V) 1.63 (415V)
		60Hz		—	1.9 (200V , 208V) 1.8 (230V) , 1 (460V)	2.8 (200V) , 2.6 (208V) 2.5 (230V) , 1.47 (460V)
Weight [kg]				14 (Single phase)	25 (Single phase) 23 (Three phase)	44 (Single phase) 38 (Three phase)
Dimensions W x D x H [mm]				Single phase 214 x 308 x 225	Single phase 264 x 397 x 338 Three phase 264 x 367 x 338	Single phase 290 x 443 x 397 Three phase 292 x 372 x 397
Applicable standard				CE , cTUV		

Air cooling Type Model : CR

Air-cooled dry vacuum pump. 4 models from16 to 300m³/hr.

CR60B

- Air-cooled roots-type vacuum pump. Oil is not used inside working chambers. Long-time stable operation is possible because there is no contact between its rotor and cylinder.

Model		CR16B	CR30B	CR60B	CR300B
Maximum Pumping Speed	[m³/h]	16	30	55	300
	[L/min]	280	500	920	5,000
	[CFM]	9.8	17.6	32.4	176
Ultimate pressure (*1)	[Pa]	3			0.5
	[Torr]	2×10^{-2}			4×10^{-3}
	[mbar]	3×10^{-2}			5×10^{-3}
Inlet port		KF25		KF40	KF50
Outlet port		KF25		KF40	
Power supply [V] (*2)		1 phase 100 , 1 phase 200 , 3 phase 200		1 phase 200 / 3 phase 200	3 phase 200
Motor rated value [kW]		0.72		1.5	3
Cooling method		Air cooled			
Gas ballast mechanism		Optional Support			
Maximum water vapor tolerance (*3)		< 300 g/h		< 500 g/h	
Weight [kg]		35		48	100
Dimensions W x D x H [mm]		180 x 520 x 350		210 x 550 x 430	280 x 594 x 595
Applicable standard		CE , cTUVus			

*1) With 0SLM gas ballast gas flow.
*2) When requesting for an estimate or ordering, specify power supply and voltage.
*3) Maximum value when gas ballast is used. Make sure to use a gas ballast mechanism when pumping down water vapor.

Multi-Stage Roots Type Model : RDA

Dry vacuum pump achieves equivalent performance as oil rotary vacuum pump.

RDA-281HA

- Single phase or three phase power can be used with one model.
- DC Motor is adopted.

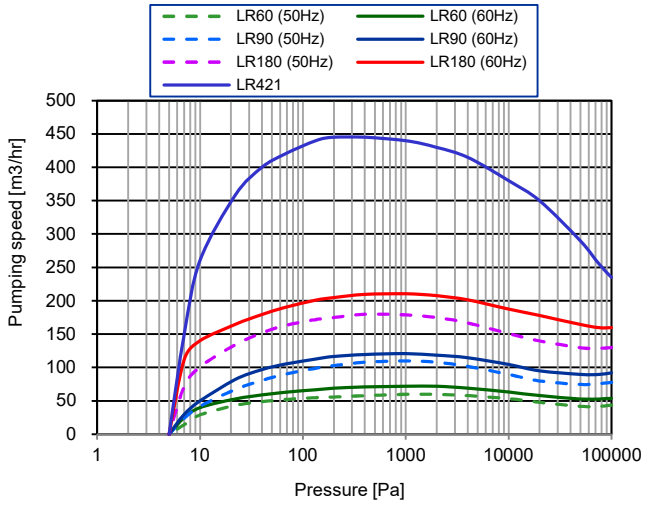
Model		RDA-281HA	RDA-501HA
Maximum pumping speed	[m³/h]	16.8	30
	[L/min]	280	500
	[CFM]	9.84	17.6
Ultimate pressure*1	[Pa]	≦ 8.0×10^{-2}	
	[Torr]	≦ 6.0 x 10-4	
	[mbar]	≦ 8.0 x 10-4	
Inlet port		KF25	
Outlet port		KF25	
Power supply [V]		Single phase 100 to 115 / 200 to 240 Three phase 200 to 240	
Motor [kW]		0.72 + 0.01 DC Motor	
Full load current [A] Single phase / Three phase		10 (100 to 115V) , 5 (200 to 240V) / 5 (200 to 240V)	
Cooling		Air cooling	
Water Capability [g/h]		≦ 300	
Weight [kg]		38	
Dimensions W x D x H [mm]		180 x 520 x 377	
Applicable standard		CE , cTUVus Compatible models*2	

*1) Flush. Air Close
*2) RDA-281HA (Single phase 100 to 115V , 200 to 240V , Three phase 200 to 240V)
RDA-501HA (Single phase 100 to 115V , 200 to 240V , Three phase 200 to 240V)

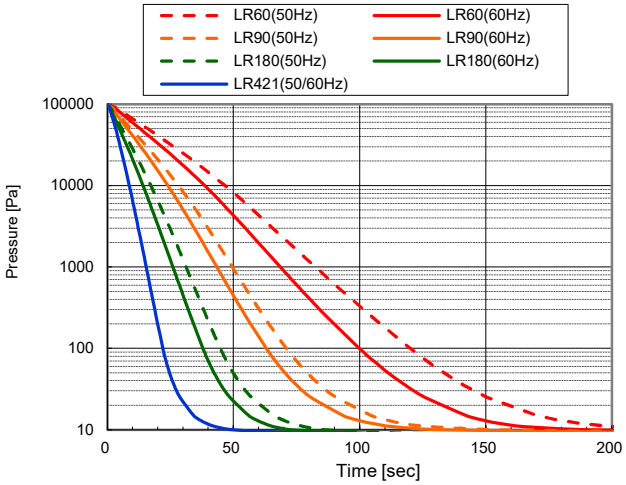
Roots type Model : LR

For high speed chamber evacuation.

■ LR60, LR90, LR180, LR421 pumping speed



■200L vacuum chamber evacuation time



*The values herein are calculated values. These may vary in actuality depending on the emission of gas, etc.

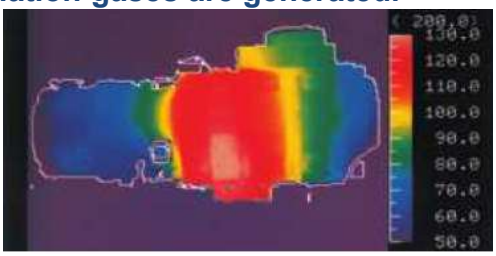
- Suitable for high speed evacuation for large vacuum chamber because of high pumping speed at high pressure range is high.
- Special surface processing which has high solidity and excellent corrosion resistant is used for their main parts. This reduces corrosion during pumping of corrosive gases.

Model			LR60	LR90	LR180	LR421-T	LR300	LR600	LR1200	LR1800	LR3601-R
Maximum pumping speed	[m^3/h]	50Hz	62	112	183	440	359	653	1,012	1,701	3,200
		60Hz	80	126	237		365	701	1,051	1,784	
	[L/min]	50Hz	1,030	1,860	3,100	7,333	5,980	10,900	16,900	28,350	53,333
		60Hz	1,333	2,100	3,950		6,080	11,700	17,500	29,700	
	[CFM]	50Hz	36	66	108	259	211	384	596	1001	1,883
		60Hz	47	74	139		215	413	618	1048	
Ultimate pressure [Pa]		[Pa]	5.0				6.7×10^{-1}				
		[Torr]	3.7×10^{-2}				5×10^{-3}				
		[mbar]	5.0×10^{-2}				6.7×10^{-3}				
Inlet port (optional)			VG50 (KF40)	VG80 (KF50)		VG100	VG80 (KF80)		VG100 (KF100)	VG150	
Outlet port			KF40			VG50	KF40				KF50
Dry pump surface treatment			with								
Mechanical booster pump surface treatment			n/a	n/a	n/a	n/a	with				none
Power supply [VAC] (Hz)	3 phase		200 (50/60) , 220 (60)			180 to 240, 380 to 440 (50/60)	200 (50/60), 220 (60)				180 to 240, 380 to 440 (50/60)
Current (at max. load) [A]			7.0	11.8	20.6	48.5	9.6	19	24.2	39.8	82
Cooling Water Flow Rate [L/min]			>5.0			>4.0	>5.0				>4.0
Nitrogen purge [SLM]	Shaft seal		5								
	Gas ballast		0 to 45								
Weight [kg]			180	245	335	415	251	371	403	553	660
Dimensions [mm]	W		378	428	528	668	378	470		528	668
	D		900	967	1,042	1,106	910	987		1,213	1,111
	H		530	579	645	742	831	951		1,037	1,274

*) When making a request for an estimate or ordering, notify us about the voltage.

Roots type Model : HR / UR

Whole working chambers inside the pump are uniformly kept at high temperature by utilizing excellent aluminium heat conductivity. Most suitable for processes such as CVD and dry etching processes for semiconductor, electronic devices and displays manufacturing, where sublimation gases are generated.



Whole working chambers inside the pump are uniformly kept at high temperature by utilizing excellent aluminum heat conductivity.

■ Experience in multi layer film process in liquid crystal low temperature polysilicon CVD production line.

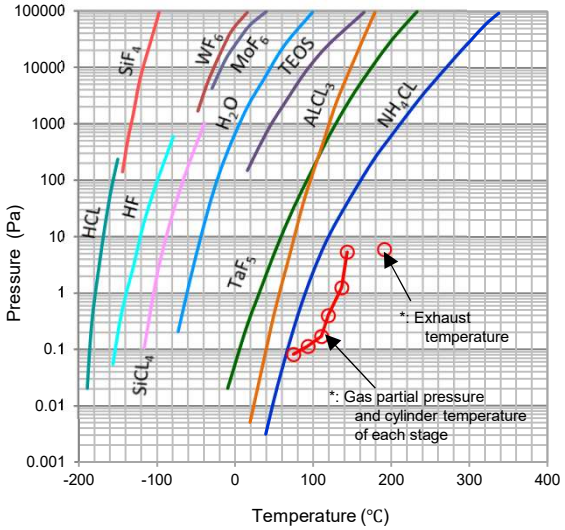
UR is the best for processes where a large volume of sublimation gases occurs.

Model : HR

Stuck by by-product in 3 months.

Model : UR

After 12 months running, exceedingly a few by-products are found but the pump could still run.



・The left side of each curved line of the steam pressure indicates a solid (liquid) state while the right side indicates a gas state.
*) An example of process gas evacuation by Model : HR.

- High temperature uniformity makes it possible to exhaust reactive gases (sublimation gases) generated in CVD, etching, etc. in gas state, and to restrain from being in solid state.
- Special surface processing which has high solidity and excellent in corrosion resistance is used for their main parts. This reduces corrosion during corrosive gas evacuation.

Model			HR60	HR90	UR421-T	HR300	HR600	UR600	HR1200	UR1200	UR1800	UR3601-TT
Maximum pumping speed	[m3/h]	50Hz	62	112	410	359	653	653	1,012	1,012	1,701	2,700
		60Hz	80	126		365	701		1,051			
	[L/min]	50Hz	1,030	1,860	6,833	5,980	10,900	10,883	16,900	16,867	28,350	45,000
		60Hz	1,333	2,100		6,080	11,700		17,500			
	[CFM]	50Hz	36	66	242	211	384	384	596	596	1,001	1,589
		60Hz	47	74		215	413		618			
Ultimate pressure (*1)		[Pa]	5.0		10	6.7×10^{-1}		1.2	6.7×10^{-1}	1.2		6.7×10^{-1}
		[Torr]	3.7×10^{-2}		0.08	5.0×10^{-3}		0.01	5.0×10^{-3}	0.01		5.0×10^{-3}
		[mbar]	5.0×10^{-2}		0.1	6.7×10^{-3}		0.01	6.7×10^{-3}	0.01		6.7×10^{-3}
Inlet port (optional)			VG50 (KF40)	VG80 (KF50)	VG100	VG80 (KF80)			VG100 (KF100)		VG150	
Outlet port			KF40		VG50	KF40						KF50
Dry pump surface treatment			with									
Mechanical booster pump surface treatment			with									
Power supply [VAC] (Hz)		3 phase	200 (50/60) , 220 (60)			200 (50/60) , 220 (60)						180 to 240 (50/60), 380 to 440 (50/60)
Current (at max. load) [A]			7.3	11.8	52.5	8.1	13.8	17.3	18.9	22.4	34.9	68.3
Cooling Water Flow Rate [L/min]			＞5.0									＞4.0
Nitrogen purge [SLM]		Shaft seal	5									
		Gas ballast	0 to 45		0 to 195	0 to 45					0 to 195	
Operation mode			3									
Weight [kg]			180	245	415	251	371		403		545	720
Dimensions [mm]		W	378	428	668	378	470				528	668
		D	900	967	1,106	910	987 (UR:1054)				1,213	1,159
		H	530	579	742	831	951				1,037	1,274
Applicable standard			CE (Option)									

*) When making a request for estimation/when ordering, please notify us about the voltage used. * The HR and UR include the exhaust piping heater.
*) Please do not carry out continuous operation for the HR300, HR600, HR1200, UR600, UR1200, UR1800 and UR3601 at a pressure above 200Pa. There may be a case where the pump temperature may become abnormal and the interlock may activate. *) 1 Values only when flowing 5SLM shaft seal gas for Model : HR. The value when flowing 5SLM gas ballast gas for Model : UR

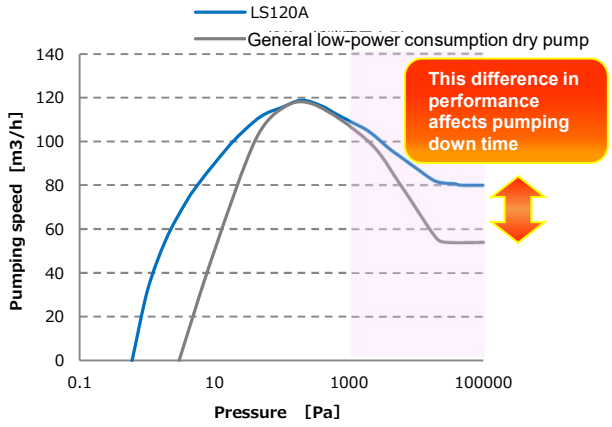
Screw type Model : LS

Dry Pump which has both high pumping speed and low power consumption.
Enable to select suitable pump from 4 different pumping speed model depending on the use condition.

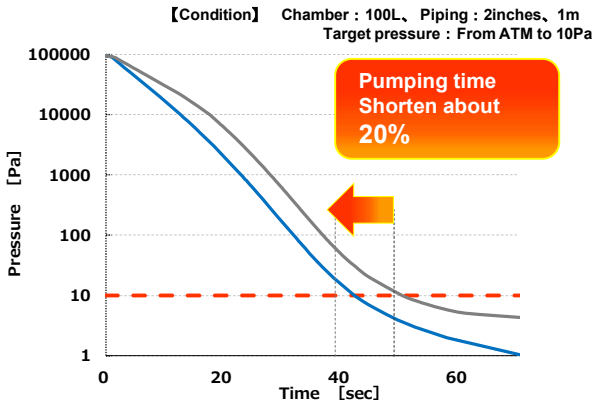
LS120A

- **High pumping speed**
  High pumping speed at near atmospheric pressure, and pumping down time can be drastically reduced
- **Low power consumption**
  ECO-SHOCK technology realizes low power consumption (C Type)
  Power consumption at the ultimate pressure is the industry-leading 0.6kW or less(LS120A-C)
- **Low noise**
  Built-in silencer achieves the noise level 61dB(A) or less
- **Low running-cost**
  No shaft sealing gas
  ※Purge gas is available with L Type.

- **Difference in pumping speed**



- **Influence on pumping down time**



This data is a calculated value. It may differ from the actual condition under the influence of the discharge Gas etc.

- **2 types for specific application**

C Type : Clean process (LS***A-**C**)
Feature : Low power consumption model (with built-in ECO-SHOCK)
Applications : For clean process such as air and N2 Sputtering/Vapor deposition/Lamination/Load lock/ TMP backing pump etc.

L Type : Light process (LS***A-**L**)
Features : Light process model(with surface treatment and purge function)
Applications : For light process such as steam and volatile liquid medicine Vacuum drying/Freeze drying/Ashing/ General industrial use etc.

Model	(C : C Type *4) (L : L Type)		LS120A		LS300A		LS600A		LS1200A	
			C	L	C	L	C	L	C	L
Max.pumping speed		m^3/h	120		380		600		1000	
		L/min	2000		6333		10000		16666	
		CFM	71		223		353		588	
Ultimate pressure		Pa	0.6		0.1					
		Torr	0.005		0.0008					
		mbar	0.006		0.001					
Power supply			200V Class : 3Phase,50/60Hz,AC200-240V or 400V Class : 3Phase,50/60Hz,AC380-480V							
Power consumption ＊1		kW	0.6	2.0	1.0	2.5	1.3	2.6	1.3	2.7
Cooling water flow rate		L/min	>2.0		>4.0					
Purge gas flow rate ＊2		SLM	-	0～50	-	0～50	-	0～50	-	0～50
Max.water vapor tolerance＊3		kg/h	-	1.5	-	1.5	-	1.5	-	1.5
Noise		dB(A)	61		61		62		64	
Inlet port			KF50(Horizontal)／ VG50(Vertical)		ISO-F-80		ISO-F-80		ISO-F-100	
Outlet port			KF40							
Dimension	W×D×H	mm	311×639×307		311×639×537		311×639×563		311×639×563	
Weight		kg	142		220		242		266	
Applicable standard			CE, cTUVus							
Standard accessory			Instruction manual(CD-R)、Power connector, Waterproof cable clamp, Remote connector, Guard for power connector							
Pump head option			Power supply : 200V Class or 400V Class, Material of seal : FFKM(L type only)							
External option			MBP inlet flange adaptor, Package Exhaust port, Earthquake-proof Bracket、 LR compatible Unit(Inlet, Remote)、Purge gas valve							

＊1 : At ultimate pressure (reference only)
＊2 : Purge gas is not available with C Type.
＊3 : Max.water vapor tolerance is a value when purge gas is used.
＊4 : C type is not leak less.

Screw type Model : MS

Model : MS is a vacuum pump which is categorized as screw type dry vacuum pump. Corrosion resistance and powder exhaust are improved as process resistance model based on traditional Model : LS. This model is designed for the process of using corrosion gas and powder exhausting.

MS120A

- **High corrosion resistance**
  Applying special surface treatment , corrosion resistance is equivalent to SUS.
- **High powder exhausting**
  Unique screw design is applied.
- **High motive power**
  Applying ULVAC design high motive power motor. 6 times higher motive power than traditional model(LS120).
  Showing power at rebooting after powder exhausting
- **Continuous exhausting in all pressure**
  Realize Continuous running in all pressure from atmosphere to ultimate.

Model			MS120A	MS600A	MS1200A
Max.pumping speed		m^3/h	115	560	980
		L/min	1917	9333	16333
		CFM	68	331	580
Ultimate pressure		Pa	0.6	0.1	
		Torr	0.005	0.0008	
		mbar	0.006	0.001	
Power supply			200V Class : 3Phase,50/60Hz,AC200-240V±10% or 400V Class : 3Phase,50/60Hz,AC380-480V±10%		
Power consumption ＊1		kW	2.4	3.1	3.1
Cooling water flow rate		L/min	>4.0		
Purge gas flow rate		SLM	0～50		
Max.water vapor tolerance＊2		kg/h	1.5		
Noise		dB(A)	61	62	64
Inlet port			KF50(Horizontal)／VG50(Vertical)	ISO-F-80	ISO-F-100
Outlet port			KF40		
Dimension	W×D×H	mm	311×945×536	311×945×563	311×945×563
Weight		kg	139	241	264
Applicable standard			CE、cTUVus		
Standard accessory			Quick manual, Power connector, Waterproof cable clamp , Remote connector, Guard for power connector, Silencer		
Pump head option			Power supply : 200V Class or 400V Class, Material of seal : FKM or FFKM		
External option			Package Exhaust port, Earthquake-proof Bracket, LR compatible Unit(Inlet, Remote), Purge gas valve		

＊1 : At ultimate pressure (reference only)
＊3 : Max.water vapor tolerance is a value when purge gas is used.

Roots type with General-purpose Motor Model : GR

Simplified designed for general industrial applications based on long time experience of the LR.

GR90A

- Multi-voltage motor.
- General-purpose induction motor. Special motor such as explosion-proof motor is available (RFQ) .

Model			GR60A	GR90A	GR180A
Maximum pumping speed	[m^3/h]	50Hz/60Hz	62 / 80	112 / 126	183 / 237
	[L/min]	50Hz/60Hz	1,030 / 1,333	1860 / 2100	3100 / 3950
	[[CFM]	50Hz/60Hz	36.4 / 47.1	65.7 / 74.2	109.5 / 139.5
Ultimate pressure (*1)		[Pa]	5.0		
		[Torr]	3.7×10^{-2}		
		[mbar]	5.0×10^{-2}		
Inlet port (optional)			VG50 (ISO63F)	VG80 (ISO80F)	
Outlet port			KF40		
Power supply (*2)		50Hz	Multi voltage motor : AC200 to 240V / AC380 to 415V		
		60Hz	Multi voltage motor : AC200 to 240V / AC380 to 460V		
Motor rated value [kW]			2.2	3.7	7.5
Cooling water flow rate [L/min]			> 5.0		
Nitrogen gas [SLM]		Shaft seal	5 (*3)		
		Gas ballast	Optional		
Weight [kg]			128	188	268
Maximum water vapor tolerance (*4)			< 500 g/h	< 1,000 g/h	< 3,000 g/h
External dimensions W x D x H [mm]			320 x 1000 x 442	380 x 1100 x 495	470 x 1300 x 582

*1) With 5SLM shaft seal gas flow. *2) When requesting for an estimate or ordering, specify power supply and voltage. *3) Nitrogen gas (shaft seal) is constant at 5SLM. *4) Maximum value when gas ballast is used. Make sure to use a gas ballast mechanism when pumping down water vapor.

Silencer for Dry Vacuum Pumps Model : RS

RS-01 RS-02 RS-03

Model	Applicable pump model	Accessories			
		Clamp	Outer ring	Connection piping	Stay
RS-01 kit A	CR60B,LR60,90,300, GR60A,90A	1	1	n/a	n/a
RS-01 kit B	LR600,1200	2	2	1	1
RS-01 kit C	CR300B,GR180A	2	2	1	1
RS-01 kit D	CR16B,30B	1	1	1	n/a
RS-02 kit A	LR180,(LR60,90,300)	2	2	1	1
RS-02 kit B	LR1800(LR600,1200)	2	2	1	1
RS-03 kit A	LR421(-T)	1	1	1	1
RS-03 kit B	LR3601(-T/TT/R/TR/TTR)	3	3	1	1
EFS-11-NW25/2/2516 (*1)	CR16B,30B	1	1	n/a	n/a
EFS-19-NW40/1 (*1) (*2)	CR60B,300B	1	1	n/a	n/a

*1) Do not use for harmful gas. *2) Open type which is not connectable to rearward piping.

Power Saving Attachment for Dry Vacuum Pump Model : ECO-SHOCK

An attachment which reduces electrical power consumption by connecting to dry vacuum pumps

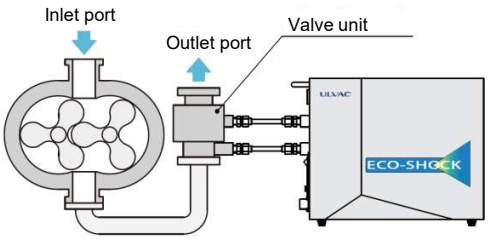
Patent Registered

ES4A

- Electrical power consumption can be reduced by connecting to dry vacuum pumps. It is possible to connect to any dry vacuum pump which there is not any problem to reduce pressure at its outlet port.
- Select the ES4A for frequently repetitive pumping down of large vacuum chamber and the pumps with an high pumping speed near atmospheric pressure.

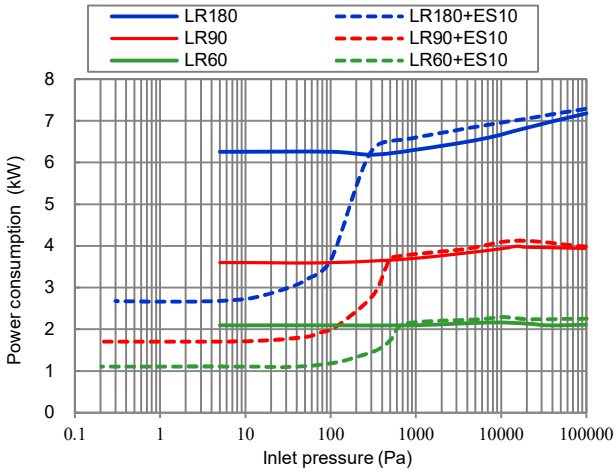
* Note: Do not use for any application where pump takes combustible, burnable and toxic gases, etc. and solid materials and liquids.

■ How to connect the ECO-SHOCK



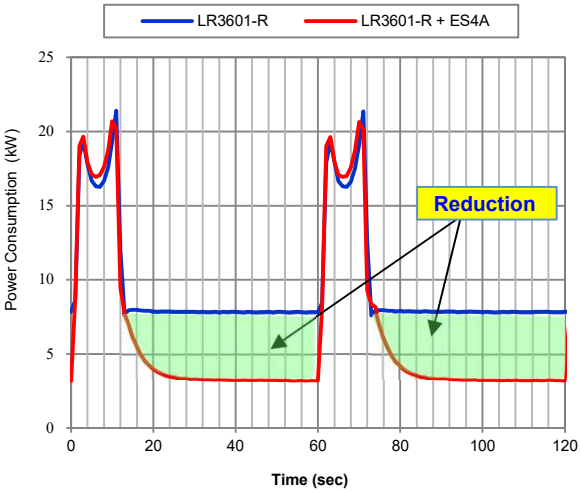
Dry Vacuum Pump　　Eco-SHOCK main unit

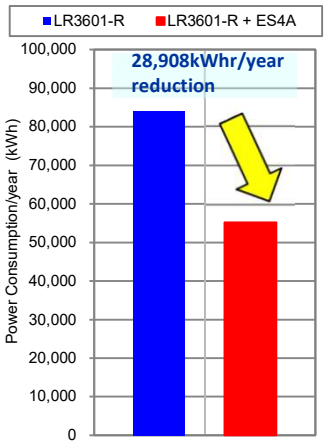
■ Electric power reduction efficiency of the ECO-SHOCK ES10



■Electrical power consumption effect

300L chamber repeat pumping down by 60 sec tact time.
Dry vacuum pump LR3601-R + ECO-SHOCK ES4A





Model		ES10	ES4A
Power Supply	Specifications	Single phase AC100 to 220V (±5%) 50/60Hz	Single phase AC200 to 220V (±5%) 50/60Hz
	Maximum apparent power [VA]	250	600
	Consumed electrical power [W]	65	400
External dimensions W x D x H	Main unit [mm]	175 x 330 x 240	250 x 515 x 373 (250 x 515 x 378) (*1)
	Valve unit [mm]	dia. 66 x 110 (KF40)	Not included (Optional)
Connection port		3/8 inch tube connector	16mm tube connector

* The valve unit is not included in the ES4A and sold separately. Select it in conformity with the pump to be connected.

Single Stage Oil Rotary Vane type Model : G

High performance, low noise, low vibration directly connected oil rotary vacuum pump.

G-5SA

G-25SA

G-101S

- This pump has many achievements. Inexpensive vacuum pump.
- Small and easy to carry. Suitable for embedding in equipment.
- These vacuum pumps are safe because they have built-in manual reset thermal protectors.

Structure	
Single stage	Double stage
Rotary vane	Rotary piunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve

Model			G-5SA	G-25SA	G-50SA	G-101S
Maximum pumping speed [m^3/h] (L/min/CFM)		50Hz	0.3 (5/0.175)	1.20 (20/0.7)	3.0 (50/1.75)	6.0 (100/3.5)
		60Hz	0.36 (6/0.21)	1.44 (24/0.84)	3.6 (60/2.1)	7.2 (120/4.2)
Ultimate pressure [Pa](Torr/mbar)		GP Close	100 (0.75/1)	9.3 ($7.0x10^{-3}$ /$9.3x10^{-3}$)	9.3 ($7.0x10^{-3}$ /$9.3x10^{-3}$)	9.3 ($7.0x10^{-3}$ /$9.3x10^{-3}$)
Motor	Output [kW] (Poles)		0.04 (4)	0.1 (4)	0.2 (4)	0.4 (4)
	Voltage [V]	50Hz	Single phase 100	Single phase 100 200 220 to 230	単相 100 200 220 to 230	Single phase 100 200
		60Hz				
	Full load current [A]	50Hz	0.92 (100V)	3.7 (100V)	5.6 (100V)	6.4 (100V)
		60Hz	0.73 (100V)	3.0 (100V)	4.8 (100V)	5.9 (100V)
Oil			SMR-100			
Oil capacity [L]			0.23	0.23	0.36	1.2
Cooling			Air cooled			
Inlet port			O.D.φ12 × I.Dφ6	O.D.φ12 × I.Dφ6	O.D.φ12 × I.Dφ6	O.D.φ12 × I.Dφ6
Outlet port			Exhaust cap (G3/4)			Exhaust cap (G1)
Weight [kg]			4.5	8.5	11.0	22.3
Dimensions W x D x H [mm]			130 × 203 × 159.5	156 × 284 × 199.5	156 × 341 × 199.5	234 × 500.5 × 264
Applicable standard			-	-	-	-

※ Select the motor voltage specification from among several specifications.

Two Stage Oil Rotary Vane type Model : G

High performance, low noise, low vibration directly connected oil rotary vacuum pump.

G-10DA

G-50DA

G-101D

- This pump has many achievements. Inexpensive vacuum pump.
- Small and easy to carry. Suitable for embedding in equipment.
- These vacuum pumps are safe because they have built-in manual reset thermal protectors.

Structure	
Single stage	Double stage
Rotary vane	Rotary piunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve

Model			G-5DA	G-10DA	G-20DA	G-50DA	G-101D
Maximum pumping speed [m^3/h] (L/min/CFM)		50Hz	0.3 (5/0.175)	0.60 (10/0.35)	1.20 (20/0.7)	3.0 (50/1.75)	6.0 (100/3.5)
		60Hz	0.36 (6/0.21)	0.72 (12/0.42)	1.44 (24/0.84)	3.6 (60/2.1)	7.2 (120/4.2)
Ultimate pressure [Pa](Torr/mbar)		GP Close	6.7 ($5.0x10^{-2}$/$6.7x10^{-2}$)	1.3 ($9.8x10^{-3}$/$1.3x10^{-2}$)	1.3 ($9.8x10^{-3}$/$1.3x10^{-2}$)	1.3 ($9.8x10^{-3}$/$1.3x10^{-2}$)	0.67 ($5.0x10^{-3}$/$6.7x10^{-3}$)
Motor	Output [kW] (Poles)		0.04 (4)	0.06 (4)	0.1 (4)	0.2 (4)	0.4 (4)
	Voltage [V]	50Hz	Single phase 100 115 220	Single phase 100 115 220	Single phase 100 200 220 to 230	Single phase 100 200 220 to 230	Single phase 100 200
		60Hz					
	Full load current [A]	50Hz	0.92 (100V)	1.38 (100V)	3.7 (100V)	5.6 (100V)	6.4 (100V)
		60Hz	0.73 (100V)	1.22 (100V)	3.0 (100V)	4.8 (100V)	5.9 (100V)
Oil			SMR-100				
Oil capacity [L]			0.18	0.25	0.18	0.26	0.8
Cooling			Air cooled				
Inlet port			O.D.φ12×I.Dφ6	O.D.φ18×I.Dφ14	O.D.φ18×I.Dφ14	O.D.φ18×I.Dφ14	O.D.φ27×I.Dφ20
Outlet port			Exhaust cap (G3/4)				Exhaust cap (G1)
Weight [kg]			5.0	5.5	9.0	11.0	23.1
Dimensions W x D x H [mm]			130×203×159.5	130×228×165	156×295.5×199.5	156×341×199.5	234×500.5×264
Applicable standard			-	-	-	-	-

※ Select the motor voltage specification from among several specifications.

Two Stage Oil Rotary Vane type Model : GLD

High performance, low noise, low vibration directly connected oil rotary vacuum pump.

GLD-137CC

- The exhaust speed is stable due to the installation of the forced oil supply mechanism.
- The backflow prevention mechanism prevents oil from flowing back to the vacuum chamber when it is stopped due to a power failure.

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve

Model			GLS-051	GLD-051	GLD-040
Maximum pumping speed [m^3/h] (L/min/CFM)		50Hz	3.0 (50/1.75)		2.4 (40/1.4)
		60Hz	3.6 (60/2.1)		2.88 (48/1.68)
Ultimate pressure [Pa] (Torr/mbar)			9.3 (7.0x 10^{-2} /9.3x 10^{-2})	6.7 x 10^{-1} (5.0x 10^{-3} /6.7x 10^{-3}) GP Close	
Motor	Output [kW] (Poles)		0.2 (4)		
	Voltage [V]	50Hz	Single phase 100 200 220 to 230	Single phase 100 200 220-230 Three phase 200-240 / 380-460	Single phase 100 to 120 / 200 to 240
		60Hz			
	Full load current [A]	50Hz	5.6 (100V)		4.2 (100V) / 4.4 (110V) 4.6 (115V) / 5.05 (120V) 2.1 (200V) / 2.2 (220V) 2.3 (230V) / 2.6 (240V)
		60Hz	4.8 (100V)		3.6 (100V) 4.2 / 3.4 (110V) 3.4 (115V) / 3.6 (120V) 1.8 (200V) / 1.7 (220V) 1.7 (230V) / 1.8 (240V)
Oil			SMR-100		R-2
Oil capacity [L]			0.4 ～ 0.7	0.5 ～ 0.8	0.55 ～ 0.8
Cooling			Air cooled		
Inlet port			KF25		
Outlet port			Exhaust cap (G3/4)		
Weight [kg]			12.9	13.9	16
Dimensions W x D x H [mm]			165.5 x 361 x 222.5	165.5 x 395 x 222.5	150 x 427 x 227.5
Applicable standard			-	-	CE, TUV, cTUVus

Model			GLD-137AA	GLD-137CC	GLD-202AA	GLD-202BB	GLD-280A
Maximum pumping speed[m^3/h] (L/min/CFM)		50Hz	8.1 (135/4.725)		12 (200/7.0)		16.8 (280/9.8)
		60Hz	9.72 (162/5.67)		14.4 (240/8.4)		20.2 (336/11.76)
Ultimate pressure [Pa] (Torr/mbar)			6.7 x 10^{-1} (5.0x 10^{-3} /6.7x 10^{-3}) GP Close				
Moto	Output [kW] (Poles)		0.4 (4)	0.4 (4)	0.55 (4)	0.55 (4)	0.75 (4)
	Voltage [V]	50Hz	Three phase 200 to 240 / 380 to 460	Single phase 100 to 120 / 200 to 240	Three phase 200 to 240 / 380 to 460	Single phase 100 to 120 / 200 to 240	Three phase 200 to 240 / 380 to 460
		60Hz					
	Full load current [A]	50Hz	2.1 (200V) / 2.2 (220V) 2.3 (230V) / 2.5 (240V) 1.3 (380V) / 1.3 (400V) 1.4 (415V)	6.8 (100 ～ 120V) 3.5 (200 ～ 240V)	2.9 (200V) / 3.1 (220V) 3.3 (230V) / 3.6 (240V) 1.8 (380V) / 1.9 (400V) 2.0 (415V)	8.2 (100 ～ 120V) 4.1 (200 ～ 240V)	3.6 (200V) / 3.8 (220V) 4.0 (230V) / 4.2 (240V) 2.2 (380V) / 2.2 (400V) 2.4 (415V)
		60Hz	2.0 (200V) / 1.9 (220V) 1.9 (230V) / 2.0 (240V) 1.1 (380V) / 1.1 (400V) 1.15 (440V) / 1.2 (460V)	5.8 (100 ～ 120V) 2.9 (200 ～ 240V)	2.7 (200V) / 2.6 (220V) 2.7 (230V) / 2.7 (240V) 1.5 (380V) / 1.6 (400V) 1.6 (440V) / 1.7 (460V)	7.9 (100 ～ 120V) 3.9 (200 ～ 240V)	3.2 (200V) / 3.2 (220V) 3.2 (230V) / 3.3 (240V) 1.8 (380V) / 1.9 (400V) 2.0 (440V) / 2.1 (460V)
Oil			SMR-100				ULVOIL R-72
Oil capacity [L]			1.0		1.1		0.7 ～ 1.1
Cooling			Air cooled				
Inlet port			KF25				
Outlet port			Exhaust cap (G1)				
Weight [kg]			26	29	29	31	34.5
Dimensions W x D x H [mm]			170 x 485.5 x 240	170 x 487.5 x 249.5	170 x 513.5 x 240	170 x 515.5 x 249.5	181 x 536 x 269
Applicable standard			CE , TUV	CE , TUV , cTUVus	CE , TUV	CE , TUV , cTUVus	CE , TUV

Two Stage Oil Rotary Vane type Model : GHD

Oil rotary vacuum pump with magnet coupling structure.

GHD-031A

- Wide range voltage motor and correspond to CE, cTUVus.
- Integrated check valve below the inlet port for backflow prevention.

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve

Model			GHD-031B	GHD-101D
Maximum pumping speed [m^3/h] (L/min/CFM)		50Hz	1.8 (30/1.05)	6 (100/3.53)
		60Hz	2.16 (36/1.26)	7.2 (120/4.24)
Ultimate pressure [Pa](Torr/mbar)		GP Close	6.7 x 10^{-1}(5.0 x 10^{-3}/6.7 x 10^{-3})	
Motor	Output [kW] (Poles)		0.1 (2)	0.3 (2)
	Voltage [V]	50Hz	Single phase 200 to 240	Single phase 220 to 240
		60Hz		
	Full load current [A]	50Hz	0.94 (200V) / 0.84 (240V)	2.5
		60Hz	1.02 (200V) / 1.03 (240V)	2.7
Oil			ULVOIL R-2	
Oil capacity [L]			0.37	1.0
Cooling			Air cooled	
Inlet port			KF16	KF25
Outlet port			Exhaust cap (G3/4)	Exhaust cap (G1)
Weight [kg]			9.3	22
Dimensions W x D x H [mm]			120 x 288.5 x 163	150 x 413.5 x 234.5
Applicable standard			CE , TUV , cTUVus*1	

*1) GHD-031B (200 to 240V) , GHD-101B (115 to 120V) , GHD-101C (200V) , GHD-101D (220 to 240V) are compatible models too.
※All single phase

Two Stage Oil Rotary Vane type Model : GCD

A chemical type oil rotary vacuum pump with surface treatment on the gas contact part.

- Wide range voltage motor adopted.
- Connectable to Oil Filtration Device

GCD-136X

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve

Model			GCD-051X	GCD-136X	GCD-201X
Maximum pumping speed [m^3/h] (L/min/CFM)		50Hz	3 (50/1.75)	8.1 (135/4.73)	12 (200/7)
		60Hz	3.6 (60/2.1)	9.72 (162/5.67)	14.4 (240/8.4)
Ultimate pressure [Pa](Torr/mbar)	GP Close		6.7×10^{-1}(5.0×10^{-3}/6.7×10^{-3})		
Motor	Output [kW] (Poles)		0.2 (4)	0.4 (4)	0.7 (4)
	Voltage [V]	50Hz	Single phase 220 to 230	Single phase 220	Single phase 220
		60Hz			
	Full load current [A]	50Hz	2.4 (100V) / 2.5(230V)	3.6	3.6
		60Hz	2.0 (220V) / 2.0(230V)	2.8	3.3
Oil			SO-M		
Oil capacity [L]			0.5 to 0.8	1.0	1.1
Cooling			Air cooled		
Inlet port			KF25		
Outlet port			KF25		
Weight [kg]			14.1	25.4	26.6
Dimensions W x D x H [mm]			165.5 x 419 x 222.7	170 x 493 x 241.1	170 x 509.5 x 241.1
Applicable standard			—		

Double Stage Rotary Vane type Model : VD Ver. C

With high efficiency (IE3) full multi-voltage motor developed by ULVAC. For various kinds of application.

VD90C


Original
IE3 Motor

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water Cooling
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve
Option	
Type. F: Fluorine Oil	
Type. N: NBR（Nitrile rubber）	
Type. B: Silicon＆Nitrile rubber	
Type. H: Helium tight	

- Single kind high efficient (IE3) full multi-voltage covers wide range voltage from 200 to 240V / 380 to 460V.
- Forced oil circulation makes pumping performance stable even near atmospheric pressure. Suitable for repetitive and consecutive operation between atmospheric and vacuum.
- Various specification , F , N , B and H are available in addition to standard model.

Model			VD30C	VD40C	VD60C	VD90C
Designed pumping speed [m^3/h] (LPM / CFM)		50Hz	30 (500 / 17.7)	40 (670 / 23.5)	60 (1,000 / 35.3)	90 (1,500 / 53.0)
		60Hz	36 (600 / 21.2)	48 (800 / 28.3)	72 (1,200 / 42.4)	108 (1,800 / 63.6)
Ultimate pressure [Pa] (Torr / mbar)	Gas ballast port closed		0.67 (5×10^{-3}／6.7×10^{-3})			
Motor	Output [kW] (Poles)		1.5 (4)	1.5 (4)	2.2 (4)	3.7 (4)
	Voltage [V]	50Hz	Three phase 200 to 240 / 380 to 415 (Multi-Voltage Motor)			
		60Hz	Three phase 200 to 240 / 380 to 460 (Multi-Voltage Motor)			
Standard Oil			ULVOIL R-72			
Oil capacity [L]			1.0 to 2.5		2.5 to 4.0	
Cooling method			Air cooled			
Inlet port (optional)			VG40 (KF40)		VG50 (KF50 or ISO63F)	
Outlet port (optional)			VG40 (KF40)			
Weight [kg]			58	60	90	113
Dimensions W x D x H [mm]			210 x 660 x 324	210 x 680 x 324	280 x 761 x 371	280 x 831 x 371
Applicable standard			CE, cTUVus			

Type F	○	○	○	○
Type N	○	○	n/a	n/a
Type B	○	○	n/a	n/a
Type H	○	○	○	○

Type	Target model	Spec	Remarks
F	Model : VD	J60F（Fluorine Oil）	Flammable Gas Countermeasures. Countermeasures against oil degradation by oxidizing gases.
N	Model : VD	NBR（Nitrile rubber）	When evacuating gases or solvents that FKM (fluorine rubber) is not resistant to.
K	Model : PVD Model : PKS	FKM（Fluorine rubber）	When the pump is used at high-temperature. For continuous vacuum evacuation at high pressure.
B	Model : VD	Silicone rubber＋NBR（Nitrile rubber） Structure to put new oil into oil seal. Surface treatment to rotor shaft.	Brake fluid filling process.
R	Model : VS1501／VS2401 Model : PKS	Cooling water pipe : SUS	Cooling water pipe for corrosion prevention.
H	Model : VD Model : PVD Model : PKS	He leak test. Structure to put new oil into oil seal.	Countermeasures to Flammable Gases. Helium tight.
Z	Model : PVD	Large Oil Tank.	Increase the amount of oil and extend the oil change cycle.

Single Stage Oil Rotary Vane type Model : VS1501／VS2401

Lower ultimate pressure even it is single stage oil rotary vane pump.

VS2401

Main applications:
- Evaporation, sputtering system
- Vacuum absorption, transportation, moulding
- Vacuum impregnation, casting
- Vacuum drying, freeze drying
- Leak test system

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve
Option	
Type. R: Anti-rust cooling water system	

- High efficiency multi voltage motor (IE-3) which enable to use 200-240 / 380-460 V.
- Lower vibration structure compared with Rotary plunger model. Suitable when installing at upper floor.
- Forced oil circulation makes pumping performance stable even near atmospheric pressure. Suitable for repetitive and consecutive operation between atmospheric and vacuum.

Model			VS1501	VS2401
Designed pumping speed [m^3/h] (LPM / CFM)		50Hz	150 (2,500 / 88.3)	240 (4,000 / 141.3)
		60Hz	180 (3,000 / 105.9)	288 (4,800 / 169.5)
Ultimate pressure [Pa] (Torr / mbar)	Gas ballast port closed		5.3 ($3.9x10^{-2}$／$5.3x10^{-2}$)	
Motor	Output [kW] (Poles)		5.5 (4)	7.5 (4)
	Voltage [V]	50Hz	Three phase 200 to 240 / 380 to 415 (Multi-Voltage Motor)	
		60Hz	Three phase 200 to 240 / 380 to 460 (Multi-Voltage Motor)	
Oil			ULVOIL R-72	
Oil capacity [L]			8.0 to 10.5	
Cooling method			Water cooled	
Inlet port (optional)			VG80 (ISO80F)	
Outlet port (optional)			VG50 (KF50 or ISO63F)	
Weight [kg]			232	271
Dimensions W x D x H [mm]			333 x 941 x 460	333 x 1,061 x 460

Single Stage Oil Rotary Vane type Model : VS300A-W

VS300A-W is classified as a single stage oil rotary vane pump.
Smallest footprint in the class and allows the direct mounting of Mechanical booster pump.

VS300A-W

PMB1200D
＋VS300A-W

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve

Main applications:
- Evaporation, sputtering system
- Vacuum Heat treatment furnace systems
- Vacuum drying
- Leak test system

- Smallest footprint in the class ： Compact design of 874×404mm.
- Mechanical booster pump allowed to be directly mounted ： MBP mount kit allows a direct mounting without frame.
- Built-in oil mist separator ： Oil mist separator is build-in in standard.

Model			VS300A-W
Designed pumping speed [m^3/h] (LPM / CFM)		50Hz	250 (4,166 / 147.1)
		60Hz	300 (5,000 / 176.6)
Ultimate pressure [Pa] (Torr / mbar)	Gas ballast port closed		15 ($1.1x10^{-1}$／$1.5x10^{-1}$)
Motor	Output [kW] (Poles)		7.5 (4)
	Voltage [V]	50Hz	Three phase 200 to 240 / 380 to 415 (Multi-Voltage Motor)
		60Hz	Three phase 200 to 240 / 380 to 460 (Multi-Voltage Motor)
Oil			ULVOIL R-72
Oil capacity [L]			10 to 15
Cooling method			Water cooled
Inlet port (optional)			DN 63 ISO-F
Outlet port (optional)			G2
Weight [kg]			270
Dimensions W x D x H [mm]			404 x 871 x 585
Overseas safety standards			CE、cTUVus

Large Size Single Stage Oil Rotary Vane Model : VS650B /

Large size and low vibration single stage oil rotary vane pump.

VS650B-A

PMB2400D＋VS650B-W

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve

- Selectable from air and water cooled type. Oil cooler is used for oil temperature cooling for a air cooled model.
- Equipped with a cartridge-type oil mist filter inside the oil tank.
- VS650B-WL : Low noise (72dB) pumps has been added to the lineup.

Main applications:
- Evaporation, sputtering system
- Vacuum furnace
- Leak test system
- Large vacuum chamber evacuation.

Model			VS650B-A	VS650B-W	VS650B-WL	VS750B-A	VS750A-W
Design Exhaust Speed [m^3/h] (LPM / CFM)		50Hz	650 (10,833 / 383)		600 (10,000 / 353)	750 (12,500 / 441)	
		60Hz	750 (12,500 / 441)			n/a	
Ultimate pressure [Pa] (Torr / mbar)	Gas ballast port closed		8 ($6x10^{-2}$／$8x10^{-2}$)				
Motor	Output [kW] (Poles)	50Hz	22 (4)				
		60Hz	25 (4)			n/a	
	Voltage [V]	50Hz	Three phase 200 to 240 / 380 to 415 (Multi-Voltage Motor)				
		60Hz	Three phase 200 to 230 / 380 to 460 (Multi-Voltage Motor)			n/a	
Oil					ULVOIL R-72		
Oil capacity [L]			23 to 27	25 to 30	25 to 30	23 to 27	25 to 30
Cooling method			Air cooled	Water cooled	Water cooled	Air cooled	Water cooled
Inlet port			DN 100 ISO-K				
Outlet port			DN 100 ISO-K				
Weight [kg]			855				
Dimensions W x D x H [mm]			1,490 x 905 x 705	1,490 x 841 x 705	1,490 x 841 x 705	1,490 x 905 x 705	1,490 x 841 x 705
Overseas safety standards			–				

Double Stage Rotary Vane type Model : PVD

Legacy and small size double stage oil rotary vane pump.

PVD-180

Main applications:
- Vacuum drying, freeze drying
- Gas and liquid charging
- Vacuum absorption, transportation, moulding
- Vacuum impregnation, casting

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve
Option	
Type. K: FKM（Fluorine rubber）	
Type. H: Helium tight	
Type. Z: Large Oil Tank	

- Quiet and low speed rotation.
- PVD-180B / PVD-360B : A solenoid valve is installed to prevent oil from flowing back to the intake side.

Model			PVD-180 (B)	PVD-360 （B）
Designed pumping speed [m3/h] (LPM / CFM)		50Hz	9 (155 / 5.3)	19 (310 / 11.2)
		60Hz	11 (186 / 6.5)	22 (372 / 12.9)
Ultimate pressure [Pa] (Torr / mbar)	Gas ballast port closed		0.67 ($5x10^{-3}$／$6.7x10^{-3}$)	
Motor	Output [kW] (Poles)		0.4 (4)	0.75 (4)
	Voltage [V]	50Hz	Three phase 200（200V class）*1	
		60Hz	Three phase 200 to 220 （200V class）*1	
Oil			ULVOIL R-72	
Oil capacity [L]			0.3	0.5
Cooling method			Air cooled	
Inlet port			dia. 28 x dia. 19	dia. 34 x dia. 27
Outlet port			G3/4	G1
Weight (without Motor) [kg]			33.5	43
Dimensions W x D x H [mm]			265 x 470 x 321	303 x 488 x 321

*1 : 400V class is optional（50Hz : 380、400、415 60Hz : 440、460） ※440V/60Hz only for PVD-180(B)

Rotary Plunger type Model : PKS

Legacy and robust single rotary plunger pump.

PKS-070B

Main applications:
- Vacuum heat treatment, vacuum sintering, vacuum carburization
- Solvent evacuation
- Vacuum impregnation, casting
- Large vacuum chamber evacuation

Structure	
Single stage	Double stage
Rotary vane	Rotary plunger
Direct driven	Belt driven
Air cooled	Water cooled
Forced oil circulation	Differential pressure oil circulation
Oil back flow prevention mechanism	Back flow prevention valve
Option	
Type. R: Anti-rust cooling water system	
Type. K: FKM（Fluorine rubber）	
Type. H: Helium tight	

- Robust and long life. Low speed rotation with few sliding parts.
- Excellent abrasion resistance material are used.
- High efficiency multi voltage motor (IE-3) which enable to use 200-240 / 380-460 V.

※ Please select the voltage of solenoid for oil circulation.

※ For PKS-070B with 200V class, 200V class motor will be recommended.

- For PKS-070B, bigger oiler and oil level gauge are introduced. Inspection hole for V belt is added.

Model			PKS-016	PKS-030	PKS-070B
Design Exhaust Speed [m^3/h] (LPM / CFM)			96 (1,600 / 56.5)	180 (3,000 / 105.9)	420 (7,000 / 247.2)
Ultimate pressure [Pa] (Torr / mbar)	Gas ballast port closed		2.7 ($2x10^{-2}$／$2.7x10^{-2}$)		
Motor	Output [kW] (Poles)		2.2 (4)	3.7B B(4)	11 (6)
	Voltage [V]	50Hz	Three phase 200 to 240 / 380 to 415 (Multi-Voltage Motor) , Three phase 200 (200V class Motor) Only available with PKS-070B		
		60Hz	Three phase 200 to 240 / 380 to 460 (Multi-Voltage Motor) , Three phase 200 to 230 (200V class Motor) Only available with PKS-070B		
Oil			ULVOIL R-72		
Oil capacity [L]			6.5	8	20
Cooling method			Air cooled	Water cooled	
Inlet port (optional)			VG50 (ASA1.5)	VG80 (ASA2)	VG100 (ASA3)
Outlet port (optional)			VF50 (ASA1.5)	VF80 (ASA2)	VF100 (ASA3)
Weight (without motor) [kg]			225	380	900
Dimensions W x D x H [mm]			587 x 884 x 572	721 x 675 x 973	971 x 983 x 1,190

Oil Mist Trap Model : TM / TMX

The trap to eliminate oil smoke exhausted from oil rotary vacuum pump.

- Exhaust sound is reduced especially at the time of repeat operation between ultimate pressure and atmospheric pressure.
- Cartridge type filter makes filter replacement easy.

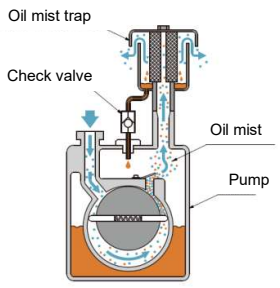
TM401

Model *1	Connecting flange (pump side / outlet side)	Weight [kg]	Material	Dimensions [mm]	For (pump model)	Remarks *2
TMX-1	Special (with adapter) / G1 x 1/2 (with screwed cover)	1.1	Main unit : soft steel (SPCC) Filter : glass wool	dia. 106 x 193	PVD-180, PVD-360, GLD-202, GLD-280	
TM201	VF40 / G1 x 1/2 (with screwed cover)	8.5		dia. 165.2 x 280	VD30C / VD301, VD40C / VD401	Low load type
TM401	VF40 / G1 x 1/2 (with screwed cover)	10		dia. 165.2 x 350	VD30C / VD301, VD40C / VD401	High load type
					VD60C / VD601, VD90C / VD901	Low load type
TM-2	VF40 (with adapter) / G2 (with screwed cover)	9.3		dia. 285 x 520	VD60C / VD601, VD90C / VD901	High load type
	VG50 / G2 (with screwed cover)			dia. 285 x 450	PKS-016	
TM-2F	VF40 (with adapter) / VG50	9.8		dia. 285 x 525	VD60C / VD601, VD90C / VD901	High load type
	VG50 / VG50			dia. 285 x 455	PKS-016	
TM-3	VF50 / G3 (with screwed cover)	17		dia. 362 x 635	VS1501	
	VG80 / G3 (with screwed cover)			dia. 362 x 735	PKS-030	
TM-3F	VF50 / VG80	18		dia. 362 x 600	VS1501	
	VG80 / VG80			dia. 362 x 700	PKS-030	
TM-4	VF50 / G4 (with screwed cover)	35		dia. 442 x 945	VS2401	
	VG100 / G4 (with screwed cover)			dia. 442 x 1160	PKS-070	
TM-4F	VF50 / VG100	36		dia. 442 x 900	VS2401	
	VG100 / VG100			dia. 442 x 1120	PKS-070	
TM-4S	VF50 / VG100	64		dia. 450 x 1487	VS2401	High load type
	VG100 / VG100			dia. 450 x 1387	PKS-070	High load type

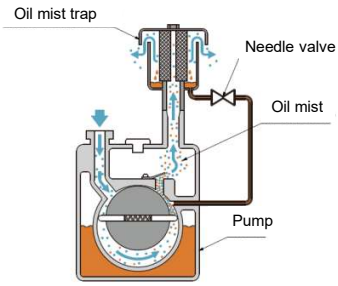
*1 F: Flange connection type instead of screwed cover.
*2 Select the high load when the pump repeatedly runs from atmosphere to vacuum in a short period or at the pressure higher than 10,000 Pa (100mbar / 75 Torr) for a long period .

Oil Mist Trap Oil Return Mechanism

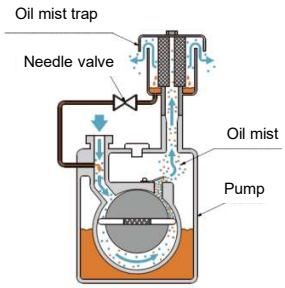
Oil return from the oil mist trap into the pump.



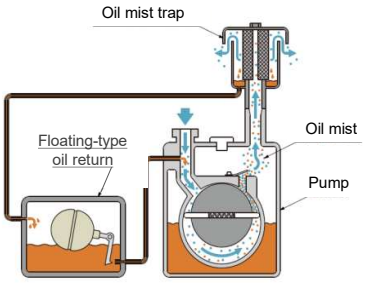
Oil return mechanism A



Oil return mechanism B



Oil return mechanism C



Oil return mechanism D

	Details	Recovery method	Effect on ultimate pressure	Recommended pressure range
Oil return mechanism A	Oil returns into the pump case through the check valve when the pump stops.	Semi-auto	Low	
Oil return mechanism B	Oil returns from the gas ballast port through the needle valve.	Manual	Some	
Oil return mechanism C	Oil returns from the inlet port side through the needle valve.	Manual	High	
Oil return mechanism D	Oil collected in the floating type oil return returns from the inlet port side.	Auto	Low	

[Pa]	1	10	10^2	10^3	10^4	Atmospheric pressure
[Torr / mbar]	10^{-2}	10^{-1}	1	10	10^2	

Continuously-workable pressure range
Repeatable working pressure range

* Oil return mechanism is not workable with the oil mist trap TMX-1.
The TMX-1 has a check valve inside like the oil return mechanism A.

Oil Mist Trap Model : OMT/OMI

The trap to eliminate oil smoke exhausted from oil rotary vacuum pump.

OMT-200A

- These traps are particularly effective when operating the pump at high pressure causing excessive oil misting from the pumps exhaust.
- Exchange of only an element (filter) is also possible.
- OMI is pipe connection-type oil-mist trap.

Model*1	Connecting Size	Weight [kg]	Material	Dimensions [mm]	For（pump model）	Remarks*2
OMT-050A	G3/4	0.105	Body: resin Filter: resin	dia.65×93	G-5DA, G-10DA, G-20DA, G-25SA, G-50SA, G-50DA, GLS-051, GHD-031A, GLD-040, GLD-051	
OMT-100A	G1	0.43	Body: resin Filter: resin	dia.113×135	GLD-040,GHD-031,GHD-101	
OMT-200A	G1	0.55	Body: resin Filter: resin	dia.113×135	GLD-137AA,GLD-137CC,GLD-202AA,GLD-202BB	
OMI-100	G1	1.25	Body: steel plate Filter: resin	dia.94×177	GLD-040,GHD-031,GHD-101	
OMI-200	G1	1.47	Body: steel plate Filter: resin	dia.116×178	GLD-137AA,GLD-137CC,GLD-202AA,GLD-202BB	

*1 Filter replaceable

*2 Adapter for Oil-mist Trap is necessary for GLD-040,GHD-031.

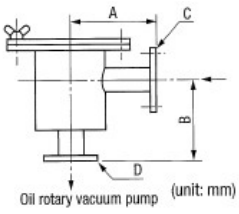
Used to change screw diameter G3/4 to G1 when you want to put an Oil-mist trap (OMT, OMI) on your exhaust port screw G3/4 pump.

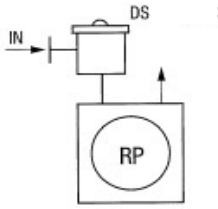
Model	Connecting size	Applicable models	Adaptive oil-mist traps
Adapter for Oil-mist Trap	G3/4 × G1	GLD-051, GLS-051, GLD-040, GHD-031	OMT-100A,OMI-100

Dust Filter Model : DS

Dust filter for gases containing dust, glass particle, etc.

- Stainless steel made enclosure powder fore line trap equipped with a filter element inside.
- Suitable when pumping down gases including dry powder with diameters of 10 μm or more.





Unit : mm

Model	For (pump model)	A	B	C (inlet port)	D (outlet port)
DS-20	PVD-180, GLD-202	90	90	VG20	VF20
DS-25	PVD-360, GLD-280			VG25	VF25
DS-40	VD30C / VD301, VD40C / VD401	140	195	VG40	VF40
DS-50	VD60C / VD601, VD90C / VD901			VG50	VF50
DS-2	PKS-016		290	VG50	VF50
DS-3	PKS-030	200	530	VG80	VF80
DS-4	PKS-070	220	583	VG100	VF100

Vacuum pump oil Model : ULVOIL

The ULVOIL is a vacuum pump oil developed for improving performance and extending life of vacuum pumps.




Model			R-42	R-72	R-80
Type			Mineral oil		
Ultimate pressure [Pa](Torr/mbar)			$<4\times10^{-1}$		<7
Characteristics	Color		Transparent pale yellow		
	Kinetic viscosity [mm^2/s]	40℃	46	68	57
		100℃	8	10	8
	Viscosity index		142	132	110
	Water content [%]		<0.01		
	Acid number [mgKOH/g]		<0.01		<1.9
	Density [g/cm^3]		0.86	0.88	
	Flash point [℃]		276	274	230
	Pour point [℃]		-17.5	-25	-37.5
Features			For low temperature start-up	For general purpose	For high temperature and load
Applicable vacuum pump			Oil rotary vacuum pump		
			Mechanical Booster Pump		-

Model			D-11	D-31	B-6
Type			Hydrocarbon	Silicon	Hydrocarbon
Ultimate pressure [Pa](Torr/mbar)			7×10^{-5}	3×10^{-8}	2.7×10^{-2}
Characteristics	Color		Transparent Pale Yellow	Colorless & Transparent	
	Kinetic viscosity [mm^2/s]	25℃	-	170	-
		40℃	32	-	22
	Steam pressure [Pa] (Torr / mbar)	20℃	7.3×10^{-5}	2.1×10^{-8}	1.2×10^{-5}
		40℃	1.7×10^{-3}	2.1×10^{-6}	1.4×10^{-4}
		100℃	1.5×10^{-1}	1.1×10^{-3}	3.3×10^{-1}
	Flash point [℃]		220	210	200以上
Features			For general purpose	For stable heat resistant	For ejector pump
Applicable vacuum pump			Oil diffusion pump		-
			-		Oil diffusion ejector pump

Model			SMR-100	MR-200	SO-M	R-2
Type			Mineral oil		Synthetic oil	
Ultimate pressure [Pa](Torr/mbar)			$<7\times10^{-1}$			
Characteristics	Color		Transparent Pale Yellow			
	Kinetic viscosity [mm^2/s]	40℃	44.6	71	63.7	17.3
		100℃	5.5	8.0	9.0	3.9
	Viscosity index		100	98	118	121
	Water content [%]		0.01			
	Acid number [mgKOH/g]		0.01			0.01 >
	Density [g/cm^3]		0.88	0.88	0.90	0.82
	Flash point [℃]		200	250	250	230
	Pour point [℃]		-15	-10	-15	-50
Features			For low temperature start-up	For high temperature and load	For heat and acid resistance	For low temperature start-up
Applicable vacuum pump			Oil rotary vacuum pump	Mechanical Booster Pump	Oil rotary vacuum pump	Oil rotary vacuum pump

Vacuum Pump Oil Model : BARRIERTA J FLUID

A non-flammable and low vapor pressure fluorine oil.
Excellent heat-resistance and oxidation resistance.

Model			J25F	J60F	J100F	J100F E
Type			Fluorine Oil			
Characteristics	Color		Colorless and transparent.			
	Kinetic viscosity [mm^2/s]	40℃	25	60	95	
		100℃	5	9	13	
	Viscosity index		85	130		
	Steam pressure [Pa] (Torr / mbar)	20℃	2×10^{-3}(1.5×10^{-5} / 2×10^{-5})	1×10^{-4}(7.5×10^{-6} / 1×10^{-6})	6×10^{-6}(4.5×10^{-8} / 6×10^{-8})	9×10^{-5}(6.7×10^{-7} / 9×10^{-7})
	Operating temperature range [℃]		-55 to 140	-50 to 160	-40 to 180	
Features			Low steam pressure, nonflammable, heat resistance, oxidation resistance, alkali resistance			
Applicable vacuum pump			Oil rotation vacuum pump		-	
			Mechanical booster pump		Mechanical booster pump	
			-		Dry vacuum pump	

Mechanical Booster Pump Model : MBS

A small type of a root type vacuum pump

MBS-053

- No oil leakage by adoption of magnet coupling.
- Can run it with the rotating speed that is the optimum which accepted load of a pump by using DC brushless motor, and can pump it from atmospheric pressure.
- Setting of a driver circuit is necessary in 100V system and 200V system.

Model			MBS-053
Maximum pumping speed[m^3/h] (L/min/CFM)		50Hz	50 (833/29.2)
		60Hz	
Ultimate pressure [Pa] (Torr/mbar)			4.0×10^{-2} (3.0×10^{-4}/4.0×10^{-4})
Motor	Output [kW] (Poles)		0.2 (DC Brushless motor)
	Voltage [V]	50Hz	Single phase 100 to 120 / 200 to 240
		60Hz	
	Current [A]	50Hz	1.2 (100V) / 0.8 (200V) ※At Ultimate pressure 4.33 (100V) / 2.54 (200V) ※At maximum load
		60Hz	
Oil			ULVOIL SMR-200
Oil capacity [L]			0.07
Cooling			Air cooled
Inlet port			VG40
Outlet port			VF40
Weight [kg]			11
Dimensions W x D x H [mm]			167 x 410 x 130
Backing pump			Oil rotary vacuum pump 130 to 240L/min
Applicable standard			-

Mechanical Booster Pumping Systems Model : VMR

It is the small high vacuum pumping system which made a mechanical booster pump, an oil rotary vacuum pump, and piping unify compactly.

VMR-050

- Handling and maintenance check are easy and ideal for an experiment.
- It is a pressure domain where the pumping speed of a backing pump decreases, and the steep rise of pumping speed is possible.
- An installation space is compact.
- By pushing a button, it exhausts at a stretch to ultimate pressure.

Model			VMR-050
Maximum pumping speed[m^3/h] (L/min)		50Hz	833 (9633.5)
		60Hz	
Ultimate pressure [Pa](Torr/mbar)			4.0×10^{-2} ($5.32/4.0 \times 10^{-4}$) (at 100Pa)
Motor	Output [kW] (Poles)		0.75
	Voltage [V]	50Hz	Single phase 100 to 120 / 200 to 240 1.5kVA
		60Hz	
	Current [A]	50Hz	12.5 (100 to 120V , 50Hz / 60Hz) 6.6 (200 to 240V , 50Hz / 60Hz)
		60Hz	
Oil			Main pump ULVOIL SMR-200 / Backing pump ULVOIL SMR-100
Oil capacity [L]			Main pump 0.07 / Backing pump 1,1
Cooling			Air cooled
Inlet port			VG-40
Outlet port			—
Weight [kg]			42
Dimensions W x D x H [mm]			241.4 × 532 × 399 (100V) 241.4 × 581 × 399 (200V)
Backing pump			Oil rotary vacuum pump (200L/min)
Applicable standard			-

With General-purpose Motor Model : PMB Ver.D

Mechanical booster pump with general-purpose motor for a wide range of applications.

PMB1200D

- It effectively shortens pumping down time by adding this pump to oil rotary vacuum pump or dry vacuum pump. Its maximum pumping speed is in about the range from 1,000Pa (7.5Torr / 10mbar) to 1Pa (7.5 x 10^{-3}Torr / 0.01mbar).
- It also helps to achieve further lower ultimate pressure of the oil rotary vacuum pump and dry vacuum pump.

- Atmospheric pressure start operation is possible with the optional inverter.
- Setting for either air-cooled or water-cooled is selectable for the optional inverter.
- Surface treatment (Alumite) is available as an option.

Model			PMB100D	PMB300D	PMB600D	PMB1200D	PMB2400D
Maximum pumping speed [m^3/h] (LPM / CFM)		50Hz	95 (1,580 / 56)	280 (4,670 / 165)	500 (8,330 / 294)	1,000 (16,667 / 589) / 1,000 (16,667 / 589)	2,500 (41,667 / 1,471) 2,000 (33,330 / 1,177)
		60Hz	115 (1,920 / 68)	330 (5,500 / 194)	600 (10,000 / 353)	1,200 (20,000 / 706) / 1,200 (20,000 / 706)	3,100 (51,667 / 1,825) / 2,400 (40,000 / 1,413)
Ultimate pressure [Pa] (Torr / mbar)			0.4 (3 x 10^{-3} / 4 x 10^{-3})			0.67(5 x 10^{-3} / 6.7 x 10^{-3})	
Motor	Capacity [kW] (Poles)		0.4(2)	0.75(2)	2.2(2)	3.7(2)	7.5(2)
	Voltage [V]	50Hz	Three phase 200 ※1	Three phase 200 to 240 / 380 to 415 (Multi-Voltage Motor)			
		60Hz	Three phase 200 to 220 ※1	Three phase 200 to 240 / 380 to 460 (Multi-Voltage Motor)			
Oil model			ULVOIL R-42	ULVOIL R-42 (Water cooled) / R-72 (Air cooled)			
Oil capacity volume [L] (Values for the horizontal exhaust direction type.)			0.35	0.7	1.5	1.9	4 (2.2)
Cooling method			Air cooled	Water cooled／Air cooled (options: to be selected by inverter setting)			
Inlet port (optional)			VG50 (KF50 or ISO63F)	VG80 (ISO80F or 100F)		VG100 (ISO100F)	VG200 (ISO200F)
Outlet port (optional)			VF50 (KF50 or ISO63F)	VF80 (ISO80F or 100F)			VF200 (ISO200F)
Weight [kg]			26	51	82	115	260
Dimensions W x D x H [mm]			267 x 576 x 180	321 x 685 x 260	362 x 784 x 320	417 x 970 x 340	520 x 1,260 x 460
Standard backing pump			VD40C / VD401	VD60C / VD601	VD90C / VD901	VS300A / VS2401	VS650B / PKS-070B
Applicable standard			CE, cTUVus				–

*1) 400V class is optional. (50 Hz: 220~240 / 380~415V, 60Hz: 208~240 / 380~460V)

With Canned Motor Model : PRC

Mechanical booster pump with canned motor for clean environment

PRC-012A

- It effectively shortens pumping down time by adding this pump to oil rotary vacuum pump or dry vacuum pump. Its maximum pumping speed is in about the range from 1,000Pa (7.5Torr / 10mbar) to 1Pa (7.5 x 10^{-3}Torr / 0.01mbar).
- It also helps to achieve further lower ultimate pressure of the oil rotary vacuum pump and dry vacuum pump.

- There is no oil leakage to the outside in the case of canned motor. Suitable for clean room environment.
- Surface treatment (Alumite) for corrosion resistance is standard specification.
- Atmospheric pressure start operation is possible with the optional inverter.

Model			PRC-003A	PRC-006A	PRC-012A	PRC-018A
Maximum pumping speed [m^3/h](LPM / CFM)		50Hz	280 (4,670 / 165)	500 (8,330 / 294)	1,000 (16,667 / 589)	1,500 (25,000 / 883)
		60Hz	330 (5,500 / 194)	600 (10,000 / 353)	1,200 (20,000 / 706)	1,800 (30,000 / 1059)
Ultimate pressure [Pa] (Torr / mbar)			0.4 (3 x 10^{-3}/4 x 10^{-3})		0.67 (5 x 10^{-3}/6.7 x 10^{-3})	
Motor	Capacity [kW](Poles)		0.75(2)	2.2(2)	3.7(2)	5.5(2)
	Voltage [V]	50Hz	Three phase 200 *1			
		60Hz	Three phase 200 to 220 *1			
Oil model			ULVOIL R-42			
Oil capacity [L]			0.7	1.5	1.9	
Cooling method			Water cooled			
Inlet port (optional)			VG80 (ISO80F or 100F)		VG100 (ISO100F)	VG150 (ISO160F)
Outlet port (optional)			VF80 (ISO80F or 100F)			VF100 (ISO100F)
Weight [kg]			51	86	118	150
Dimension W x D x H [mm]			296 x 575 x 260	356 x 619 x 320	406 x 759 x 340	406 x 989 x 340
Standard backing pump			VD60C / VD601	VD90C / VD901	VS2401	VS2401

*1 400V class is optional.

For Large Capacity. With General-purpose Motor Model : PMB-C

Mechanical booster pump with low speed rotation. Suitable for large-scale chambers such as vacuum furnaces, etc.

- Belt driven low speed rotation makes it robust.

PMB-040C

			PMB-040C	PMB-060C
Maximum pumping speed [m^3/h] (LPM / CFM)			3,800 (63,300 / 2,237)	6,200 (103,300 / 3,649)
Ultimate pressure [Pa] (Torr / mbar)			0.67 (5 x 10^{-3} / 6.7 x 10^{-3})	
Motor	Output [kW](Poles)		15(4)	18.5(4)
	Voltage [V]	50Hz	Three phase 200 *1	
		60Hz	Three phase 200 to 230 *1	
Oil model			ULVOIL R-72	
Oil capacity [L]			8	
Cooling Method			Water cooled	
Inlet port (optional)			VG250 (ISO250F)	VG300 (ISO320F)
Outlet port (optional)			VF150 (ISO160F)	VF200 (ISO200F)
Weight(without motor)[kg]			970	1,100
Dimensions (without motor) W x D x H [mm]			772 x 1,182 x 680	772 x 1,452 x 680
Standard backing pump			PKS-070B	PKS-070B x2

*1 : 400V class is optional (50Hz : 400 60Hz : 400～460)

Frame Unit for Mechanical Booster Pump Model : YMV

Frame unit for combining a mechanical booster pump and oil rotary vacuum pump.

- Removable frame makes it possible to pull out oil rotary vacuum pump from the system.

YMV standard configuration	Frame, connection piping, bellows, caster, adjuster
Option	Atmospheric pressure start operation (inverter is attached to frame), oil mist trap, control box, terminal box, inlet flange (gauge port + leak port), vacuum delay solenoid valve, cooling water flow switch.

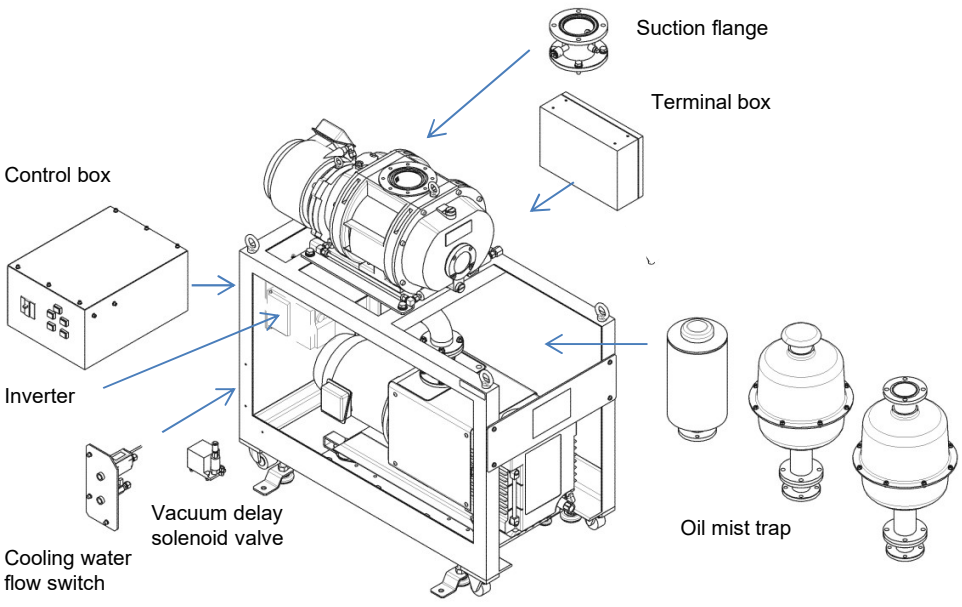
Model	Recommended pump	
	Mechanical booster pump	Oil rotation vacuum pump
YMV-01A	PMB100D	VD30C / VD301
YMV-03A	PMB300D	VD40C / VD401
YMV-06A	PMB600D	VD60C / VD601
		VD90C / VD901
YMV-12A	PMB600D	VS1501
		VS2401
	PMB1200D	VS1501
		VS2401

Separate arrangements are made for each kind of pump.

Frame unit
Model : YMV

Mechanical booster pump

Oil rotary vacuum pump



TMP with separate controller Model : UTM-MS

This is a turbo molecular pump with a separate controller that uses magnetic bearings. We have a lineup of models with pumping speeds of 300 to 4000 L/s. The controller unit can monitor the operating status and supports various communication standards.

UTM400A-MS

- **Separated pump body and controller**
  The controller can monitor the operating status and support various communication standards.
- **Free mounting direction**
  Free mounting direction makes the system design flexible.
- **Pumping speed 300L/s to 4000L/s class lineup**
- **Pump rotation variable from 25% to 100%**
  Enabling the pressure adjustment in a chamber by changing the rotation speed.
- **High durability and safety**
  Safety confirmation tests are passed, such as air rushing-in test and touch down test.

Model			UTM300A-MS	UTM400A-MS	UTM800A-MS	UTM1000A-MS	UTM1300A-MS	UTM1500A-MS	UTM2400A-MS	UTM3400A-MS	UTM4300A-MS
Inlet port			VG100 ICF152	VG150 ICF203		VG200 ICF253		VG250		VG300 VG350	VG350
Outlet port			KF25		KF40						
Cooling method			Water cooling / Air cooling	Water cooling / Air cooling	Water cooling / Air cooling	Water cooling / Air cooling	Water cooling				
Ultimate pressure *1		Pa/Torr/mbar	10^{-7} / 10^{-9} / 10^{-9}		10^{-8} / 10^{-10} / 10^{-10}		10^{-7} / 10^{-9} / 10^{-9}				
Pumping speed *2	N2	L/s	320	420	800	1080	1300	1500	2100	3200	4400
Compression rate	N2		1×10^{9}				6×10^{8}		1×10^{9}		
Max inlet pressure *3		Pa/Torr/mbar	Water cooling:200 / 1.5 / 2.0 Air cooling:1.3 / 0.01 / 0.01		Water cooling:400 / 3.0 / 4.0 Air cooling:1.3 / 0.01 / 0.01		133 / 1.0 / 1.3		40 / 0.3 / 0.4		
Max outlet pressure *3		Pa/Torr/mbar	Water cooling:400 / 3.0 / 4.0 Air cooling:40 / 0.3 / 0.4		Water cooling:665 / 5.0 / 6.7 Air cooling:40 / 0.3 / 0.4		270 / 2.0 / 2.7		270 / 2.0 / 2.7		
Rotation speed		rpm	45000		35000		30300		27000	27600	24000
Start-up time			5minutes or less				7minutes or less		11minutes or less	12minutes or less	18minutes or less
Mounting position			In any desired direction								
Surface treatment			Nickel plating								
Cooling water	Flow rate	L/min	1～3 / —	1～3 / —	1～3 / —	1～3 / —	1～3		2～4		
Noise		dB(A)	60						57	60	
Weight		kg	14		33	32	39	42	70	84	105
Recommended backing pump			200L/min or more		500L/min or more		600L/min or more		1300L/min or more	1500L/min or more	
Controller	Composition		Separate type								
	Input electric Power		Single phase AC200 ～240V ±10%（50/60Hz ±2Hz）								
	Max power		0.55		1.0				1.5		
	Speed variation		Speed is variable between 25% and 100% of the rated speed.（set as 0.1%）								
	Weight	kg	8								

*1 : digit number is expressed. *2 : Without a protective net. *3 : Max inlet pressure and Max outlet pressure cannot be satisfied at same time.

Ceramic Ball Bearing type Model : UTM-B

Compound turbo molecular pump with ceramic ball bearings. An integrated controller saves installation space. Installation in any orientation makes your system design flexible.Excellent high back pressure performance allows to use smaller backing pump.


UTM70B

Model				UTM70B		UTM300B	
Pump	Inlet flange (*1)			VG65,ICF114,ISO63-K		VG100, ICF152, ISO100-K	
	Outlet flange			KF16		KF16	
	Cooling method			Natural air cooled	Forced air cooled	Natural air cooled	Forced air cooled
	Pumping speed(N2) [L/sec]			280		280	
	Ultimate pressure [Pa] / [Torr] / [mbar] (*2) (with double stages backing pump)		After baking	(*3)	10^{-8} / 10^{-10} / 10^{-10}	(*3)	10^{-8} / 10^{-10} / 10^{-10}
			Before baking	10^{-6} / 10^{-8} / 10^{-8}		10^{-6} / 10^{-8} / 10^{-8}	
	Maximum compression ratio(N2)			$>1\times10^{9}$		$>1\times10^{9}$	
	Maximum inlet pressure(N2) [Pa] / [Torr] / [mbar] (*4)			$4.3 / 3.2\times10^{-2} / 4.3\times10^{-2}$	$1.1 / 8.3\times10^{-3} / 1.1\times10^{-2}$	$6\times10^{-2} / 5\times10^{-4} / 6\times10^{-4}$	$0.7 / 5\times10^{-3} / 7\times10^{-3}$
	Maximum outlet pressure(N2) [Pa] / [Torr] / [mbar] (*4) (*5)			300 / 2.3 / 3	900 / 6.8 / 9	100 / 0.75 / 1.0	1000 / 7.5 / 10
	Surface treatment			None		None	
	Recommended backing pump (when evacuating 10SCCM)			Approx. 60L/min		Approx. 120L/min	
	Weight [kg]	VG / ISO / ICF		3.3 / 3.0 / 5.0	3.5 / 3.2 / 5.2	6.0 / 6.0 / 9.0	6.3 / 6.3 / 9.3
Power Supply	Input voltage, power consumption			DC24V, 120W		DC24V, 180W	
Applicable standard				CE, Tutu's		CE, TUVus	

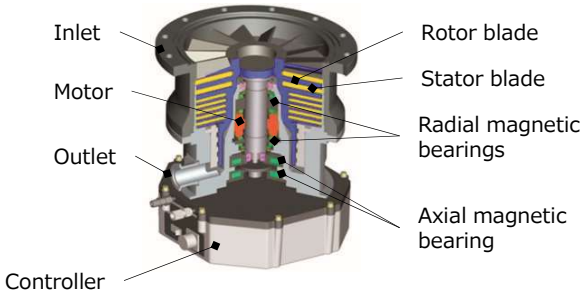
*1) Select inlet flange type from VG100, ICF152 and ISO100-K when ordering. *2) Value is described by range.
*3) Baking is available only when forced air cooling method with ICF flange is selected.
*4) Max. inlet and outlet pressure are not satisfied at same time. *5) Continuous workable pressure when 5sccm gas flow from the inlet port.

TMP with integrated controller Model : UTM-MI

Controller integrated turbo molecular pump with magnetic bearings saves wiring work and installation space.

UTM1600A

- **Controller integrated with the pump body**
  No wiring work between pump body and controller.
- **Free mounting direction**
  Free mounting direction makes the system design flexible.
- **5 models from 1000L/S to 4000L/S class.**
- **Wide range and high flow for the light processes.**
- **Pump rotation variable from 25% to 100%**
  Enabling the pressure adjustment in a chamber.
- **High durability and safety**
  Safety confirmation tests are passed, such as air rushing-in test and touch down test.



Model			UTM1200A	UTM1600A	UTM2300A	UTM3400A
Inlet port			VG150 ISO160F	VG200/VG250 ISO200F/ISO250F	VG250 ISO250F	VG300/VG350 ISO320F
Outlet port			KF40			
Ultimate pressure(*1)		[Pa/ torr/ mbar]	10^{-7} / 10^{-9} / 10^{-9}			
Pumping speed (*2)(*3)	N2	[L/s]	1030	1400	2100	3200
Compression rate	N2		2×10^{8}		1×10^{8} or more	1×10^{9} or more
Max inlet pressure(*4)		[Pa/ torr/ mbar]	26 / 0.2 / 0.3		4.5 / 0.03 / 0.05	7 / 0.05 / 0.07
Max outlet pressure(*4)		[Pa/ torr/ mbar]	266 / 2 / 2.7		200 / 1.5 / 2	270 / 2 / 2.7
Rotation speed		[rpm]	37200		33700	27600
Speed variation			Speed is variable between 25% and 100% of the rated speed. (set as 0.1%)			
Start-up time			8 minutes or less		9 minutes or less	16 minutes or less
Mounting position			In any desired direction			
Surface treatment(*5)			None			
Communication	Contact		D-sub 25 pin female		D-sub 37 pin female	
			Contact input and output signal		Contact input and output signal	
	Serial		Serial connecter RS232C/RS485		D-sub 9 pin male	
					RS232C/RS485	
Controller	Composition		Pump with integrated controller			
	Input electric power		Single phase AC200～240V ±10% （50/60Hz ±2Hz）			
	Max power		0.75kVA		1.2kVA	
Cooling method			Water cooled			
Cooling water(*6)	Flow rate	[L/min]	3～4			
	Pressure	[MPaG]	0.2～0.4			
Noise		[dB(A)]	57		60	
Weight		[kg]	43	41	56	94
Recommended backing pump(*7)			600L/min or more		1500L/min or more	
Applicable standard			CE, TUVus			
Standard accessories			O-ring(Only VG), Dust cap(Outlet port), Remote-control Connector, Instruction manual(CD-ROM)			
Select parts	AC Cable		AC Connector / AC Cable（5m/10m/15m/20m）			
	Special bolt for fixing pump		M10（Non-RoHS / RoHS） / M12（Non-RoHS / RoHS）			

*1：A digit number is expressed. *2：Without a protective net. *3：Calculated values:UTM2300A and UTM3400A *4：Max inlet pressure and Max outlet pressure cannot be satisfied at same time. *5：Do not flow reactive gas and corrosive gas. Please contact us when using other gases. *6：Not condensing *7：When evacuating 30SCCM *8：Grade of bolts, Fixing method and etc. are subject to various conditions. Please contact us for the detailed information.

Turbo Molecular Pumping System Model : Desktop

Desktop high vacuum pumping station featuring a low noise, low vibration design and ceramic ball bearing turbo molecular pump. Simple, easy to read touch screen control for user-friendly operation.

YTP70A−D

➢**Consideration for use environment on desktop**
Running noise and vibration during operation are reduced.

➢**Low noise**
43dB(A) or less at Ultimate pressure.
(Measured by ULVAC standard for ICF flange type.)

➢**User-friendly**
Simple operation with easy to read touch panel display

➢**Pressure indication**
Designed for easy integration of up to 2 vacuum gauges

Start Screen

Main Screen

Alarm Pop-up

Vacuum gauge selection screen

Built-in simple integration with ULVAC vacuum gauges.
※Vacuum gauge sold separately.

Model			YTP70A-D
Inlet port			ICF114,VG65,ISO63-K
Ultimate pressure(*1)		Pa / Torr / mbar	10^{-6} / 10^{-8} / 10^{-8}
Pumping speed (*2)	N2	L/s	70
	He	L/s	60
	H2	L/s	49
Backing pump		L/min	20
Weight		kg	17.5
Noise (*3)		dB(A)	< 43
Input power source			Single phase AC100～240V(50/60Hz)
Power capacity			300W
Standard accessories			Instruction manual(CD-R),I/F connector, Protective net, Gasket
External option			AC cable (3m) (*4)
Applicable standard			CE, cTUVus

*1 : A digit number is expressed. *2 : Without a protective net.
*3 : At ultimate pressure. Measured by ULVAC standard for ICF flange type. *4 : Plug is selectable.

Turbo Molecular Pumping System Model : YTP Ver.B

YTP version B is a high vacuum pumping system with a ceramic ball bearing turbo molecular pump. Vacuum pumping from atmospheric pressure to high vacuum is possible.

SA type automatically starts up entire system by pushing start button and M type manually starts up turbo molecular pump by checking its back pressure.

YTP-50SAB-DRY

- The system with oil rotary backing pump is standard and dry backing pump is also available.
- A solenoid fore valve is equipped as standard configuration to prevent back flow and accident in case of black out.
- Pirani vacuum gauge is equipped as a standard configuration to monitor pressure during roughing evacuation.

Model		YTP-50MB YTP-50SAB	YTP-50MB-DRY YTP-50SAB-DRY	YTP-300MB YTP-300SAB	YTP-300MB-DRY YTP-300SAB-DRY
Inlet port		VG65,ICF114,ISO63-K		VG100, ICF152, ISO100-K	
Ultimate pressure	Before baking	10^{-6} / 10^{-8} / 10^{-8}		10^{-6} / 10^{-8} / 10^{-8}	
*1 *2 [Pa] / [Torr] / [mbar]	After baking	10^{-8} / 10^{-10} / 10^{-10}		10^{-8} / 10^{-10} / 10^{-10}	
Pumping speed	N2	70 L/s		280 L/s	
*3	H2	49 L/s		220 L/s	
Outlet port		G3/4	KF16	G1	KF16
Baking pump	50Hz	50 L/min	90 L/min	200 L/min	250 L/min
	60Hz	60 L/min	100 L/min	240 L/min	300 L/min
Dimension W×D×H mm		400×592×470	450×592×463	492×665×576	542×665×576
Weight		55 kg	57 kg	86 kg	85 kg
TMP back pressure and rough pressure monitoring		Pirani vacuum gauge (2.7×10^{3}～10^{-1}Pa) (0.2×10^{2}～7.5×10^{-4}Torr) (2.7×10^{1}～10^{-3}mbar)			
Fore valve		Solenoid valve for rotary pump automatic vent system(Solenoid valve)			
Input power source		Single phase AC100V (50/60Hz)			
Input cable length		5m with 3P outlet			
Power capacity		1.2 kVA	0.9 kVA	1.7 kVA	1.6 kVA
Power consumption during stable operation		0.6 kVA	0.4 kVA	1 kVA	

*1 Baking is only available with ICF flange type. *2 A digit number is expressed.(Display only the digits of power.) *3 Without a protective net.

CRYO Pump Model : CRYO-U

An ultra-high vacuum pump that excels in exhausting water and exhausts all gases.

- Provide Ultra clean vacuum which is exclusive to our cryo pumps.
- Vacuum any kind of gas
- No liquid helium needed means low running cost.
- Can be installed in any orientation.
- Easy operation.
- Higher pumping speed compared to ion pumps or turbo molecule pumps.

CRYO-U12HSP / C30VRT

Model			CRYO-U4H	CRYO-U6H	CRYO-U8H	CRYO-U10H
Pumping speed @20°C	[L/s]	Nitrogen	450	750	1,700	2,400
		Hydrogen	500	1,100	2,700	3,600
		Argon	370	620	1,400	2,000
		Water	1,100	2,100	4,000	6,900
Ultimate pressure		[Pa]	10^{-7}			
Maximum throughput	[Pa L/s]	Argon	1.3×10^{3}	1.1×10^{3}	1.2×10^{3}	1.3×10^{3}
	[Pa L/s]	Hydrogen	–	1.1×10^{2}	2.4×10^{2}	1.5×10^{2}
Pumping capacity	[Pa L]	Argon	1.0×10^{7}	5.6×10^{7}	1.0×10^{8}	1.0×10^{8}
	[Pa L]	Hydrogen	1.5×10^{5}	3.1×10^{5}	1.0×10^{6}	1.2×10^{6}
Mounting flange			ISO-K DN100	UVG-150 ICF-203	UVG-200 , 6^{B}ANSI UFC-253	UVG-250 ICF-305
Cool down time[min]			45 / 40 (50Hz / 60Hz)	80 / 70 (50Hz / 60Hz)	100 / 90 (50Hz / 60Hz)	110 / 100 (50Hz / 60Hz)
Compressor unit			C10T , C10AT		C10T , C10AT	C15T
Weight [kg]			14.5	19	25	29

Model			CRYO-U12H	CRYO-U12HSP	CRYO-U16P	CRYO-U20H
Pumping speed @20°C	[L/s]	Nitrogen	4,000	4,100	5,000	10,000
		Hydrogen	6,000	6,000	10,000	18,000
		Argon	3,300	3,400	4,200	8,400
		Water	9,500	9,500	16,000	29,000
Ultimate pressure		[Pa]	10^{-7}			
Maximum throughput	[Pa L/s]	Argon	2.0×10^{3}	2.0×10^{3}	1.6×10^{3}	1.7×10^{3}
	[Pa L/s]	Hydrogen	4.1×10^{2}	4.1×10^{2}	4.5×10^{2}	5.0×10^{2}
Pumping capacity	[Pa L]	Argon	2.1×10^{8}	4.4×10^{8}	4.3×10^{8}	5.8×10^{8}
	[Pa L]	Hydrogen	9.8×10^{5}	1.6×10^{6}	2.4×10^{6}	4.6×10^{6}
Mounting flange			UVG-300 , 10^{B}ANSI	UVG-300 , 10^{B}ANSI	UVG-400	UVG-500 , 20^{B}ANSI ISO-500
Cool down time[min]			85 / 75 (50Hz / 60Hz)	90 / 80 (50Hz / 60Hz)	120 / 100 (50Hz / 60Hz)	160 / 140 (50Hz / 60Hz)
Compressor unit			C15T , C30VRT		C30VRT	C30PVRT
Weight [kg]			40	42	65	72

Model			CRYO-U22P	CRYO-U22WB	CRYO-U22H	CRYO-U30HP
Pumping speed @20°C	[L/s]	Nitrogen	11,500	13,000	17,000	28,000
		Hydrogen	14,000	16,500	25,000	43,000
		Argon	9,700	11,000	14,000	23,000
		Water	39,000	39,000	39,000	70,000
Ultimate pressure		[Pa]	10^{-7}			
Maximum throughput	[Pa L/s]	Argon	1.7×10^{3}	3.5×10^{3}	4.1×10^{3}	2.7×10^{3}
	[Pa L/s]	Hydrogen	5.0×10^{2}	1.3×10^{3}	1.3×10^{3}	7.4×10^{2}
Pumping capacity	[Pa L]	Argon	5.8×10^{8}	8.1×10^{8}	8.1×10^{8}	7.8×10^{8}
	[Pa L]	Hydrogen	6.0×10^{6}	8.5×10^{6}	8.5×10^{6}	1.5×10^{7}
Mounting flange			UVG-550			VG-750
Cooldown time[min]			180 / 170 (50Hz / 60Hz)	165 / 150 (50Hz / 60Hz)	150 / 135 (50Hz / 60Hz)	240 / 200 (50Hz / 60Hz)
Compressor unit			C30PVRT	C30PMVRT × 1	C30VRT x 2	C30PVRT x 2
Weight [kg]			115	125		200

■ Export control policy

Vacuum pumps that pump nitrogen gas at pumping speed of 15,000L/s or more fall under row 2(35) of appended table 1 of Japan's Export Trade Control Order, which is based on international export control regimes. Customers must follow all related rules and regulations such as Foreign Exchange and Foreign Trade Act and take appropriate procedures when exporting or re-exporting those products.

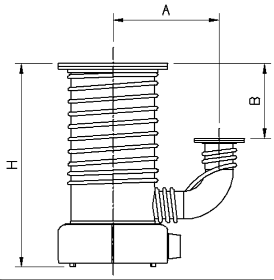
4 to 14 inch Model : ULK

4 kinds of models from 4” to 14”.
Required pumping speed and ultimate pressure are selectable by 2 types of oils and heaters.

ULK-14A

- A steady high vacuum pump without mechanical moving parts.
- A mechanism preventing oil backflow to the backing pump is included.

Major applications
- Vacuum deposition system
- High vacuum laboratory equipments



Model	ULK-04A		ULK-06A		ULK-10A		ULK-14A	
Pumping speed [L/sec]	550	500	1,200	1,100	3,400	3,000	5,400	4,900
Ultimate pressure [Pa] (Torr / mbar)	＜2.6×10^{-5} (1.9×10^{-7} / 2.6×10^{-7})	＜2.6×10^{-6} (1.9×10^{-8} / 2.6×10^{-8})	＜2.6×10^{-5} (1.9×10^{-7} / 2.6×10^{-7})	＜2.6×10^{-6} (1.9×10^{-8} / 2.6×10^{-8})	＜2.6×10^{-5} (1.9×10^{-7} / 2.6×10^{-7})	＜2.6×10^{-6} (1.9×10^{-8} / 2.6×10^{-8})	＜2.6×10^{-5} (1.9×10^{-7} / 2.6×10^{-7})	＜2.6×10^{-6} (1.9×10^{-8} / 2.6×10^{-8})
Critical backing pressure [Pa] (Torr / mbar)	40 (0.3 / 0.4)	60 (0.4 / 0.6)	40 (0.3 / 0.4)	60 (0.4 / 0.6)	35 (0.26 / 0.35)	40 (0.3 / 0.4)	30 (0.22 / 0.3)	30 (0.22 / 0.3)
Oil	ULVOIL D-11	ULVOIL D-31	ULVOIL D-11	ULVOIL D-31	ULVOIL D-11	ULVOIL D-31	ULVOIL D-11	ULVOIL D-31
Oil capacity [L]	0.15		0.35		0.8		1.5	
Cooling water capacity [L/min]	1	1	1	1.5	2.5	3	2.5	3.5
Voltage	Single phase AC200V							
Required electric power [kW]	0.55	0.73	0.9	1.2	2	2.4	2.25	2.4
Recommended backing pump	GLD-280		VD40C / VD401		VD90C / VD901		VS2401	
Dimensions A x B x H [mm]	175 x 150 x 341		250 x 180 x 449		340 x 240 x 650		340 x 240 x 670	
Inlet port	VG100		VG150		VG250		VG350	
Outlet port	VG25		VG40		VG80		VG80	
Weight [kg]	7.5		13.5		47		56	
Oil level gauge	None		None		Viewport		Viewport	
Thermostat option	Available		Available		Available		Available	
Thermostat setting temperature [℃]	250		250		220		220	

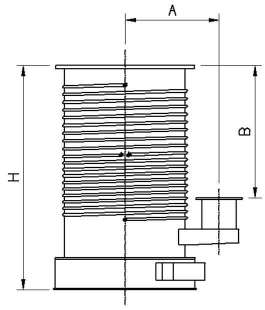
22 to 52 inch Model : PFL

4 kinds of models from 22” to 52” for large size vacuum systems such as vacuum furnaces, etc.

PFL-22

- A steady high vacuum pump without mechanical moving parts.
- An efficient and economical pump because required electric power and oil volume are small.

Major applications
- Vacuum heat treatment furnace, sintering furnace, carburizing furnace, etc.
- Large chamber evacuation.

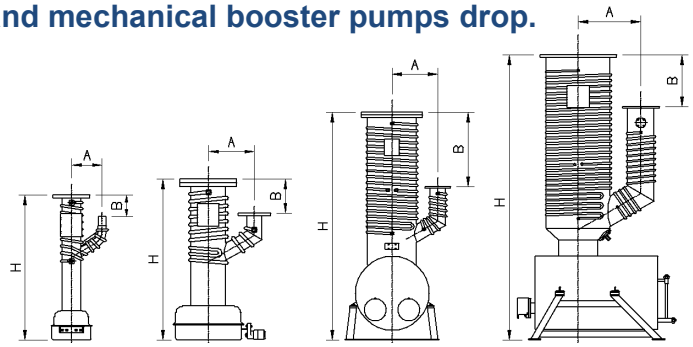


Model	PFL-22	PFL-22TM	PFL-36	PFL-52
Pumping speed [L/sec]	10,000	10,000	34,000	70,000
Ultimate pressure [Pa] (Torr / mbar)	3.0×10^{-4} (2.2×10^{-6} / 3.0×10^{-6})			
Maximum fore pressure [Pa] (Torr / mbar)	16 (1.2×10^{-1} / 1.6×10^{-1})		6.7 (5×10^{-2} / 6.7×10^{-2})	16 (1.2×10^{-1} / 1.6×10^{-1})
Oil	ULVOIL D-11			
Oil capacity [L]	5	5	13	27
Cooling water capacity [L/min]	12	15	38	50
Voltage	Three phase AC200V			
Required electric power [kW]	8	10	Start up: 22, Normal: 11	Start up: 45, Normal: 30
Recommended backing pump	PMB-040C + PKS-070B			PMB-060C + PKS-070B x 2
Dimensions A x B x H [mm]	480 x 630 x 1,330	480 x 630 x 1,330	725 x 1,022 x 1,732	1,000 x 2,000 x 2,845
Inlet port	VG550	VG550	VG900	VG type equivalent 52 inch
Outlet port	VG150	VG200	VG250	VG350
Weight [kg]	290	290	650	1,400
Oil level gauge	Viewport	Viewport	Viewport	Viewport
Thermostat option	Available	Available	Available	Available
Thermostat setting temperature [℃]	180	180	110	110

Oil Diffusion Ejector Pump Model : PBL

It has maximum pumping speed at the range of 10^{-1} Pa (10^{-3} mbar and Torr), where pumping speed of oil rotary vacuum pumps and mechanical booster pumps drop.

PBL-02



PBL-02 PBL-04 PBL-06 PBL-10 PBL-14 PBL-20

- A steady high vacuum pump without mechanical moving parts.
- Suitable in intermediate pressure range between oil rotary vacuum pump / mechanical booster pump and oil diffusion pump.
- Body of the pump from the PBL-02 to the PBL-04 is made of stainless copper which is excellent for corrosion resistance.
- Excellent heating efficiency because a pipe heater is placed directly in hydraulic oil for large pumps bigger than the PBL-06.

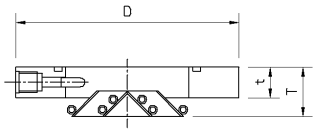
Model	PBL-02	PBL-04	PBL-06	PBL-10	PBL-14	PBL-20
Pumping speed [L/sec]	80	200	500	1,800	4,000	7,000
Ultimate pressure [Pa] (Torr / mbar)	2.7×10^{-2} (2×10^{-4} / 2.7×10^{-4})					
Maximum fore pressure [Pa] (Torr / mbar)	40 (3×10^{-1} / 4×10^{-1})					
Oil	ULVOIL B-6					
Oil capacity [L]	0.1	0.6	7.5	18	36	90
Cooling water capacity [L/min]	1.5	5	8	12	18	25
Voltage	Single phase AC200V		Three phase AC200V			
Required electric power [kW]	0.44	1.8	4 2kW x 2 pcs	8 4kW x 2 pcs	11 5.5kW x 2 pcs	18 6kW x 3 pcs
Recommended backing pump	VD30C / VD301	PKS-016	PKS-030	PKS-070B	PMB1200D + PKS-030	PMB-040C + PKS-070B
Dimensions A x B x H [mm]	100 x 70 x 463	150 x 112 x 524	200 x 152 x 973	300 x 346 x 1,321	340 x 548 x 1,687	510 x 444 x 2,320
Inlet port	VG50	VG100	VG150	VG250	VG350	VG500
Outlet port	3/4B Hose port	VG40	VG50	VG80	VG100	VG200
Weight [kg]	6	17	86	198	313	495
Oil level gauge	None	None	Level gauge	Level gauge	Level gauge	Level gauge
Thermostat option	None	None	None	None	Available	Available
Thermostat setting temperature [℃]	-	-	-	-	160	160

Water-Cooling Baffle Model : BW

For reducing oil steam backflow from oil diffusion pump into suction side.

BW-04B＋Adapter

- For preventing inside of vacuum chamber from the oil steam contamination from the oil diffusion pump.
- It is designed to minimize exhaust resistance.
- By setting the adapter for BW-04B and BW-06B, volume of the oil stem backflow volume can be suppressed additionally.



Model		BW-02	BW-04B	BW-06B	BW-10	BW-14	BW-20	BW-22	BW-36	BW-52
Conductance [L/sec]		100	940	2,200	3,130	5,000	13,000	14,000	54,000	75,000
Outer diameter Dimensions [mm]	D	dia. 120	dia. 149	dia. 199	dia. 350	dia. 450	dia. 625	dia. 680	dia. 1,065	dia. 1,480
	T	16	28	28	44	50	152	101	113	165
	t	16	25	25	22	22	24	26	28	35
Cooling water ports (Size)		Rc 1/8	Rc 1/4	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8	Rc 3/8	Rc 3/8	Rc 1/2
Coolant Volume [L/min]		1.5	0.7	1	2	2	3	3	5	5
Weight [kg]		1	1.3	1.7	7.6	11	22	28	66	200

Sputter Ion Pump Model : PST

New type element, which is actor element and optimized magnet filed improves pumping speed in extreme and ultra high vacuum ranges.

PST-030 PST-050 PST-100 PST-110 PST-200 PST-400

Model		PST-030CU	PST-030AU	PST-050CU	PST-050AU	PST-100CX	PST-100AX	PST-110AU	PST-200CXⅡ	PST-200AXⅡ	PST-400CXⅡ	PST-400AXⅡ
Gas type		Active Gas	Rare Gas	Active Gas	Rare Gas	Active Gas	Rare Gas	Rare Gas	Active Gas	Rare Gas	Active Gas	Rare Gas
Regenerated pumping speed [m3/sec]	N2 (*2)	0.03 (0.02)		0.045 (0.03)		0.10 (0.08)		0.11 (0.06)	(0.20)		(0.36)	
	Ar (*2)	(0.013)		(0.016)		(0.05)		-	(0.02)	(0.105)	(0.04)	(0.19)
Ultimate pressure		10^{-9} Pa range (10^{-11} Torr and mbar)		10^{-9} Pa range (10^{-11} Torr and mbar)		10^{-9} Pa range (10^{-11} Torr and mbar)		10^{-9} Pa range (10^{-11} Torr and mbar)	10^{-10} Pa range (10^{-12} Torr and mbar)		10^{-10} Pa range (10^{-12} Torr and mbar)	
Operation pressure (*1)	Recommended value	< $8x10^{-3}$ Pa (<$6x10^{-5}$ Torr, <$8x10^{-5}$ mbar)		< $8x10^{-3}$ Pa (<$6x10^{-5}$ Torr, <$8x10^{-5}$ mbar)		< $5x10^{-3}$ Pa (<$4x10^{-5}$ Torr, <$5x10^{-5}$ mbar)		< $5x10^{-3}$ Pa (<$4x10^{-5}$ Torr, <$5x10^{-5}$ mbar)	< $4x10^{-3}$ Pa (<$3x10^{-5}$ Torr, <$4x10^{-5}$ mbar)		< $8x10^{-3}$ Pa (<$6x10^{-5}$ Torr , <$8x10^{-5}$ mbar)	
Connection flange type		CF70		CF114		CF152		CF152	CF203		CF203	
Recommended controller		GST-07L-B		GST-07L-B		GST-07L-B		GST-07L-B	GST-07L-B		GST-07L-B	
Applied voltage [kV]		DC +7.5		DC +7.5		DC +7.5		DC +7.5	DC +7.5		DC +7.5	
Bake-out temperature [℃]		250		250		250		250	250		250	
Weight [kg]		About 9.5		About 12.8		About 37		About 37	About 65		About 124	
Dimensions W x D x H [mm]		108 x 183 x187		153 x 204 x 241		155 x 340 x 340		180 x 390 x 300	296 x 361 x 376		296 x 544 x 376	
Power for Heater Unit		—		Single phase 200V,300W		Single phase 200V,320W		—	Single phase 200V,600W		Single phase 200V,800W	

*1) During the time of use of the GST-07L-B-Type controller.
*2) At 1 x 10^{-7} Pa (8 x 10^{-10}Torr, 1 x 10^{-9} mbar).

Controller for PST Model : GST-07L-B

The GST-07L-B is a sputter ion pump controller with the high functionality and reliability through the plenty of technology and long time experience in ultra-high vacuum area that ULVAC has engaged.

GST-07L-B

Model	GST-07L-B
Display range	7 segments LED display
a) Output current display	2 ranges, mA and μA, automatic switchable (linear scale)
b) Output voltage display	DC 0.0 to 7.5kV
c) Pressure display	10^{-2} to 10^{-8} Pa, 10^{-4} to 10^{-10} mbar)
Output release voltage	DC +7.5kV (2 points, H and L, setting switchable on the front control panel)
	Volume variable from about 1.0 to 7.5kV for H and L setting voltage
Input voltage / current	AC100 to 115V ±10%, 50/60Hz, 3.0A or lower
	AC200 to 240V ±10%, 50/60Hz, 1.5A or lower
Monitor terminal output signal	Output of signals being proportionate to 7 segments panel display. DC 0 to 10V full scale for each range, more than 100kΩ
Pressure set point	2 points
Remote / Local	Switchable on the front control panel
External control functions	Various input functions (with remote connector) for remote control and RS-232C communication
Protection functions	Error display / various protection functions
	High voltage output cutoff when error lighted (ERR 0 to 5)
	Startup protection timer (adjustable from 1 to 255 minutes)
Weight	Main unit: Approx. 4kg
Dimensions W x D x H	240 x 370 x 99 mm (W : 200mm without the rack mounting bracket.)

Notes

■ Portfolio table

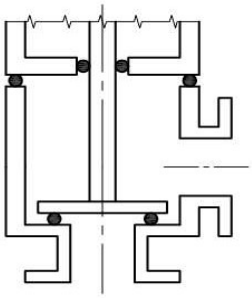
Nominal diameter (*1)			016	020	025	040	050	063	080	100	160	200	250	320	-	400	-	500	550	900
	◆A (ISO)	[mm]																		
	◇A (JIS)	[mm]	-	020	025	040	050	065	080	100	150	200	250	300	350	400	450	500	600	900
	●B	[inch]	5/8	3/4	1	1・1/2	2	2・1/2	3	4	6	8	10	12	14	16	18	20	22	36
VLP-SA□JH		VF		◇	◇	◇	◇	◇	◇	◇	◇	◇	◇		◇					
VLP-SA□KF		ISO-KF	◆		◆	◆	◆													
VLP-SA□KC		ISO-K						◆	◆	◆	◆	◆	◆							
VLP-SB□JH		VF		◇	◇	◇	◇	◇	◇	◇	◇	◇	◇							
VLP-SB□KF		ISO-KF	◆		◆	◆	◆													
VLP-SB□KC		ISO-K						◆	◆	◆	◆	◆	◆							
VLP-SB□CH		ISO-CF	◆			◆														
VLP-MB□CH		ISO-CF	◆			◆		◆		◆	◆									
VLP-U□		VF																●	●	●
VLB-SA□KF		ISO-KF	◆		◆	◆	◆													
VLB-SB□KF		ISO-KF	◆		◆	◆	◆													
VLH-SB□JH		VF		◇	◇	◇	◇	◇	◇	◇	◇									
VLH-SB□KF		ISO-KF	◆		◆	◆	◆													
VLH-SB□KC		ISO-K						◆	◆	◆	◆									
VLH-SB□CH		ISO-CF	◆			◆														
VLH-MB□CH		ISO-CF	◆			◆		◆		◆	◆									
VFR-□		VF														◇		◇		

*1) Numerical number used in model is : ◆ “Nominal Diameter: A (ISO) mm”, ◇ “Nominal Diameter: A(Former JIS) mm” , ● “Nominal Diameter: B inch”.
◇ “Nominal Diameter: A (JIS) mm” is the standard for the JIS B2290 appendix (maintenance flange).

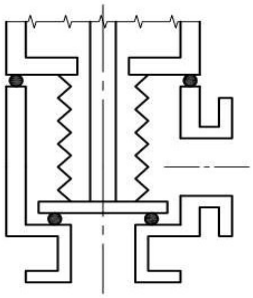
*2) Contact us for details.

ISO-CF nominal diameter	016	025	040	063	100	160	200	250
ULVAC-UFC nominal diameter	034	054	070	114	152	203	253	306

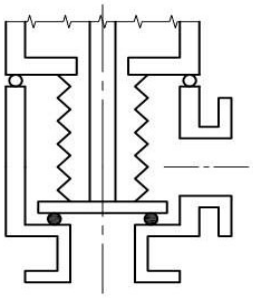
■ Feedthrough



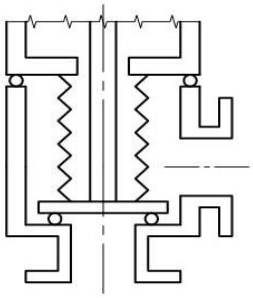
Type	Vacuum level
Angle	**V**
	HV
	UHV
	XHV



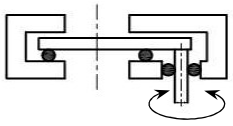
Type	Vacuum level
Angle	V
	HV
	UHV
	XHV



Type	Vacuum level
Angle	V
	HV
	UHV
	XHV



Type	Vacuum level
Angle	V
	HV
	UHV
	XHV



Type	Vacuum level
Pendulum	V
	HV
	UHV
	XHV

● **O-ring seal**
○ **Metal seal**
Bellows seal

Vacuum level	
V	≦10^{-5} Pa 10^{-7}Torr(mbar)
HV	≦10^{-6} Pa 10^{-8}Torr(mbar)
UHV	≦10^{-8} Pa 10^{-10}Torr(mbar)
XHV	≦10^{-9} Pa 10^{-11}Torr(mbar)

Selection Guide

Long time experienced and proven know-how from ULVAC who is the leading company of vacuum technology is also utilized in our vacuum measurement product line-up.

	Pruduct / Model	Pa	1E-8	1E-7	1E-6	1E-5	1E-4	1E-3	1E-2	1E-1	1E+0	1E+1	1E+2	1E+3	1E+4	1E+5
		mbar	1E-10	1E-9	1E-8	1E-7	1E-6	1E-5	1E-4	1E-3	1E-2	1E-1	1E+0	1E+1	1E+2	1E+3
		Torr	7.5E-11	7.5E-10	7.5E-9	7.5E-8	7.5E-7	7.5E-6	7.5E-5	7.5E-4	7.5E-3	7.5E-2	7.5E-1	7.5E+0	7.5E+1	7.5E+2
Transducer type G-tran series	Atmospheric Pressure Sensor														SAU	
	Capacitance Manometer											CCMT-1000D				
											CCMT-100D					
										CCMT-10D						
									CCMT-1D							
	Pirani Gauge									SW100						
											SP1					
	Cold Cathode Type Ionization gauge						SC1									
	Multi Ionization Gauge (Hot Cathode Type Ionization Gauge + Optional Unit)						ST200									
							ST200 + SWU10-R									
							ST200 + SWU10-R + SAU									
				SH200												
				SH200 + SWU10-R												
				SH200 + SWU10-R + SAU												
Conventional type	Pirani Gauge										GP-1G/1000G					
											GP-2001G					
	Hot Cathode Type Ionization gauge						GI-D7·WIT									
						GI-D7·WIB										
	Samrtphone-Direct Pirani Gauge									SWU10-U						

Vacuum Gauge Calibration Service JCSS

ULVAC is the first company in Japan to receive JCSS accreditation in the vacuum field as a vacuum gauge calibration laboratory.

ilac-MRA IA Japan JCSS 0258 JCSS

- At June 3, 2010, accredited as a JCSS-MRA calibration laboratory (JCSS 0258), the first ISO/IEC 17025 compliant calibration laboratory of pressure (vacuum) field in Japan.
- Running JCSS calibration based on ISO/IEC17025.
- JCSS-calibration certificate is available around the countries and region of the ILAC and APLAC MRA.
- Vacuum gauge compliant with calibration possible : Thermal conductivity gauge (pirani vacuum gauge), diaphragm vacuum gauge, ionization vacuum gauge, viscosity vacuum gauge.

(Supports all vacuum gauges from our company as well as those manufactured by other companies.)

Vacuum gauge calibration room

Designation for the classification of calibration method	Category	Calibration range	Highest measurement capacity (trust level approx. 95%)
Vacuum gauge	Viscosity vacuum gauge	Above 0.1mPa less than1mPa	2.0%
		Above 1mPa less than 10mPa	1.0%
		Above 10mPa less than 0.1Pa	0.8%
		Above 0.1Pa less than 1Pa	0.7%
	Diaphragm vacuum gauge	Above 1Pa less than 100Pa	1.5%
		Above 10kPa less than 133kPa	0.6%
		Above 0.1mPa less than 1mPa	0.3%
	Ionization gauge	Above 0.1mPa less than 1mPa	5.0%
		Above 1mPa less than 1Pa	3.0%
	Thermal conductivity gauge	Above 1Pa less than 1kPa	2.0%

Multi Ionization Gauge G-TRAN Model:

Transducer type vacuum gauge which is connectable with different measurement range sensor units. It saves running cost significantly.

ST200

SH200

ST200/SH200 SWU10-R

Example of combination use with optional unit

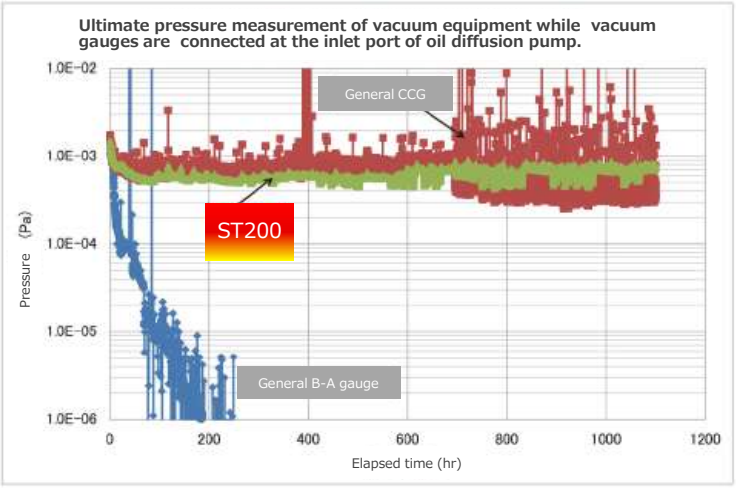
- Model: ST200-A/ST200-R
  - The world's first metal type triode ionization gauge (patented). Long lifetime taking advantage of triode type even in harsh environment for vacuum gauges.
  - Measurement accuracy is improved at ±10% and sensitivity stability is also improved significantly.
  - For measurement of ultimate pressure of vacuum furnaces / organic EL or touch panel manufactured systems, in atmosphere with lots of hydrocarbon or cleaning fluid, and in equipments where reduction of replacement frequency for sensor heads is required.
- Model: SH200-A/SH200-R
  - For measurement from ultra-high vacuum to high-vacuum.
  - For measurement of ultimate pressure of sputtering or evaporation system for PV･FPD / SEMI and electronic component manufacturing systems, and pressure monitoring for ultra high vacuum equipment.
- Common to Model: ST200/SH200
  - Operable in combination with optional pirani sensor unit and pressure sensor unit.
  - The world's smallest class (56% reduction of controller volume compared to the previous model).
  - Easy set point setting and status check by connecting PC/smartphone. *Need power supply when measuring.
  - Filament life alarm function by monitoring filament power.

Image of connection by PC/smartphone

Model	ST200-A	ST200-R	SH200-A	SH200-R
Measurement pressure range	1 x 10^{-5} to 1 x 10^{+1}Pa 7.5 x 10^{-8} to 7.5 x 10^{-2}Torr 1 x 10^{-7} to 1 x 10^{-1}mbar		5 x 10^{-8} to 1 x 10^{+1}Pa 7.5 x 10^{-11} to 7.5 x 10^{-2}Torr 1 x 10^{-10} to 1 x 10^{-1}mbar	
Accuracy	±10%: 1 x 10^{-4} to 3Pa, 7.5 x 10^{7} to 2.2 x 10^{-2}Torr, 1 x 10^{-6} to 3 x 10^{-2}mbar		±15%	
Filament	1 pc (Ir/Y_2O_3)		2 pcs (Ir/Y_2O_3 and W)	
Degas method	Electron bombardment			
Measurement value output	LOG output (DC 0 to 10V)			
Set point	3 points (open collector output)	None	3 points (open collector output)	None
Serial communication	None	RS232C / RS485	None	RS232C / RS485
Power supply voltage	DC 20 to 28V			
Dimensions	69 x 63 x 125 mm (ST200 / SWT-16)			
Connectable sensor unit(Model)	Pirani sensor unit SWU10-R (optional), pressure sensor unit SAU (optional)			
Connectable sensor head(Model)	SWT-16 (KF16), SWT-25 (KF25)		M-44 (KF16), M-45 (KF25), M-46 (ICF070)	
Applicable standard	CE			

* Connectable with different measurement range sensor units. Measurable from low-vacuum to atmospheric pressure in combination with pirani sensor unit SWU10-R and pressure sensor unit SAU.

Advantage of Model: ST200 in contamination resistance



[General B-A gauge]
Sensitivity got deteriorated (measurement value got lower) significantly in short time. Cannot continue to use.

[General CCG]
Measurement value fluctuated and the fluctuation range became wider halfway through measurement. Difficult to continue to use any longer.

[Model: ST200]
Measurement value was stable from start to finish.

➢ Long life of ST200 can be expected in applications much contamination.

Pirani Vacuum Gauge G-TRAN Model:

Pirani vacuum gauge which has user-friendly functions with a renewed design.

SW100

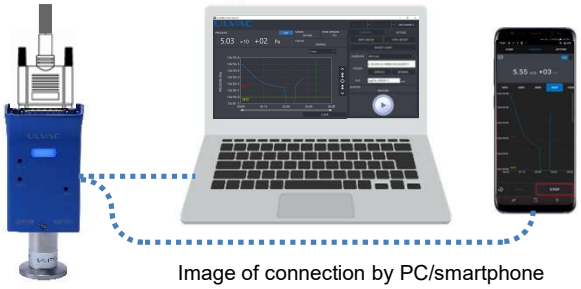


Image of connection by PC/smartphone

SP1

Model: SW100-A/SW100-R

- Easy set point setting and status check by connecting PC/smartphone. *Need power supply when measuring.
- Wide measurement range: 5 x 10^{-2} to 1 x 10^{+5}Pa (3.75 x 10^{-4} to 760Torr, 5 x 10^{-4} to 1,013mbar).
- Excellent shock-resistance and vibration resistance design (patented).
- For sputtering system, vacuum laminator, vacuum pump carousel system, manufacturing system where there is vibration from vacuum pumps, etc.

Model: SP1

- Long time experienced sensor head WP series is used. Sensor head is fully compatible with other ULVAC Pirani vacuum gauges.
- For interlock and sequence control for various kind of vacuum manufacturing equipment, other rough pumping systems, etc.

Model	SW100-A	SW100-R	SP1
Measurable pressure range	5 x 10^{-2} to 1 x 10^{+5} Pa 3.75 x 10^{-4} to 760 Torr 5 x 10^{-4} to 1,013 mbar		4 x 10^{-1} to 3.0 x 10^{+3} Pa 3 x 10^{-3} to 22 Torr 4 x 10^{-3} mbar
Accuracy	±10% (1 x 10^{-1} to 1 x 10^{+4}Pa, 7.5 x 10^{-4} to 75Torr, 1 x 10^{-3} to 100mbar) ±20% (5 x 10^{-2} to 1 x 10^{+5}Pa, 3.75 x 10^{-4} to 760Torr, 5 x 10^{-4} to 1 x 1,013mbar)		±15% (51 to 760Pa, 3.8 x 10^{-1} to 5.7Torr, 5.1 x 10^{-1} to 7.6mbar) ±30% (10 to 1,000Pa, 7.5 x 10^{-2} to 7.5Torr, 0.1 to 10mbar) ±50% (0.4 to 3,000Pa, 3 x 10^{-3} to 22Torr, 4 x 10^{-3} to 30mbar)
Filament	Platinum (Pt)		
Measurement value output	DC 0 to 10V LOG output		DC 0 to 10V non-linear output
Set point	2 points (open collector output)	None	2 points (open collector output)
Serial communication / Digital output	None	RS232C/RS485	None
Power supply voltage	DC 14 to 30V		DC 24V±2 V
Dimensions	48 x 30 x 104 mm		50 x 30 x 146 mm
Sensor head model	SWP-16 (KF16), SWP-25(KF25), SWP-P18(dia.18), SWP-P15(dia.15), SWP-CF16(ICF034), SWP-R1/8 (R1/8)		WP-01（dia.18）, WP-02（dia.15）, WP-03（R3/8）, WP-16（KF16）
Applicable standard	CE		–

Capacitance Manometer G-TRAN Model: CCMT-

vacuum gauge which detects change of static electric capacitance occurring from the ceramic diaphragm transforms due to the change of gas pressure.

CCMT-D

ISG1

- Excellent corrosion resistance and long-time stable ceramic (alumina) diaphragm.
- Total pressure measurement not depending on gas types.
- Equipped with temperature compensation circuit.
- Sensor protection structure against contamination from flying objects.
- Warming up time after power-on until stabilization is greatly reduced.
- Coating process control for equipments such as sputtering, evaporator, etc. and pressure monitor for various kind of manufacturing equipment such for photovoltaic cell, etc.

Model	CCMT-1000D	CCMT-100D	CCMT-10D	CCMT-1D
Range full scale (F.S.)	133kPa 1,000Torr 1,330mbar	13.3kPa 100Torr 133mbar	1.33kPa 10Torr 13.3mbar	133Pa 1Torr 1.33mbar
Lowest reading	13Pa, 10^{-1}Torr, 1.3 x 10^{-1}mbar	1.3Pa, 10^{-2}Torr, 1.3 x 10^{-2}mbar	0.13Pa, 10^{-3}Torr, 1.3 x 10^{-3}mbar	0.013Pa, 10^{-4}Torr, 1.3 x 10^{-4}mbar
Practical lowest reading	66.6Pa, 5 x 10^{-1}Torr, 6.7 x 10^{-1}mbar	6.7Pa, 5 x 10^{-2}Torr, 6.7 x 10^{-2}mbar	0.67Pa, 5 x 10^{-3}Torr, 6.7 x 10^{-3}mbar	6.7 x 10^{-2}Pa, 5 x 10^{-4}Torr, 6.7 x 10^{-4}mbar
Accuracy	±0.2% for the indicated value ± temperature coefficient (2 hours after power-on at 25 ℃)			
Display	None (optional display: ISG1)			
Measurement value output	Linear output (DC 0 to 10V)			
Set point	None			
Material where gas contacts	AL_2O_3, Vacon70, SUS316, glass ceramic solder, Ag Ti Cu hard solder			
Power supply voltage	DC 14 to 30V			
Dimensions	Dia. 55 x 117 mm			
Fitting	KF16, 1/2 pipe（dia.12.7）, 8VCR			
Applicable standard	CE			

Pressure Sensor Unit G-TRAN Model: SAU

Semiconductor type thin-film element makes measurement near atmospheric pressure (gauge pressure : -100 kPa to 10kPa, - 1bar to 0.1 bar, -14.5psi to 1.45psi) accurate.

SAU

- Optimum for atmospheric pressure checking because pressure standard is for gauge pressure. It measure atmospheri pressure accuracy.
- Semiconductor type thin film element makes continuous use in high vacuum process possible (SUS316L).
- DC 0-5 linear output as standard.
- Power supply is widely supported from DC 12V to 24V.
- Atmospheric pressure checking or gauge pressure measurement for various kind of coating system such as PV･FPD･SEMI･electronic devices manufacturing system.

Model	SAU
Pressure standard	Gauge pressure
Measurable pressure range (gauge pressure)	-100 to 10kPa -750 to 75Torr -1,000 to 100mbar
Accuracy	±3% F.S.
Measurement value output	DC 0 to 5V linear output
Material	SUS316L
Sensor pressure proof	200kPa, 1,500Torr, 2,000mbar (gauge pressure) *need for the consideration of pressure resistance of the flange and the clamp.
Power supply	DC 12 to 24V±10%
Dimensions	dia. 30 x 68mm
Flange	KF16

Cold Cathode Ionization Gauge G-TRAN Model:

Reverse magnetron cold cathode gauge.

SC1

- Simple structure makes periodical maintenance easy and inexpensive.
- No filament. Sensor is recyclable by cleaning.
- 2 set points.
- Various kind of vacuum furnace, evaporator, organic EL manufacturing system and other high vacuum system.

Model	SC1
Measurable pressure range	1 x 10^{-5} to 1 x 10^{0} Pa 7.5 x 10^{-8}-7.5 x 10^{-3}Torr 1 x 10^{-7}-1 x 10^{-2}mbar
Accuracy	−50 to +100% (1 x 10^{-4} to 1 x 10^{-1}Pa, 7.5 x 10^{-7}-7.5 x 10^{-4}Torr, 1 x 10^{-6}-1 x 10^{-3}mbar)
Measurement value output	DC 0 to 10V nonlinear output
Set point	2 points (open collector output)
Serial communication / digital output	None
Power supply voltage	DC 24V±2V
Dimensions	dia. 90 x 145 (C-21)
Sensor head model	C-21 (dia. 18/15), C-23 (ICF034), C-24 (KF16), C-25 (KF25)

Display Unit G-TRAN Model: ISG1

Display for all G-TRAN Models.

ISG1

- Usable with all G-TRAN Models (excluding serial communication model: SW100-R/ST200-R/SH200-R)
- 3 set points
- DIN standard compact design
- LED display

Model	ISG1
Number of connectable sensor unit	1 unit
Connectable sensor unit(Model)	SW100-A, SP1, ST200-A, SH200-A, SC1, CCMT
Indication	Digital display mantissa portion: 2 digit Exponent portion: 1 digit
Measurement value output	DC 0 to 10V
Set point	3 points
Sampling time	70ms
Power supply	DC 24V±1V
Dimensions	DIN 48 x 70 x 96 mm
Applicable standard	CE

Pirani Vacuum Gauge Model: GP-G

Constant temperature Pirani vacuum gauge which utilizes heat conductivity of gases. Bestseller product, more than 150,000 units.


GP-1000G


GP-2001G


GP-1G with case

- Display is included as standard. Analog or digital display.
- Long time experienced sensor head WP series is used. Sensor head is fully compatible with other ULVAC Pirani vacuum gauges.
- Filament is corrosion resistant platinum (Pt).
- Various interface function according to usage : Digital output, serial communication, control output signal (set point), etc.
- For sputtering system, vacuum laminator, vacuum pump carousel system and interlock and sequence control various kind of vacuum manufacturing system, and other rough pumping systems, etc.

Model	GP-1000G	GP-2001G	GP-1G	GP-1G with case
Measurable pressure range	0.4 to 2,700Pa 3 x 10^{-3} to 20Torr 4 x 10^{-3} to 27mbar	0.4 to 3,000Pa 3 x 10^{-3} to 22.5Torr 4 x 10^{-3} to 30mbar	0.4 to 2,700Pa 3 x 10^{-3} to 20Torr 4 x 10^{-3} to 27mbar	
Pressure unit	Pa or Torr	Pa／kPa	Pa or Torr	
Accuracy	±15% (51 to 760Pa, 0.38 to 5.7Torr, 0.5 to 7.6mbar), ±30% (10 to 1,000Pa, 0.075 to 7.5Torr, 0.1 to 10mbar), ±50% (0.4 to 2,700 / 3,000Pa, 3 x 10^{-3} to 20Torr, 4 x 10^{-3} to 27/30mbar)		Within ±3% of the 100% straight scale conversion full scale	
Indication	Digital display (LCD) Mantissa portion: 2 columns/exponent Portion: 1 column	Digital display (LED) 4.5 columns	Analog display	
Measurement value output	DC 0 to 10V linear output	DC 0 to 10V linear output	DC 0 to 10mV non-linear output	
Set point	3 point (relay contact output)	3 point (open collector output)	None	
Serial communication / digital output	RS232C / BCD output	None		
Power supply voltage	AC100 to 240V			
Dimensions (display control unit)	50 x 236 x 99mm	99 x 136 x 48mm	100 x 130 x 100mm	150 x 134 x 191mm
Sensor head (Model)	WP-01 (dia. 18), WP-02 (dia. 15), WP-03 (R3/8), WP-16 (KF16), WPB-10-034 (ICF034)			
Applicable standard	CE	—		

Hot Cathode Ionization Gauge Model: GI-D7

Hot cathode ionization vacuum gauge for high vacuum measurement.


GI-D7

- For high vacuum measurement.
- Glass tube and nude type sensor head is available according to your application.
- WIT is for vacuum heat treatment furnace, vacuum brazing furnace, evaporator (oil diffusion pump), etc. WIB is for sputtering system, evaporator (turbo molecule pump), various kind of high and ultra-high vacuum system, etc.

Model	(GI-D7
Pressure range	1.3 x 10^{-5} to 6.7 x 10^{-1}Pa WIT: 1.0 x 10^{-7} to 5 x 10^{-3}Torr 1.3 x 10^{-7} to 6.7 x 10^{-3}mbar
	1.3 x 10^{-6} to 1.3 x 10^{-2}Pa WIB: 1.0 x 10^{-8} to 1.0 x 10^{-4}Torr 1.3 x 10^{-8} to 1.3 x 10^{-4}mbar
Pressure unit	Pa or Torr
Accuracy	±15%
Display	Digital display (LED) mantissa portion: 3 columns / exponent portion: 2 columns
Measurement value output	Mantissa portion linear output, quasi-LOG output (DC 0 to 10V)
Set point	2 points (relay contact output)
Serial communication	RS232C / BCD output
Power supply	AC 100 V±10 V
Dimensions (display control unit)	240 x 380 x 99 mm
Sensor head (Model)	WIT-G1(W・dia.18/15), WIT-G8(Ir・dia.18/15), WIB-G5(dia.18/15), WIB-N3(ICF070)

Smartphone-Direct Pirani Gauge Model: SWU10-U

Pirani vacuum gauge which can measure degree of vacuum by connecting your smartphone directly with USB cable. No AC power supply and dedicated display required.

SWU10-U (NW16 spec)

Product usage

- Direct connection with smartphone: Measure quickly, connect your smartphone (tablet or PC) via USB cable (patent pending). No other component required.
- No AC power supply required: No dedicated power supply required.
- Lightweight and compact: Size: φ46×81mm, weight: 85g (NW16 spec), ULVAC's smallest, lightest pirani vacuum gauge.
- Excellent shock resistance: ULVAC original structure (patent number 6595945) and body protection rubber.
- Wide range measurement: Measureable pressure range from 5×10^{-2} to $1\times10^{+5}$Pa (3.75×10^{-4} to 760Torr, 5×10^{-4} to 1,013mbar)
- Extensive fittings: 7 fittings available, including NW16 and R1/8.

Model	SWU10-U						
Measurable pressure range	5 x 10^{-2} to 1 x 10^{+5} Pa / 3.75 x 10^{-4} to 760 Torr / 5 x 10^{-4} to 1,013 mbar						
Accuracy(*1)	±10% (1 x 10^{-1} to 1 x 10^{+4}Pa / 7.5 x 10^{-4} to 75Torr / 1 x 10^{-3} to 100mbar) ±20% (5 x 10^{-2} to 1 x 10^{-1}Pa, 1 x 10^{+4} to 1 x 10^{+5}Pa / 3.75 x 10^{-4} to 7.5 x 10^{-4}Torr, 75 to 760Torr / 5 x 10^{-4} to 1 x 10^{-3} mbar, 100 to 1,013mbar)						
Repeatability	±2% (1 x 10^{-1} to 1 x 10^{+4}Pa / 7.5 x 10^{-4} to 75Torr / 1 x 10^{-3} to 100mbar)						
Filament	Platinum (Pt)						
Burst pressure(*2)	2 x 10^{+5}Pa(abs)						
Operating temperature range	10 to 40℃ / 50 to 104℉						
Operating humidity range	15 to 85% (not condensing)						
Storage temperature	-20 to 65% (not condensing)						
IP rating	IP30						
Fixing position	Free						
Power supply voltage	DC5±5% 350mA_{MAX}						
I/O connector	USB microB						
Fitting	NW16	NW25	R1/8	φ18	φ15	ICF034	Sanitary
Weight	85g	88g	94g	93g	80g	80g	145g
Option	USB2.0 cable (certified product, TypeC-microB, 2.0m)(*3) Inspection certificate, calibration certificate, traceability certificate, JCSS calibration certificate						

*1)Value after atmospheric pressure adjustment and zero point adjustment

*2)Consider separately burst pressure of flange and clamp, etc.

*3)Select TypeC-microB OTG cable when using a commercial USB cable.

Available smartphone(*4)
Android 6 or later
Connector: USB TypeC

*4)For available smartphone models list, see ULVAC web page.

Application software "UL-MOBI"(*5)
For smartphone: Download from Google Play
For PC: Download from ULVAC web page

*5)For further details, see explanation of app on Google Play.

Image of "UL-MOBI" on smartphone

GET IT ON Google Play

Pressure value display

Trend graph display

Data logging function

Log data is saved as CSV format.

Sampling interval: Min. 200ms

Image of "UL-MOBI" on PC

Process Gas Monitor (Residual Gas Analyzer)

Basic Process Gas Monitor model:Qulee BGM2

For various kind of evaporator and vacuum furnace for quality control and yield ratio improvement.

Qulee BGM2-102

- Interface : Ethernet
- Residual gas analysis.
- Integrated display does not always require PC for operation. Simple and easy with one touch function.
- Electron stimulated desorption (330V, 5mA) for degas.
- Preventive maintenance function for ion source, secondary electron multiplier and analyzer tube.
- For evaporator, vacuum furnace, organic EL manufacturing system, PV・FPD・semiconductor manufacturing system and other high vacuum systems.

Model	BGM2-101	BGM2-201	BGM2-102	BGM2-202
Mass range	1 to 100 amu	1 to 200 amu	1 to 100 amu	1 to 200 amu
Resolution	M/△M=1M (10%P.H.)			
Detector	Faraday cup		EM tube／faraday cup	
Sensitivity	1 x 10^{-7} A/Pa, 1.33 x 10^{-5} A/Torr, 1 x 10^{-5} A/mbar		4 A/Pa, 532 A/Torr, 400 A/mbar	
Minimum detectable partial pressure	1 x 10^{-8}Pa, 7.5 x 10^{-11}Torr, 1 x 10^{-10}mbar		1 x 10^{-12}Pa, 7.5 x 10^{-15}Torr, 1 x 10^{-14}mbar	
Maximum operating pressure	1 x 10^{-2}Pa, 7.5 x 10^{-5}Torr, 1 x 10^{-4}mbar			
Maximum bake out temperature	120°C, 248F (when analyzer tube is connected) 250°C, 482F (without analyzer tube)			
Interface	Ethernet			
Software	Qulee QCS Ver.4.2 later (Windows 8/10/11 supported)			
Applicable standard	CE			

High Performance Process Gas Monitor model:Qulee HGM2

For research & development equipment.

Qulee HGM2-202

- Interface : Ethernet
- Highest sensitivity 2.5 x 10^{-6} A/Pa (3.3 x 10^{-4} A/Torr, 2.5 x 10^{-4} A/mbar) .
- Measurable while baking at 250°C (482F) or below. Maximum 300°C (572F) when analyzer tube is disconnected.
- Electron stimulated desorption (330V, 5mA) for degas.
- Preventive maintenance function for ion source, secondary electron multiplier and analyzer tube.
- For thermal desorption gas analysis, residual gas analysis for extreme high and ultra high vacuum equipments, organic compound analysis and environmental analysis, etc.

Model	HGM2-202		HGM2-302	
Mass range	1 to 200 amu		1 to 300 amu	
Resolution	M/△M=1M (10%P.H.)			
Detector	Faraday cup	EM tube	Faraday cup	EM tube
Sensitivity	2.5 x 10^{-6} A/Pa 3.3 x 10^{-4} A/Torr 2.5 x 10^{-4} A/mbar	4 A/Pa 532 A/Torr 400 A/mbar	2 x 10^{-6} A/Pa 2.6 x 10^{-4} A/Torr 2 x 10^{-4} A/mbar	4 A/Pa, 532 A/Torr 400 A/mbar
Minimum detectable partial pressure	1 x 10^{-9} Pa 7.5 x 10^{-12}Torr 1 x 10^{-11}mbar	1 x 10^{-13}Pa 7.5 x 10^{-16}Torr 1 x 10^{-15}mbar	1 x 10^{-9} Pa 7.5 x 10^{-12}Torr 1 x 10^{-11}mbar	1 x 10^{-13}Pa 7.5 x 10^{-16}Torr 1 x 10^{-15}mbar
Maximum operating pressure	1 x 10^{-2}Pa, 7.5 x 10^{-5}Torr, 1 x 10^{-4}mbar			
Maximum bakeout temperature	250°C, 482F (when analyzer tube is connected) 300°C, 572F (without analyzer tube)			
Interface	Ethernet			
Software	Qulee QCS Ver.4.2 later (Windows 8/10/11 supported)			
Applicable standard	CE			

Compact Process Gas Monitor model: Qulee CGM2

For sputtering system for process control, quality control and yield ratio improvement.

Qulee CGM2-051/101

- No differential pumping system required for process monitoring up to 1Pa (7.5 x 10^{-3}Torr, 1 x 10^{-2}mbar).
- Integrated display does not always require PC for operation. Simple and easy with one touch function.
- Electron stimulated desorption (330V, 5mA) for degas.
- Preventive maintenance function for ion source, secondary electron multiplier and analyzer tube.
- For sputtering system.

Model	CGM2-051	CGM2-101	CGM2-052	CGM2-102
Mass range	1 to 50 amu	1 to 100 amu	1 to 50 amu	1 to 100 amu
Resolution	M/△M=1M (10%P.H.)			
Detector	Faraday cup		EM tube／faraday cup	
Sensitivity	1 x 10^{-7} A/Pa, 1.33 x 10^{-5} A/Torr, 1 x 10^{-5} A/mbar		1 x 10^{-4} A/Pa, 1.33 x 10^{-2} A/Torr, 1 x 10^{-2} A/mbar	
Minimum detectable partial pressure	1 x 10^{-7}Pa, 7.5 x 10^{-10}Torr, 1 x 10^{-9}mbar		1 x 10^{-10}Pa, 7.5 x 10^{-13}Torr, 1 x 10^{-12}mbar	
Maximum operating pressure	2Pa, 1.5 x 10^{-2}Torr, 2 x 10^{-2}mbar		1 x 10^{-2}Pa, 7.5 x 10^{-5}Torr, 1 x 10^{-4}mbar (SEM) 2Pa, 1.5 x 10^{-2}Torr, 2 x 10^{-2}mbar (FC)	
Maximum bake out temperature	120°C, 248F (when analyzer tube is connected) 250°C, 482F (without analyzer tube)			
Interface	Ethernet			
Software	Qulee QCS Ver.4.2 later (Windows 8/10/11 supported)			
Applicable standard	CE			

Process Gas Monitor (Residual Gas Analyzer)

Process Gas Monitor with Pumping System/ Vacuum model — Qulee with YTP-H

For wide range of usage from process control, residual gas analysis of various vacuum equipments to R&D.

Qulee with YTP-H
Vacuum model

- Excellent cost performance : From processing monitoring to residual gas analysis by single unit.
- BGM2-101 and 102 for 1-100amu, BGM2-201 and 202 for 1-200 amu and HGM2-302 for 1-300 amu.
- The analytical pressure can be selected from 3000 Pa, 500 Pa, 100 Pa, 10 Pa, 1 P or VLV specifications.compact design : Utilizes standard vacuum unit model desktop YTP.
- Low noise : 43dB(A) or less at Ultimate pressure.

Process gas monitor		Select from BGM2-101, BGM2-102, BGM2-201, BGM2-202, HGM2-302
Maximum operation pressure		Select from, 3,000,500,100,10,1Pa / 22.5,3.75,7.5,0.75,0.075Torr / 30,5,1,0.1,0.01mbar
Gas introduction system (Vacuum type) (3000 to 1Pa, 22.5 to 0.075Torr, 30 to 0.01mbar)		Manual bellows valve (2 way), Flange : IFC070
Pump unit desktop YTP (YTP70A-D)	Turbo Molecular Pump	70L/s (N_2)
	Dry pump	20L/min
	Ultimate pressure	Below 10^{-6} Pa
Power supply		Single phase AC100-240V, 300W (Vacuum type)
Software		Qulee QCS Ver.4.2 later (Windows 7/8/10/11 supported)

∗ Pumping system desktop YTP, Qulee main unit, gas inlet and other parts are packaged separately. Please refer to the assembly manual for set up.

Process Gas Monitor with Pumping System/ Atmospheric pressure specification model — Qulee with YTP-H

For wide range of usage from process control, residual gas analysis of various vacuum equipments to R&D.

Qulee with YTP-H
Atmospheric pressure specification Model

- Excellent cost performance : From processing monitoring to residual gas analysis by single unit.
- BGM2-101 and 102 for 1-100amu, BGM2-201 and 202 for 1-200 amu and HGM2-302 for 1-300 amu.
- Able to measure atmospheric pressure
- Compact design : Utilizes standard vacuum unit model desktop YTP.
- Low noise : 43dB(A) or less at Ultimate pressure.

Process gas monitor		Select from BGM2-101, BGM2-102, BGM2-201, BGM2-202, HGM2-302
Maximum operation pressure		Atmospheric pressure
Atmospheric pressure sampling unit (atmospheric pressure)	Dry vacuum pump	DAP-6D, ultimate pressure: 6700Pa, 50Torr, 67mbar
	Control unit	APS-001
	Capillary unit	Manual bellows valve (1 way): Joint 1/4" Swagelok
Pump unit desktop YTP (YTP70A-D)	Turbo Molecular Pump	70L/s (N_2)
	Dry pump	20L/min
	Ultimate pressure	Below 10^{-6} Pa
Power supply		Single phase AC100-240V, 300W (Vacuum type)
Software		Qulee QCS Ver.4.2 later (Windows 7/8/10/11 supported)

∗ Pumping system desktop YTP, Qulee main unit, gas inlet and other parts are packaged separately. Please refer to the assembly manual for set up.

Reactive Process Gas Monitor — model:Qulee

For etching and CVD system for process control, quality control, yield ratio improvement and end point monitoring.

Qulee RGM2-201F

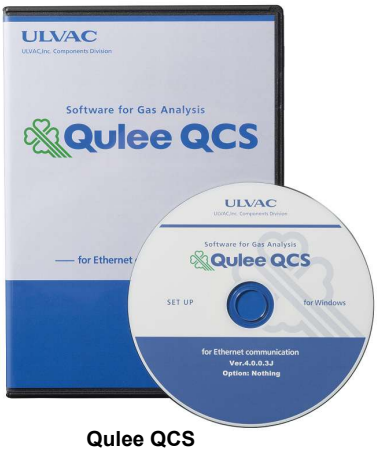
- Stable and long-time measurement in reactive gases or corrosive gases environment.
- Adoption of a magnetic closed-type ion source: Soft ionization with minimal gas deviation, long lifespan, and two filaments.
- Compact size: Integrated exhaust and control systems, allowing for vertical placement, considering the footprint.
- Outstanding maintenance: Ion source replacement can be done in approximately 10 minutes.
- For process monitoring residual gas analysis and leak test for etching system and CVD system.

Model	RGM2-201F
Mass range	1 to 200 amu
Resolution	M/△M=1M (10%P.H.)
Detector	Faraday cup
Sensitivity (EM tube)	2 x 10^{-6} A/Pa 2.67 x 10^{-4} A/Torr 2 x 10^{-4} A/mbar
Minimum detectable partial pressure	1 x 10^{-10}Pa, 7.5 x 10^{-13}Torr, 1 x 10^{-12}mbar
Sampling pressure	0.1 to 500 Pa (adjustable depending on the selected orifice)
Total pressure measurement function	Capable
Ion source / filament	Closed ion source with magnet ／V-shaped filament Ir/Y_2O_3 (2 piece)
Maximum Baking Temperature	110±10℃ (Standard Equipped with Dedicated Block-Type Heater Unit)
Interface	Ethernet
Software	Qulee QCS Ver.4.2 later (Windows 8/10/11 supported)

Process Gas Monitor (Residual Gas Analyzer)

Software for Gas Analysis Model：Qulee QCS

Standard software for Qulee series.



Qulee QCS

- Standard software for all Qulee series. (Windows 8/10/11 supported)
- User-friendly with many shortcut buttons on the screen.
- Various measurement mode such as scan mode, trend mode, analog mode, sensitivity-calibration mode, etc.
- Ethernet support for up to 16 simultaneous Qulee measurements (any combination of Qulee series).
- For all Qulee series.

Model	Qulee QCS Ver.4.2
OS	Microsoft Windows 8/10/11
Interface	Ethernet
Connectable quantity	Maximum 16. Any type of Qulee series are connectable.
Supported model	Qulee BGM2 / Qulee HGM2/ Qulee CGM2 / Qulee RGM2 / Qulee with YTP−H
Recipes to save	100 (user area 70)
Measurement speed	50, 100, 200, 500, 1,000, 2,000 ms
Analog input	0 to 10V (2 points)
Partial pressure set point	2ch partial pressure set point (error and warning) setting (trend mode only)
PC required specifications	HDD: 2MB (measurement data excluded.), RAM: 256MB or more, display area: 1024 x 768 or more, CD-ROM Drive
	Ethernet port, CPU:Corei5 or higher,(8 units or more/Corei7 or higher)

Leak Detector Model: HELIOT900

HELIOT 900 series is a leak detector which has high speed pumping capability and user-friendliness.

The search gases are helium gas and hydrogen.

HELIOT901W1/D2

HELIOT904W2/D3R/D4R

HELIOT901+Cart

- High speed pumping capability 5L/sec helium in ULTRA flow mode.
- Tablet wireless remote control as standard.
- Simple and eye-friendly high-definition screen.
- Backing pump is selectable from oil rotary pump and dry scroll pump in different sizes.
- Mobile-friendly with maneuverable cart (904 series) and low height floor cart (901 series).
- Easy maintenance. Tool-free removal panel, easy access to each part and maintenance instruction movies installed.
- Aside from helium, hydrogen detection is possible.
- The PC software “HELIOT monitor” is available for use.

Model			901W1	901D2	904W2	904D3R	904D4R
Body type			Portable		Mobile		
Detectable gas			^4He, $^2H_2$				
Minimum detectable leak rate (^4He)			<5E-13 Pa・m^3/sec, <5E-12 mbar･L/sec, <5E-12 Torr･L/sec				
Leak rate display range	^4He	ULTRA	0.01E-12 to E-6 Pa・m^3/sec, 0.01E-11 to E-5 mbar･L/sec, 0.01E-11 to E-5 Torr･L/sec				
		FINE	0.01E-10 to E-5 Pa・m^3/sec, 0.01E- 9 to E-4 mbar･L/sec, 0.01E- 9 to E-4 Torr･L/sec				
		GROSS	0.01E- 8 to E-3 Pa・m^3/sec, 0.01E- 7 to E-2 mbar･L/sec, 0.01E- 7 to E-2 Torr･L/sec				
	$^2H_2$	FINE	0.01E- 8 to E-5 Pa・m^3/sec, 0.01E- 7 to E-4 mbar･L/sec, 0.01E- 7 to E-4 Torr･L/sec				
Inlet pumping speed (^4He)[L/sec]		ULTRA	5				
		FINE	1				5
Maximum connecting pressure		ULTRA	<2 Pa, <0.02 mbar, <0.015 Torr				
		FINE	<100 Pa, <1 mbar, <0.75 Torr				
		GROSS	<1,200 Pa, <12 mbar, <9 Torr				
Main pump : pumping speed [L/sec]			Turbo molecule pump :31				
Backing pump speed (50Hz/60Hz)			Oil rotary pump: 30/36 L/min, 1.8/2.2 m^3/h, 1.1/1.3 cfm	Dry scroll pump: 90/108 L/min, 5.4/6.5 m^3/h, 3.2/3.8 cfm	Oil rotary pump: 135/162 L/min, 8.1/9.7 m^3/h, 4.8/5.7 cfm	Dry Roots pump: 250 L/min, 15m^3/h, 8.8 cfm	Dry Roots pump: 500 L/min, 30 m^3/h, 17.6 cfm
Weight (including floor cart) [kg]			About 33 (about 46)	About 37 (about 50)	About 79	About 72	About 77
Dimensions W x D x H [mm] (floor cart included.)			320 x 480 (652) x 505.5 (917)		444 x 660 x 991		
Power consumption [VA]			600	500	1100	800/950	800/950
Power supply [V]			Single phase 100 to 120 or 200 to 240				
Inlet port flange			KF25				
Start-up time [min]			<2				
External interface			RS232C, RS485, analog DC output, digital input output				
Display language			Japanese, Chinese, Korean, Chinese (simplified character), Chinese (traditional character), German, Spanish, Russian				
Controller unit			7inch tablet-type industrial computer (wireless standard :IEEE 802.11 b/g/n) (*1)				
	Operation range [m]	Cable	Cable length : 2 (standard attachment), 5 (optional)				
		Wireless	40 (*2)				
	Battery lasting time [hr]		3 to 5 (*3)				
Operating temperature range [℃]			10 to 40 (non condensation.)				
Applicable standard			CE, IP30		CE		

*1) Applicable radio law. 1) Tablet: Telec, CE, FCC. 2) Main unit: Telec, CE, FCC, IC, C-TICK. 3) “Wired operation spec” that doesn’t emit radio waves is also available (tablet controller has wireless radio on/off function). *2) May change depending on operating environment. *3) May change depending on communication condition, brightness, volume, etc. *4) Be careful about inrush current. Check if specification is sufficient when using drum reel.

■Sniffer

Model	AS9	BS9	BT9
Detected gas	^4He		
Leak rate display range	0.01E-8 to E-5 Pa・m^3/sec, 0.01E-7 to E-4 mbar･L/sec, 0.01E-7 to E-4 Torr･L/sec	0.01E-7 to E-3 Pa・m^3/sec, 0.01E-6 to E-2 mbar･L/sec, 0.01E-6 to E-2 Torr･L/sec	
Flow rate [SLM]	<0.03	About 3	
Sniffing inlet port	Handy probe		dia. 6mm hose joint
Tube [m]	1 to 10		

Optional accessories for Model: HELIOT900

Various option lineup for the HELIOT900 Series

a. Sniffer unit
a-1. a-2. a-3.



b. Cart, Case
b-1. b-2. b-3.



c. Oil mist trap
c-1.

d. Controller optional accessories
d-1. d-2. d-3. d-4. d-5.





e. Calibrated leak
e-1. e-2.


f. Parts
f-1. f-2. f-3. f-4. f-5.





g. Application of Bombing method
g-1.


h. Interface
h-1. h-2.


i. Consumable parts
i-1. i-2. i-3.



a. Sniffer unit	
a-1	AS unit
a-2	BS unit
a-3	BT unit
b. Cart, Case	
b-1	Low height cart for 901 series.
b-2	Controller storage box. *Low height cart is necessary to fix this box in case of 901 series.
b-3	Carrying case for 901 series *901 series with low height cart is not stored in this case.
c. Oil mist trap	
c-1	Oil mist trap for 904W2.
d. Controller optional accessories	
d-1	Controller cable set 5m
d-2	Charger for the controller (input: 100 to 240V)
d-3	Touch pen for the controller
d-4	Alarm security wire set including mounting bracket to the HELIOT, excluding lock.
d-5	Dial combination lock including master key

e. Calibrated leak	
e-1	Calibrated leak membrane type: E-7, E-8, E-9, E-10 [Pa·m^3/sec]
e-2	Calibrated leak channel type: E-4, E-5, E-6 [Pa·m^3/sec], Vacuum method or sniffer method.
f. Parts	
f-1	Manual angle type valve: KF25-KF25
f-2	Helium spray gun
f-3	Helium regulator (applicable only for Japanese domestic helium cylinder)
f-4	Test chamber: dia. 96mm x H30mm inside dimension
f-5	Bombing tank: dia. 95.5mm x H160mm inside dimension. Pressure range < 0.5MPaG
g. Application of Bombing method: for closed container	
g-1	Console unit
h. Interface	
	I/O connector set : Rec. Out, EXT.I/O
h-1	Signal conversion unit for the HELIOT300 series.
h-2	Power supply conversion cable: for the HELIOT700 / 710 series and HELIOT300 series.
i. Consumable parts	
i-1	Ion source
i-2	Pirani vacuum gauge sensor head
i-3	Micro separator: for Sniffer-BS unit and -BT unit

Module type Leak Detector HELIOT MONO

Leak detector specially designed for system integration.

Size : W360 × H229 × D310
Weight : 13kg

High pumping speed 3.0L/s & high connection pressure 100Pa
→ Fast response/cleanup reduces test time
Compact & vertically/horizontally install & integrated into one access surface
→ Increased flexibility in equipment design Downsizing of equipment, Shorten test time
Configurable by PC
→ Simple display-less design
External valve control basic sequence
→ No external control preparation is required (Type G option).
Hydrogen gas detectable
→ Alternative gas support
A copper-free gas contact part
→ Prevents defects in rechargeable batteries and aluminum products

Model	HELIOT MONO
Detectable gas	^4He , $^2H_2$
Minimum detectable leak rate[Pa·m^3/sec]	5×10^{-12}
Detection Range [Pa·m^3/sec]	0.01×10^{-12} ～ 10^{-4} (<100Pa)
Test Port / Fore Line Port	NW25 (ISO) ／ NW16 (ISO)
Operating temperature	10～40℃
Input voltage	DC24V / 300W
External control	EXT.IO／ DCV 0-10V／Serial interface／ USB(software “HELIOT monitor” for PC)

DC Power Supply Model : Digital DC

DC-2-D/DC-4-D
2kW/4kW

DC-10-D/DC-20-D
10kW/20kW

- High reliability design based on long time experienced ULVAC know-how.
- Stable process is ensured by excellent arc handling by ULVAC who is also vacuum process equipment supplier and has full knowledge about plasma processes.
- Extremely low ark energy by utilizing an optional high-speed arc shutoff circuit. It contributes to high productivity and improves manufacturing yield.
- 800V and 1000V are available. High-impedance load resistance.

Model		DC-2-D	DC-4-D	DC-10-D	DC-10-DH	DC-20-D	DC-20-DH
Input specification	Rated input voltage	3-Phase AC200V / 220V		3-Phase AC208V			
	Input capacity	3.5kVA or less	6.2kVA or less	13.5kVA or less		25kVA or less	
Output specification	Maximum rated power	2kW	4kW	10kW		20kW	
	Rated current	5A	10A	25A	18A	40A	50A
	Rated voltage	800V / 900V（Option）		800V	1000V	800V	1000V
	Ignition voltage	1200V		1500V			
	Abnormal discharge control	Shutoff by inverter stop or high-speed arc shutoff circuit when abnormal discharge is detected					
Control	Control method	Constant power control (P control)/constant current control (I control)/constant voltage control (V control)					
	Control precision	Constant power control (P Control)：±1% of the set value		Constant power control (P Control)：Below ±0.5% of the rated output or ±1% of the set value, whichever is larger. High-precision option available separately (Option)			
	Control compensation range	1 to 100% of rated power value		Constant power control, 1 to 10% of rated power value (Option) Constant power control, 10 to 100% of rated power value			
	External interface	Analog/Digital、RS-232C or 485					
		EtherCAT (Option)					
Parallel operation		None		Up to 12units can be controlled by master/slave communication Mixing 10-D/10-DH and mixing 20-D/20-DH is not allowed.			
Cooling method		Forced air-cooling					
Dimension WxDxH (excluding protrusions)		241 x 610 x 133 (mm)		483 x 630 x 133 (mm)			
Weight		15kg		29kg		36kg	
Applicable standard		CE、KC、SEMI F47、RoHS (Europe)					

Power supply for deposition made
by equipment manufacturer

CARES Technology

C：Guaranteed range of 1 to 10% of rated power（Low Range Control）

➢ By expanding the range from 1 to 10%, one unit can cover processes from low output

A：Minimum ARC processing time 5us

➢ Achieves 10 times faster minimum processing time than previous models, streamlining processes

R：Ramp Up function that can also be used for ignition

➢ Adding a function to the Ignition to suppress overvoltage

E：Equipped with EtherCAT communication function

➢ Supports EtherCAT communication, enabling high-speed data communication

S：Discharge judgment function（Auto Arc Suppression）

➢ The power supply detects when the arc has been extinguished and automatically restores the output.

CARES

Pursuing process evolution with five technologies

DC Power Supply Model : DCS0052B 500W for sputtering

DCS0052B
500W

- It provides a stable process with high reliability performance proved by more than 20 years experience.
- Excellent repetitive and repeatable output ensures higher quality sputtering processes.

Model		DCS0052B
Input specifications	Input voltage	Single phase AC100V / 200V
	Input capacity	1kVA or less
Output specifications	Maximum rated power	500W
	Rated current	1.25A
	Rated voltage	800V
	Ignition voltage	1100V
	Abnormal discharge control	Stop the Inverter when abnormal discharge is detected.
Control	Control method	Rated Power Control (P Control) / Rated Current Control (I Control) / Rated Voltage Control (V Control)
	Control precision	Rated power control (P Control) : Less than ±2% of the rated power value. Rated current control (I Control) : Less than ±1% of the rated current value. Rated voltage control (V Control) : Less than ±1% of the rated voltage value.
	Control guarantee scope	10% to 100% of the rated output value
	External interface	Analog/Digital
Parallel operation		None
Cooling method		Forced air cooled
Dimensions W x D x H (excluding protrusions)		240 x 450 x 99 (mm)
Weight		9kg
Applicable standard		-----

DC Power Supply Model : DC 30kW for sputtering

- Extremely low ark energy by utilizing an optional high-speed arc shutoff circuit. It contributes to high productivity and improves manufacturing yield.
- 1200V output with high-impedance load resistance.
- EtherCAT communication is available.

DC-30-44H-E
30kW

Model		DC-30-44H-E
Input specifications	Input voltage	3 phase AC 440V
	Input capacity	41.5kVA or less
Output specifications	Rated power	30kW
	Rated current	55A
	Rated voltage	1200V
	Ignition voltage	1500V
	Abnormal discharge control	Stop the inverter or shutoff with high-speed arc shutoff circuit when abnormal discharge is detected.
Control	Control method	Rated power control (P Control) Rated current control (I Control) Rated voltage control (V Control)
	Control precision	P Control : Less than ±0.5% of the rated output or ±1% of the set value, whichever is larger. I Control : Less than ± 1 % of the rated output or ± 2 % of the set value, whichever is larger. V Control : Less than ± 1 % of the rated output or ± 2 % of the set value, whichever is larger.
	Control guarantee scope	10 to 100% of rated power value
	External interface	Analog/Digital、RS-232C or 485、EtherCAT
Parallel operation		Maximum up to 12 units
Cooling method		Forced air cooled
Dimensions W x D x H (excluding protrusions)		483 x 650 x 177 (mm)
Weight		45kg
Applicable standard		CE、KC、SEMI F47、RoHS (Europe)

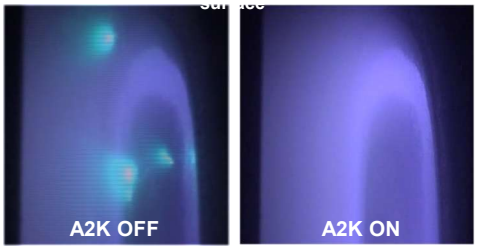
Pulse Unit Model：A2K

Model：A2K is the accessory of DC power supply which neutralize the charge built up on the cathode (target) by charging positive voltage pulse to DC power output in the reactive sputtering processes.

A2KH-25U

A2K-20K/A2K-40K

Comparison arc conditions on the cathode



- High reliability design based on long time experienced ULVAC know-how.
- Adding Model：A2K to the existing DC power supply improves productivity and throughput.
- Long time experienced ULVAC arc handling technology minimizes arc energy.

Model		A2KH-25U	A2K-20K	A2K-40K
Control electrical power	Input voltage	Single phase AC90 to 110V	Single phase AC100 to 240V	
	Input capacity	100VA or less	400VA or less	
Input Specifications	Operating Voltage	-100V to -800V		
	Operating current	25A	50A	100A
	Rated input power	15kW	20kW	40kW
Output Specifications	Frequency	1kHz to 20kHz	1kHz to 50kHz	
	Reverse voltage pulse width	5μs / 10μs Switching with internal switch	3us to 18us	
	Oscillation mode	Continuous / 1 Pulse / Pass		
	Output Format	For Single Target		
Parallel operation		Nothing	Up to 6 units can be controlled	
Cooling method		Forced air cooling		
Dimension WxDxH (excluding protrusions)		238 x 450 x 149 (mm)	483 x 630 x 177 (mm)	
Weight		16kg	30kg	45kg
Applicable standard		RoHS (Europe)	CE、KC、SEMI F47、RoHS (Europe)	

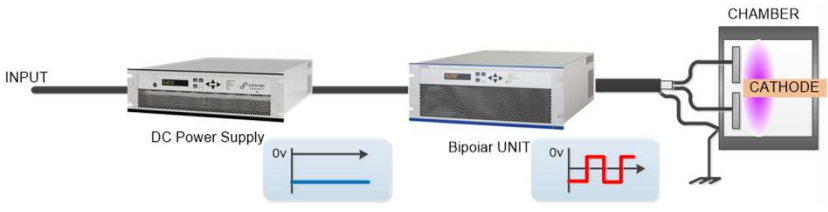
Bipolar unit Model：MFU-20K

Model：MFU is designed for bipolar output power system for dual cathode.

MFU-20K

- High reliability design based on long time experienced ULVAC know-how.
- Wide range oscillation frequency, 10k to 100kHz, supports various processes.
- Square wave makes duty cycle changeable and power supply to each cathode adjustable for more stable processes.

Bipolar output power system configuration



Model		MFU-20K
Control power input	Input voltage	Single phase AC 100 to 240V
	Input capacity	400VA or less
Input specifications	Operating voltage	0 to -1000V
	Maximum operating current	50A
	Maximum operating power	20kW
Output specifications	Oscillation frequency	10k to 100kHz (output current and voltage limited when oscillation frequency is 61kHz or more)
	Rated output voltage	1000V (RMS)
	Rated output current	50A (RMS)
	Output Format	For Dual Target
Parallel operation		Maximum up to 6 units
Cooling method		Forced air cooled
Dimensions W x D x H (excluding protrusions)		483 x 630 x 177 (mm)
Weight		29kg
Applicable standard		CE、KC、SEMI F47、RoHS (Europe)

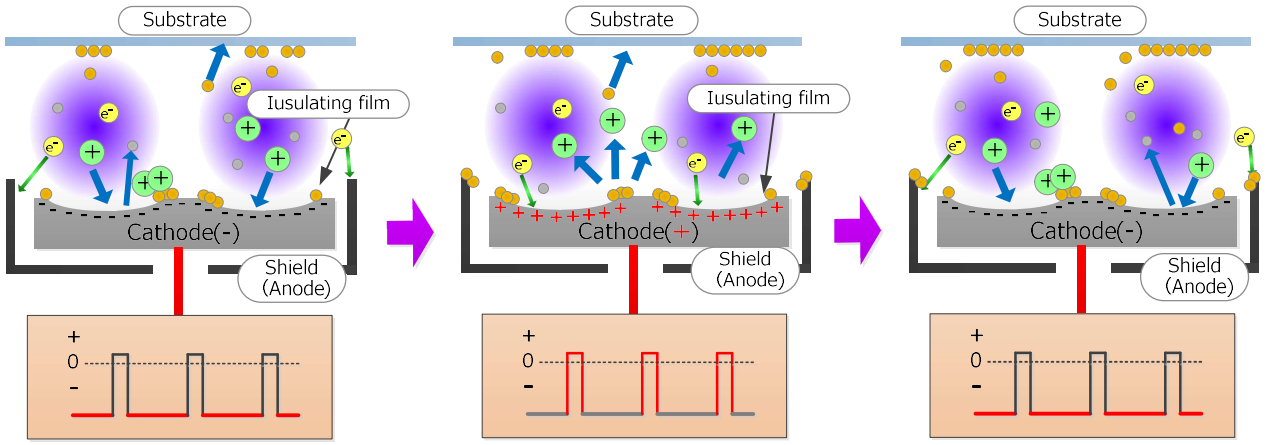
DC Pulse Power Supply Model : DC PULSE

DC pulse power supply which neutralize the charge built up on the cathode (target) by charging positive voltage pulse to DC power output in the reactive sputtering processes.

DC-5-P/DC-10-P
5kW/10kW

- High reliability design based on long time experienced ULVAC know-how.
- High throughput process is available because of high power input by suppressing abnormal discharge.
- Since it supports 800V output, it can also be easily used as a DC power supply with excellent arc handling performance.

Principle of abnormal discharge suppression in reactive sputtering



①Normal discharge state. Insulating film built on cathode surface is charged.

②Static electricity is neutralized by charging positive voltage pulse.

③Discharge is maintained inhibiting arc generation.

Model		DC-5-P	DC-10-P
Input specifications	Input voltage	3 phase AC208V	
	Input capacity	8kVA or less	13.5kVA or less
Output specifications	Rated power	5kW	10kW
	Rated current	12.5A	25A
	Rated voltage	5kHz to 150kHz : 800V / 155kHz to 250kHz : 650V	
	Ignition voltage	1500V	
	Oscillation frequency	5kHz to 250kHz	
	Reverse pulse range	0.4μ to 5μs (Setting range limited by oscillation frequency)	
External interface	Control method	Constant power control (P control)/constant current control (I control)/constant voltage control (V control)	
	Control precision	Less than ±0.5% of rated output or ±1% of the set value, whichever is larger.	
	Control guarantee scope	10 to 100% of rated electric power value.	
	External interface	Analog/Digital、RS-232C or 485	
Parallel operation		Maximum up to 6 units (with same model only)	
Cooling method		Forced air cooled	
Dimensions W x D x H (excluding protrusions)		483 x 630 x 133 (mm)	
Weight		29kg	36kg
Applicable standard		CE、KC、SEMI F47、RoHS (Europe)	

LF Power Supply Model : SG-10-4

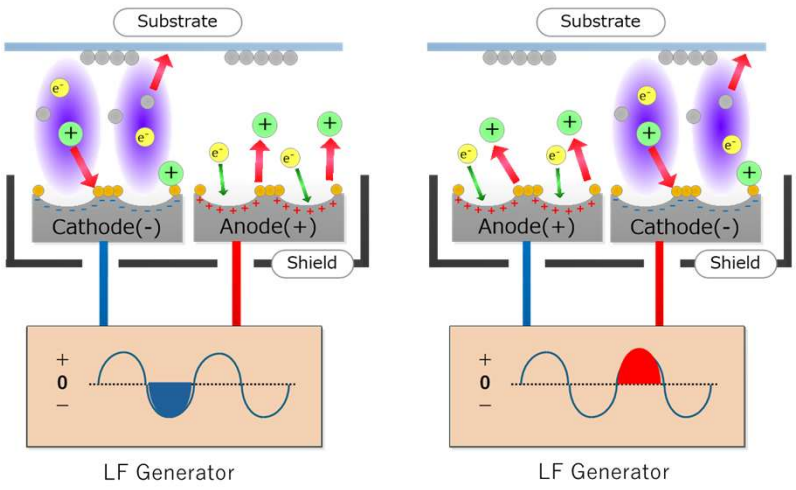
It is designed for plasma generation such as LF power supply, dual cathode sputtering, plasma CVD, etc., and can continuously output rated power at frequencies from 20kHz to 100kHz for plasma loads. Highly reliable and ideal for plasma loads that reflect know-how including power supply applications cultivated over many years in the design Power supply.

SG-10-4
10kW

- You can set the oscillation frequency from 20kHz to 100kHz in 1kHz increments. *1
- It is possible to output to the output range of the specifications without changing the transformer tap.
- Pulse output control is possible.
- External analog control, control by controller, etc. are standard equipment, and various controls such as S232C, RS485, and EtherCAT are possible with OPTION.

*1：There is a limit on the output voltage/current depending on the frequency setting conditions.

Discharge principle in dual cathode sputtering process



Model		SG-10-4
Input Specifications	Input Voltage	3 phase AC380V ～ 440V
	Input Capacitance	13.2kVA or less
Output Specification	Rated Power	10kW
	Rated Current	32A※
	Rated Voltage	1000Vrms※
	Oscillation Frequency	20kHz ～ 100kHz
Control	Control	Constant power control (P control)/constant current control (I control)/constant voltage control (V control)
	Control Accuracy	±100W
	Control Warranty Coverage	10 ～ 100% of rated power value(Voltage 30V or more, current 1.5A or more)
	External interface	Analog/Digital RS-232C or 485 (Option) EtherCAT (Option)
Cooling Methode		Water cooling: 7 L/min or more
Dimensions W x D x H (excluding protrusions)		483 x 500 x 177 (mm)
Weight		40kg
Applicable standard		CE、KC、SEMI F47、RoHS (Europe)

※：There are limitations on output voltage/current depending on the frequency setting conditions.

RF Power Supply / Matching Box Model : RFS-N

High frequency power supply for plasma generation in LCD and Semiconductor manufacturing systems.

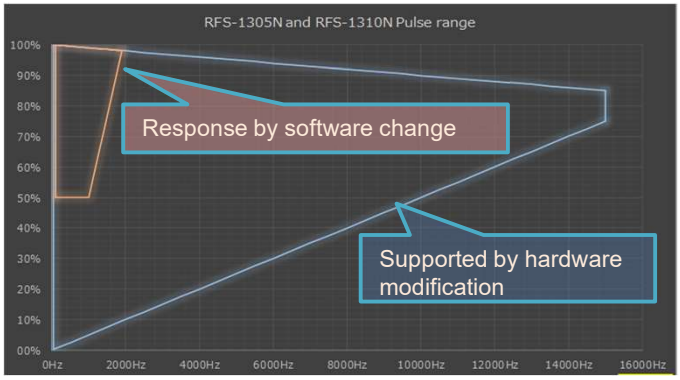
RFS-1305N/RFS-1310N
500W/1kW

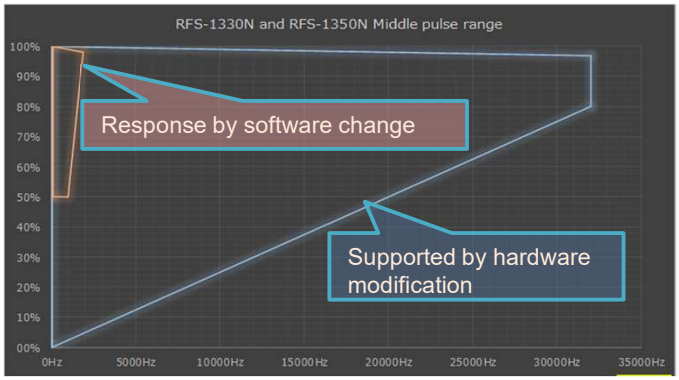
RFS-1330N/RFS-1350N
3kW/5kW

Matching Assistant Tool

- 0.5kW, 1kW, 3kW, 5kW at 13.56MHz.
- High reliable design based on long time experienced ULVAC know-how.
- Simple configuration with the built-in auto-matching controller.
- Stable process is committed by stable auto-matching function which tracks the plasma unique impedance fluctuation through ULVAC original algorithm.
- Matching conditions can be monitored by the optional matching assistant tools.

Pulse output function is available as an option（Option）





■RF Power Supply

Model		RFS-1305N	RFS-1310N	RFS-1330N	RFS-1350N
Input specification	Input voltage	Single phase AC200V to 220V		3 phase AC200V to 220V	
	Input capacity	1.2kVA or less	1.8kVA or less	5kVA or less	8kVA or less
Output specification	Oscillating frequency	13.56MHz			
	Rate travelling wave power	500W (under 50Ω load)	1000W (under 50Ω load)	3000W (under 50Ω load)	5000W (under 50Ω load)
	Reflected wave power	100W		500W	
	Harmonic distortion ratio	-35dB or less (Rate output time 50Ω Loading time)			
Control	Control accuracy	Rated output ±2% or less			
	Guaranteed control range	10 % to 100 % of rated power value			
	External interface	Analog/Digital、RS-232			
Cooling method		Forced air cooled		Water cooled (4L / min)	Water cooled (6L / min)
Dimensions W x D x H (excluding protrusions)		240 x 495 x 150 (mm)		480 x 495 x 150 (mm)	
Weight		11kg		23kg	
Applicable standard		CE、KC、SEMI F47、SEMI F2、RoHS (Europe)			

■Matching box

Model	MBX-1305N	MBX-1310N	MBX-1330N	MBX-1350N
Permissible input power	10 to 500W	10 to 1000W	30 to 3000W	50 to 5000W
Permissible output current	30Arms		80Arms	120Arms
Permissible output voltage	2500Vpp		5000Vpp	10000Vpp
Cooling method	Forced air cooled		Water cooled (2L / min)	
Dimensions W x D x H (excluding protrusions)	375 x 250 x 120 (mm)		375 x 250 x 170 (mm)	450 x 500 x 248 (mm)
Weight	8kg		10kg	21kg
Applicable standard	CE、KC、SEMI F47、SEMI F2、RoHS (Europe)			
Output Option	N・HN・M・DIN-7/16		-----	

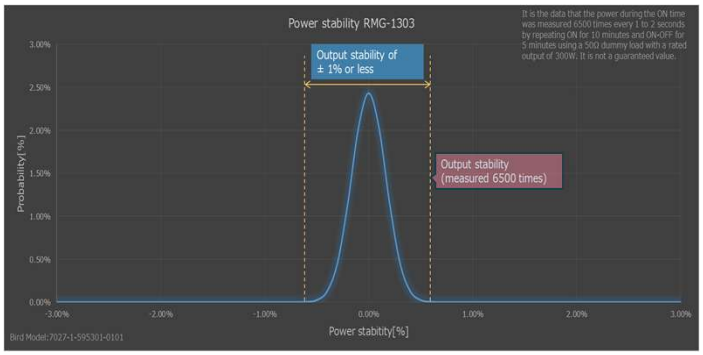
Integrated High-Frequency Power Supply Model : RMG-1303

High-frequency power supply for plasma generation used in electronic components and semiconductor manufacturing equipment

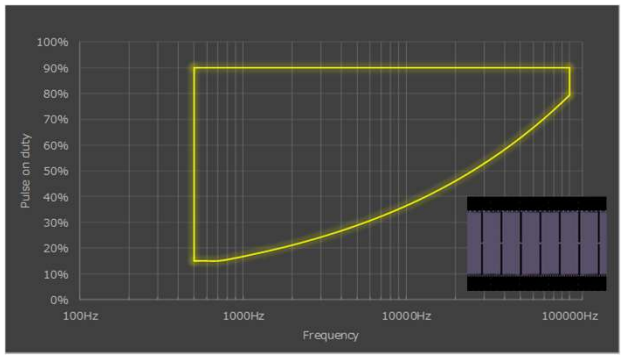
RMG-1303
300W

- This is an RF power supply with an integrated matching unit of 13.56MHz and 300W output for plasma processes such as RF sputtering and plasma CVD etching.
- High reliable design based on long time experienced ULVAC know-how.
- Simple configuration with the built-in auto-matching controller.
- By integrating the matching unit and RF power supply, we have achieved miniaturization and weight reduction.
- It can be controlled with low output , and can be used in a wide range of fields from research and development applications to mass production equipment.

High output stability



Pulse output function is standard



■RF Power Supply

Model		RMG-1303（Part of RF Power Supply）
Input specification	Input voltage	Single phase AC100V ～ 220V
	Input capacity	700VA or less
Output specification	Oscillating frequency	13.56MHz
	Rate travelling wave power	300W (50Ω load)
	Reflected wave power	80W
	Harmonic distortion ratio	<-35dB (Full power output 50Ω load)
Control	Control accuracy	Less than ±2W or ±1% of the set value, whichever is larger.
	Guaranteed control range	1 % to 100 % of rated power value
	External interface	Analog/Digital、RS-232 EtherCAT (Option)
Cooling		Forced air cooled
Dimensions W x D x H (excluding protrusions)		200 x 350 x 200(mm) (Include Matching BOX)
Weight		10kg
Applicable standard		CE、KC、SEMI F47、SEMI F2、RoHS (Europe)

■Matching Box

Model	RMG-1303（Part of Matching Box）
Permissible input power	300W
Permissible output current	10Arms
Permissible output voltage	2500Vpp
Output Option	N・HN・M・DIN-7/16

RF Power Supply Option Model : MEX-N

Matching box switching unit for Model : RFS-N

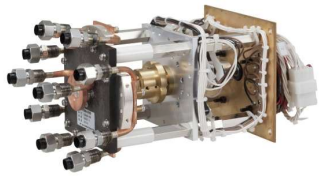
MEX2N-1k

- Switching for multiple matching boxes.
- Not for simultaneous discharge. Using this unit reduces quantity of power supplies and leads to cost down.
- Various cathodes with different impedance are selectable because individual matching box is used to individual cathode.

Capacity	Qty. of matching box which is switchable by the matching box switching unit						
		2 units	3 units	4 units	5 units	6 units	7 units	8 units
500 / 1kW	Model	MEX2N-1k	MEX3N-1k	MEX4N-1k	MEX5N-1k	MEX6N-1k	MEX7N-1k	MEX8N-1k
3kW		MEX2N-3k	MEX3N-3k	MEX4N-3k	MEX5N-3k	MEX6N-3k	MEX7N-3k	MEX8N-3k
5kW		MEX2N-5k	MEX3N-5k	MEX4N-5k	-	-	-	-

RF Power Supply Option Model : EXN

Switching unit for multiple cathodes



EXN4M-70W

- Switching for matching box output.
- Greatly contributes to cost reduction for the various systems as it is not necessary to install matching box per cathodes.
- Manual and motor driving type are provided as switching method. A water cooled type is also available for higher power.
- Useable as a switching unit for DC power supply and DC pulse power supply.
- Since only single matching box is used with this unit, it is not available to mutual loads exceeding matching range.

Switching points		Air cooled (1kW or less)		Water cooled (3kW)	
		Manual	Motor driven	Manual	Motor driven
2 points	Model	EXN2T-40A	EXN2M-40A	EXN2T-70W	EXN2M-70W
3 points		EXN3T-40A	EXN3M-40A	EXN3T-70W	EXN3M-70W
4 points		EXN4T-40A	EXN4M-40A	EXN4T-70W	EXN4M-70W

RF Power Supply Option Model : PHS-N

Output phase control of multiple RF power supplies.

PHS-04N

- Phase control of maximum 4 or 8 units of RF power supplies.
- It provides stable process with very small variation by adjusting differences occurs between cathodes by phase shift function.

Model		PHS-04N	PHS-08N
Input specifications	Input voltage	Single phase AC100 to 240V	
	Input capacity	70VA	
Output specifications	Output channel	4	8
	Oscillation frequency	13.56MHz ± 0.05%	
	Phase setting scope	0 to 359.9°	
Dimensions W x D x H (excluding protrusions)		480 x 192 x 49 (mm)	

RF Power Supply Option Model : EXO-13

Output phase synchronization of multiple RF power supplies.

EXO-13

- Phase synchronization of maximum 4 units of RF power supplies.
- No phase shift function.

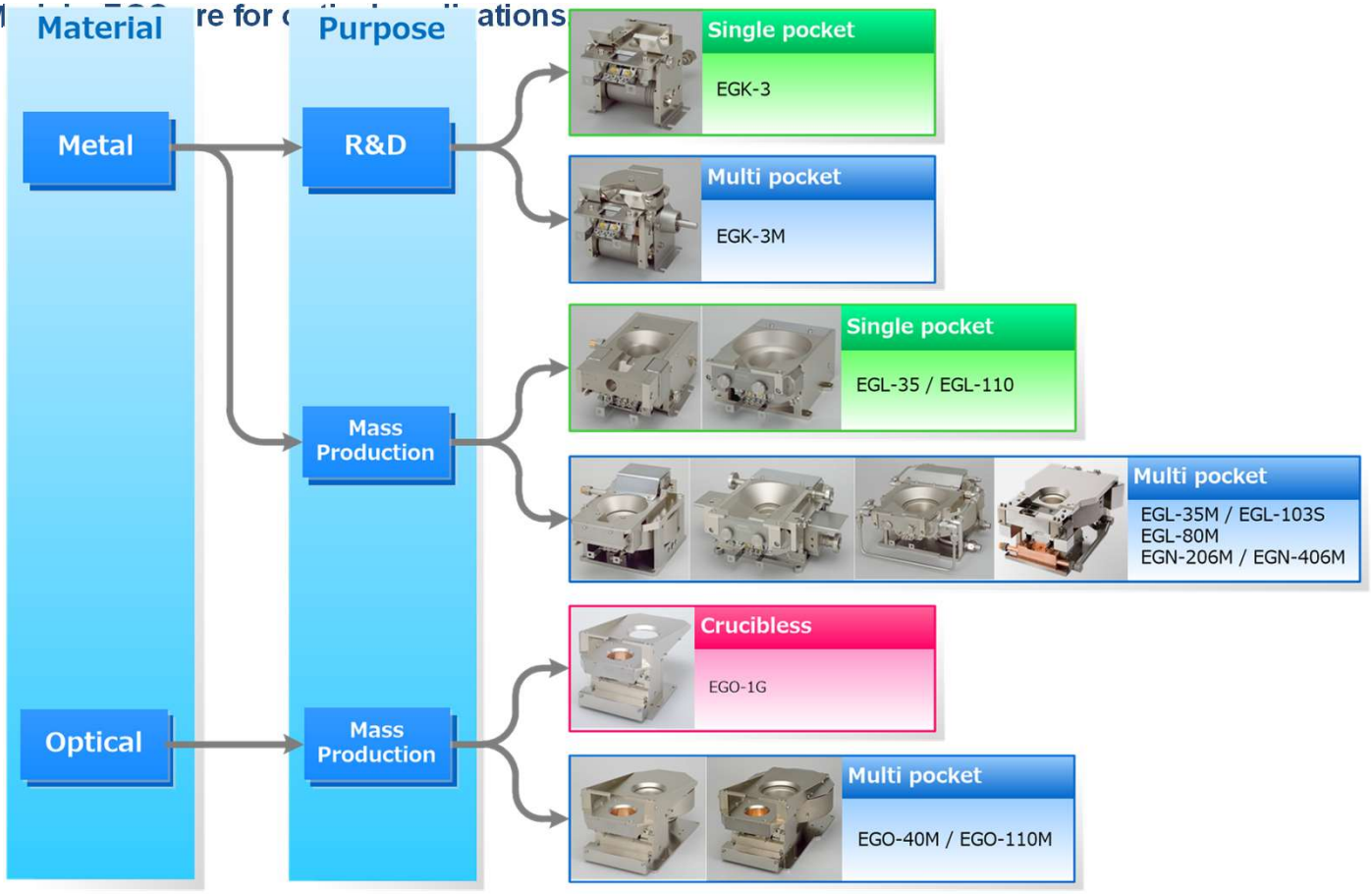
Model		EXO-13
Input specifications	Input voltage	Single phase AC100V
	Input capacity	10VA or less
Output specifications	Oscillation frequency	13.56MHz ± 0.05%
Dimensions W x D x H (excluding protrusions)		145 x 110 x 44 (mm)

Electron beam source with a long-life filament by having the structure to prevent pollution from evaporation materials.

Model：EGK with small volume pocket for experiment purposes.

Model：EGL and EGN with small medium to large volume pocket are for mass production purposes.

Model：EGO are for optical applications



■EB Source / EB power supply system Selection Table

Material	EB Source	EB power supply system		Pocket capacity / Qty. of pocket				
	Model	Model	Power	Nothing	1	3	4	6
Metal	EGK-3	HPS-510S	5kW		2.6cc			
	EGK-3M	HPS-510S	5kW				2.9cc	
	EGL-35	HPS-1000N-S100 *1	10kW		40cc			
	EGL-35M	HPS-1000N-S100 *1	10kW				10cc×2 40cc×2	
	EGL-103S	HPS-1000N-S100 *1	10kW			10cc		
	EGN-206M	HPS-1000N-S100 *1	10kW					20cc
	EGN-406M	HPS-1000N-S100 *1	10kW					40cc
	EGL-110	HPS-1600F-DS100 *1	16kW		110cc			
	EGL-80M	HPS-1600F-DS101	16kW				110cc	
Optical	EGO-1G	HPS-1000N-G100 *1	10kW	No Hearth				
	EGO-40M	HPS-1000N-G100 *1	10kW				10cc×2 40cc×2	
	EGO-110M	HPS-1000N-G100 *1	10kW				110cc	

*1) Two-source power supplies are also available.
*) EB power supply system model decides depend on which model of the source controller use

High Function EB Power Supply Model : HPS-N

6kW/10 kW EB power supply designed with stabilized circuit and improved performance.

HPS-1000N

EGC-10GS

- Usable for both optical and metal film by using highly-functional EB source controller.
- Using graphic user interface assists to multi-functional and complicated operation and it leads to productivity improvement.
- Stable deposition is ensured by excellent arc handling by ULVAC who is also vacuum process equipment supplier and has full knowledge about deposition processes.

■EB power supply system specifications

Model		HPS-1000N-S100 (for metal film)	HPS-1000N-S200 (for metal film)	HPS-1000N-G100 (for optical film)	HPS-1000N-G200 (for optical film)
Specification		1source	2source	1source	2source
Input specification	Input voltage	3 phase AC190 to 231V			
	Input capacity	14kVA	15kVA	14kVA	15kVA
Output specification	Rated out power	10kW			
	Voltage range	-4k～-10kV			
	Ripple ratio	2%p-p or less			
	Beam current	0～1.0A			
Cooling method		Forced air cooled			
Dimensions WxDxH (excluding protrusions)	Power supply	494 × 701 × 712 (mm)			
	Source controller	480.5 × 499 × 143 (mm)			
Weight	Power supply	120kg	133kg	120kg	133kg
	Source controller	11.5kg			
Applicable standard		CE			

Model		HPS-1600F-DS100 (for metal film)	HPS-1600F-DS200 (for metal film)	HPS-1600F-DS101 (for metal film)
Specification		1source	2source	1source
Input specification	Input voltage	3 phase AC190 to 231V		
	Input capacity	21kVA	22kVA	21kVA
Output specification	Rated out power	16kW		
	Voltage range	-4k～-10kV		
	Ripple ratio	2%p-p or less		
	Beam current	0～1.6A		
Cooling method		Forced air cooled		
Dimensions WxDxH (excluding protrusions)	Power supply	500 × 700 × 710 (mm)		
	Source controller	480.5 × 499 × 143 (mm)		
Weight	Power supply	113kg	120kg	113kg
	Source controller	11.5kg		12kg
Applicable standard		-----		

EB Power Supply Model : HPS

5kW for electron beam source.

- Stable process is ensured with high quality and high-reliability proven through more than 15 years experience.
- Stable deposition is ensured by excellent arc handling by ULVAC who is also vacuum process equipment supplier and has full knowledge about deposition processes.

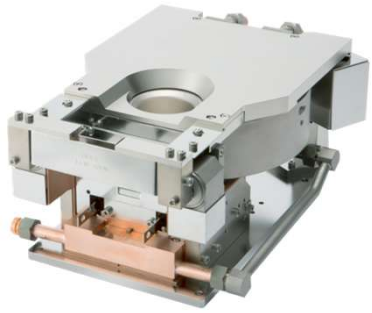
HPS-510S

■EB power supply system specifications

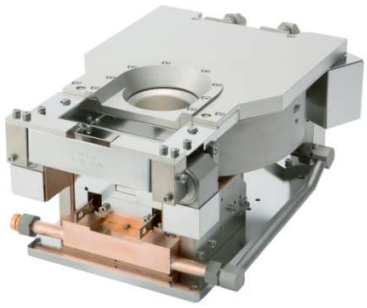
Model		HPS-510S (for metal film)
Specification		1source
Input specification	Input voltage	3 phase AC190 to 231V
	Input capacity	7kVA
Output specification	Rated out power	5kW
	Voltage range	-4k～-10kV
	Ripple ratio	2%p-p or less
	Beam current	0～0.5A
Cooling method		Forced air cooled
Dimensions WxDxH (excluding protrusions)	Power supply	480 × 620 × 300 (mm)
	Source controller	
Weight	Power supply	45kg
	Source controller	
Applicable standard		-------

EB Source for Metal Film Model : EGN

EB deposition source with full flat top configuration without any structural object above the hearth cover.



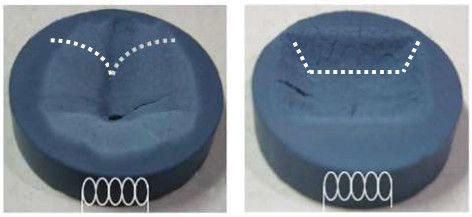
EGN-206M/406M



EGN-206M/406M with health cover shield

- By changing a part of EB source, the ribbon-shaped beam suitable for metal deposition or spot-shaped beam suitable for sublime substances/oxides and compounds deposition is selectable.
- Built-in electronic reflection trap mechanism suppresses temperature increase on the substrate which may become critical problem for evaporation process.
- Using the optional hearth cover shield makes maintenance time short and improves productivity.

EB guns for metal films can also be used for some ITO materials
Result of beam form optimization (ITO)



Ribbon Beam Spot Beam

Hearth cover shield

Model		EGN-206M	EGN-406M
Beam deflection angle		270°	
Qty of pocket		6	
Pocket capacity		20cc	40cc
Pocket dimensions Top x Bottom x Depth		Φ42 x Φ32 x 19mm	Φ50 x Φ41 x 25mm
Cooling water flow rate	Pocket	10 L/min	
	Hearth cover	2 L/min	
Dimensions W x D x H		214 x 343 x 144mm (excluding protrusions)	
Weight		28kg	
Effective evaporation angle		More than 100°	
Deposition speed		1.6 μm/min (Ribbon beam, Al, 8kW, 40cc pocket, 250mm from health cover)	
Maximum acceleration voltage		-10kV	
Maximum emission current		800mA	1000mA
EB power supply system		HPS-1000N-S100/S200	

■Optional accessories

Accessory	Model	Required qty.	Remarks
High voltage feedthrough	BERH311A	2	
Feedthrough for magnet coil	PTS-004	2	For coil wiring , For hearth positioner
Ground terminal	ERZ-003	1	
Vacuum interlock switch	DTA-002	1	
Cooling water feedthrough	DK5203-045	4	Φ10

EB Source for Metal Film Model : EGL/EGK

High reliable EB source designed based on ULVAC long time experienced technologies.


EGK-3


EGK-3M


EGL-35


EGL-35M


EGL-103S


EGL-110


EGL-80M


High voltage feedthrough BERH311A


Feedthrough for magnet coil PTS-004

Ground terminal ERZ-003


Vacuum Interlock switch DTA-002


Cooling water feedthrough DK5203-045

- Various line-up from R&D to mass production.
- Unique water cooling mechanism reduces contamination from pocket to the evaporation material and so high-grade deposition process is ensured.

Model		EGK-3	EGK-3M	EGL-103S	EGL-35	EGL-35M	EGL-110	EGL-80M
Beam deflection angle		225°		270°				
Qty. of pocket		1	4	3	1	4	1	4
Pocket capacity		2.6cc	2.9cc	10cc	40cc	10cc x 2 / 40cc x 2	110cc	110cc x4
Cooling water flow rate	Pocket	8 L/min		10 L/min			19 L/min	20 L/min
	Coil	1 L/min		2 L/min	-	2 L/min	-	4 L/min
Dimensions W x D x H		110 x 207 x 126mm	140 x 207 x 126mm	313 x 250 x 108mm	110 x 206 x 79mm	170 x 240 x 156mm	136 x 220 x 90mm	265 x 318 x 168mm
Weight		4kg	5kg	16kg	10kg	18kg	15kg	30kg
Maximum acceleration voltage		-10kV						
Maximum emission current		500mA		600mA	1,000mA		1600mA	
Power supply system		HPS-510S	HPS-510S	HPS-1000N-S100			HPS-1600F-DS100	HPS-1600F-DS101

■Optional accessories

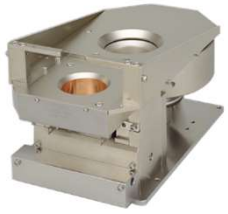
Accessory	Model	EGK-3	EGK-3M	EGL-103S	EGL-35	EGL-35M	EGL-110	EGL-80M
High voltage feedthrough	BERH311A	2	2	(*1)	2	2	2	2
Current terminal	PTS-004	1	1	(*1)	1	2	2	1(*2)
Ground terminal	ERZ-003	1	1	(*1)	1	1	1	1
Vacuum checker	DTA-002	1	1	(*1)	1	1	1	1
Cooling water terminal	DK5203-045	Φ x2 Φ10 x2	Φ6 x2 Φ10 x2	(*1)	Φ10 x2	Φ6 x2 Φ10 x2	Φ12 x2	Φ6.35 x2 Φ12.7 x2

*1) Ultra-high vacuum specification is necessary. Please contact us separately.
*2) The current terminal for the hearth positioner is PTS-004. However, 3p-16A is used in the case of the current terminal for coil driving.

EB Source for Optical Film Model : EGO

High reliable EB source designed based on ULVAC long time experienced technologies.


EGO-1G


EGO-40M


EGO-110M

- High performance deflection coil makes sweep performance high and deposition process stable and uniform.

Model		EGO-1G	EGO-40M	EGO-110M
Beam deflection angle		270°		
Qty. of pocket		0	4	4
Pocket capacity		-	10cc x2 / 40cc x2	110cc
Cooling water flow rate	Pocket	-	10 L/min	19 L/min
	Coil	2L / min	2 L/min	2 L/min
Dimensions W x D x H		168 x 285 x 174mm	170 x 309x174mm	232 x 368 x 174mm
Weight		10kg	18kg	30kg
Power supply system		HPS-1000N-G100/G200		

■Optional accessories

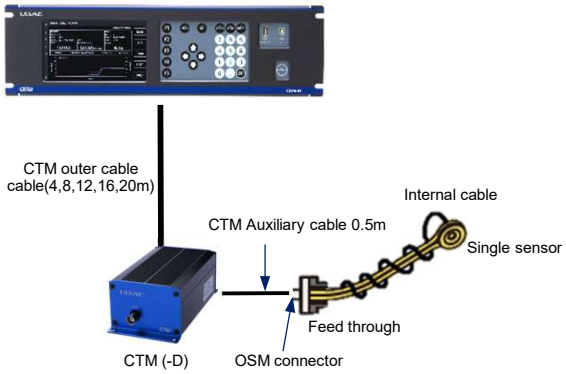
Accessory	Model	EGO-1G	EGO-40M	EGO-110M
High voltage terminal	BERH311A	2	2	2
Current terminal	PTS-004	1	2	2
Ground Terminal	ERZ-003	1	1	1
Vacuum Checker	DTA-002	1	1	1
Cooling water terminal	DK5203-045	Φ10 x2	Φ10 x2	Φ10 x2 / Φ12.7 x2

Deposition Controller Model : CRTM-R1(-EL)

ULVAC has developed the new quartz crystal deposition controllers based on our longtime experience and technologies. Contributes to improved quality and reliability in vapor deposition processes.

- Excellent rate stability and resolution make it suitable for low rate control.
- Ability value (CI value) measurement function improves crystal anomaly detection.
- Simultaneous vapor deposition control of up to 8 sources is possible. (add option)
- lineup of Model:CRTM-R1-EL optimized for organic film deposition applications.

Example for single sensor connection



＊When using Model:CRTM-R1, requires options such as CTM(-D) ,cables and CRTS sensor.

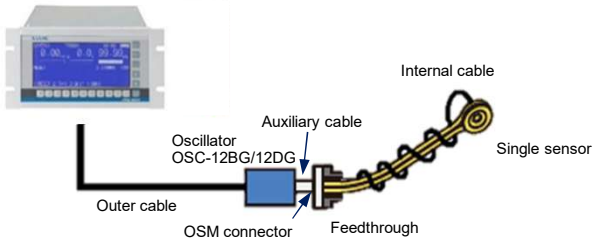
Model		Model:CRTM-R1(-EL)
Frequency	Measurement Range	4.00～3.00MHz@4MHz 5.00～3.50MHz@5MHz 6.00～4.50MHz@6MHz
	Measurement Resolution	1mHz
	Display Resolution	1mHz
Deposition rate	Measurement Range	0.000～999.9Å/s （0～99.99nm/s）
	Measurement Resolution	0.0028Å/s @4MHz 0.0018Å/s @5MHz 0.0012Å/s @6MHz
	Display Resolution	0.001Å/s
Film thickness	Measurement Range	0.000～9999kÅ （0～999.9μm）
	Measurement Resolution	0.0028Å @4MHz 0.0018Å @5MHz 0.0012Å @6MHz
	Display Resolution	0.001kÅ
Number of sensors that can be attached		Single senosr:2 (Max.8) Multi-sensor:2 (Max.8)
Simultaneous measurement & control		2 (Max.8)
Sampling rate		100msec
Number of multilayer		99
Number of process programs		99
Number of deposition programs		999
Dimensions W×D×H		480×320×130 mm

Deposition Controller Model : CRTM-6000G

Deposition controller with excellent cost / performance features. Wide deposition control range for single as well as multilayer films.

- Two sensors can be switched for deposition control.
  (The simultaneous measurement cannot be done. It is a switch type.)
- Excellent response is obtained with a sampling rate of 125 ms.
- Up to 99 deposition programs can be stored with battery backup.
- Memory of the controller can record up to 30 process sequences.

Example for single sensor connection



＊When using Model:CRTM-6000G, requires options such as Oscillator, cables and CRTS sensor.

Model		Model:CRTM-6000G
Frequency	Measurement Range	3.0~5.01MHz @5MHz 4.0~6.01MHz @6MHz
	Measurement Resolution	24mHz
	Display Resolution	0.001MHz
Deposition rate	Measurement Range	0.000～999.9Å/s （0～99.99nm/s）
	Measurement Resolution	0.041Å/s @5MHz 0.029Å/s @6MHz
	Display Resolution	0.1Å/s
Thickness	Measurement Range	0 ～ 999.9 kÅ
	Measurement Resolution	0.041Å：5MHz, 0.029Å：6MHz
	Display Resolution	0.001kÅ：0 ～ 9.999kÅ 0.01kÅ：10 ～ 99.99kÅ 0.1kÅ：100 ～ 999.9kÅ
Number of sensors that can be attached		Single sensor : 2(The simultaneous measurement cannot be done. It is a switch type.), Multi senor : 1
Simultaneous measurement & control		1
Sampling rate		125msec
Number of multilayer		99 layer
Number of process programs		30
Number of deposition programs		99
Dimensions W×D×H		240×350×99 mm

Deposition Controller Software Model : CRTM

Measurement software exclusively for model:CRTM-R1(-EL). Allows remote operation, real-time data display, recipe editing, etc. from a PC.

- Remote operation (start/stop measurement)
- Display of measurement data (numerical and graphical)
- Save measurement data (csv format)
- Reading/editing/writing of Recipe
- Confirmation of input/output status of DIO (Digital Input/Output)

Model	Model: CRTM Manager
Applicable Models	Model:CRTM-R1/CRTM-R1-EL
OS	Windows10/11
Interface	Ethernet/RS-232C
Function	Remote operation, Save Data/Log, Edit recipe, etc
Graph Display	Vertica axis: Rate（Å/s or nm/s)、POWER(%)
	Horizontal axis: Scrolling time, display of stored data
Require PC Spec	LAN Port / USB Port(2.0Type-A or 2.0Type-C)
	CD-ROM Drive(For software installation)
	Core i5 8th Gen
	Free HDD space: 15MB or more
	RAM: 8GB or more

Deposition Controller Sensor Model : CRTS

Various line-up for various deposition processes.

Model:CRTS-0

Model:CRTS-4, 6

Model:CRTS-4U, 6U

Model:CRTS-M6

Model:CRTS-12NS

Single sensor

- To be selected depends on deposition condition such as with or without baking, temperature range, etc.
- Compact sensor head makes installation in the chamber easy.
- Long life time oscillator is available.
- Specified sensor length and pipe shape are available.

Multi-sensor

- Multiple crystals, 6 or 12. Crystal is exchangeable by its holder.
- High reliability with ULVAC original driving system with vacuum motor.
- Crystal is automatically switched by detecting abnormal crystal oscillation (end of life).

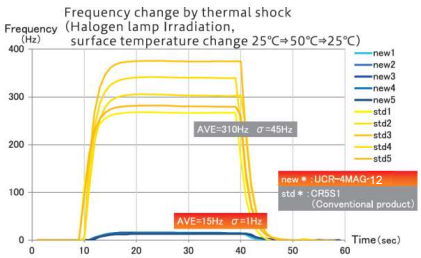
		Single sensor						Multi-sensor	
Model		Model:CRTS-0		Model:CRTS-4	Model:CRTS-6	Model:CRTS-4U	Model:CRTS-6U	Model:CRTS-M6	Model:CRTS-12NS
			+Water Cooling Jacket						
Process		Deposition in 80℃ or less	Deposition in 300℃ or less	Deposition in 100℃ or less	Deposition in 200℃ or less	Ultra-high vacuum deposition in 100℃ or less	Ultra-high vacuum deposition in 200℃ or less	Continuous deposition for thick film 350℃	
Qty. of crystals		1						6	12
Crystal frequency		4MHz, 5MHz (6MHz. Contact us or further information)							
Cooling water pipe	Length	—	100 to 800mm					—	
	Diameter	—	6mm	4mm	6mm	4mm	6mm	1/4 inch	
	Capacity	—	400 cc/min	200 cc/min	400 cc/min	200 cc/min	400 cc/min	1 L/min	
	Connector	—	3/8 inch	1/4 inch	3/8 inch	1/4 inch	3/8 inch	1/4VCO	

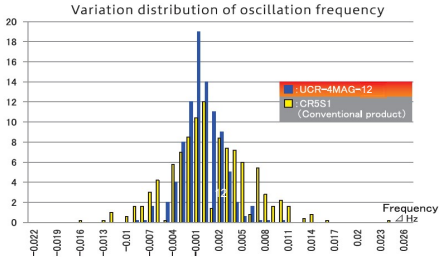
Quartz Crystal Model : UCR

ULVAC's Quartz crystal Model:UCR for quartz crystal type deposition controller has excellent temperature characteristics and enable stable measurement. The lineup includes 4MHz silver electrode, 5MHz gold/silver electrode and 6MHz gold electrode, allowing you to select the optimal product for your application.

- Excellent temperature characteristics during deposition
- Small fluctuation and change by thermal shock during shutter opening/closing.
- Small and stable frequency fluctuation
- Excellent rate measurement stability
- The new 12-piece package enables batch replacement of quartz crystals when using ULVAC multi-sensors

Model	Model:UCR-4MAG-12	Model:UCR-5MAU-12	Model:UCR-5MAG-12	Model:UCR-6MAU-12
Appearance				
Surface pattern				
Frequency	4MHz	5MHz	5MHz	6MHz
Electrode	Ag	Au	Ag	Au
Surface finish	Mirror finish	Standard		
Diameter	φ12.4mm			φ14mm
Controller	Model:CRTM-9200 Model:CRTM-R1 (−EL)	Model:CRTM		
Sensor	Model:CRTS			6MHz Sensor
Recommended Use	Organic, Metal, Optical	Metal, Optical film deposition		
Case	Carousel type case (12pcs)			





Spectroscopic Ellipsometer Model : UNECS

UNECS series is Spectroscopic Ellipsometer which measures thin film thickness and refractive index with high speed and high precision. Unique measurement method makes high speed measurement and compact size design.

Model:UNECS-1M

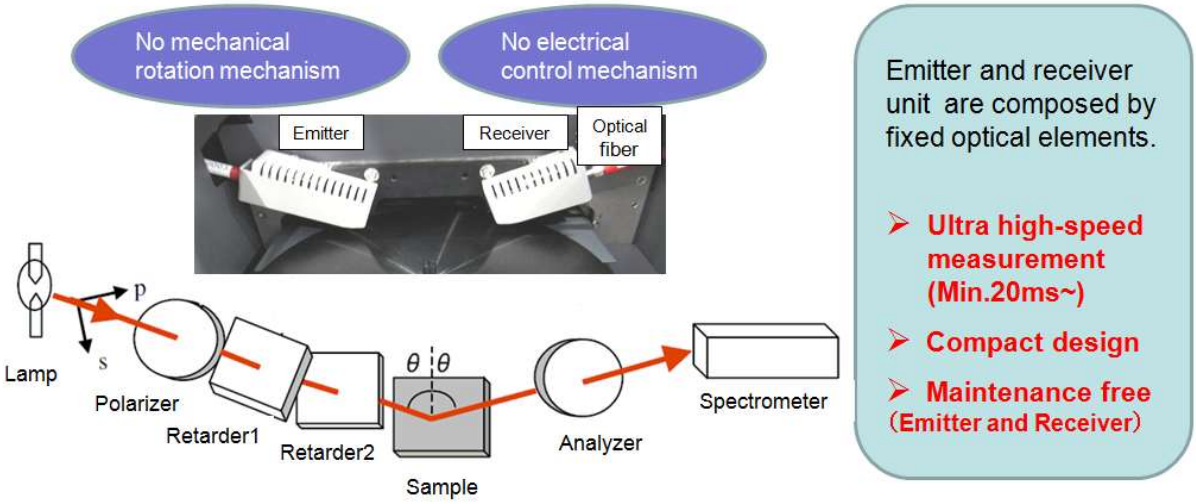
Model:UNECS-Portable

Model:UNECS-1500M

Model:UNECS-1500A/2000A

Model:UNECS-3000A

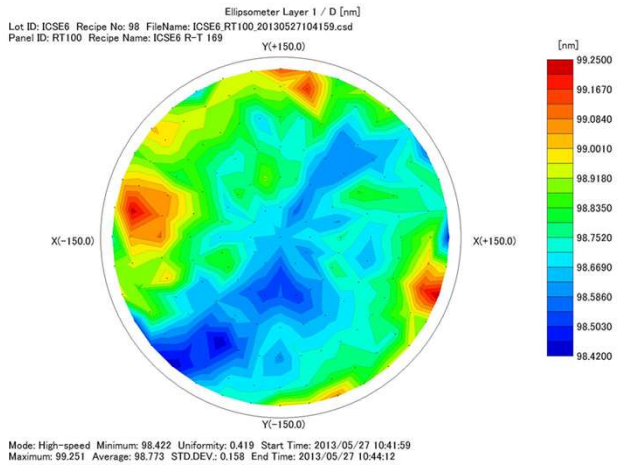
- Unique measurement method which does not have a rotation mechanism makes measurement speed extremely high in 20ms.
- Wavelength of standard type from 530nm to 750nm and visible spectroscopy type from 380nm to 760nm.
- The emitter and receiver sensor consists of only optical elements which does not include any rotating mechanism. It makes weight and design light and compact, and periodical maintenance cycle very low.
- Wide variety of models, including unique portable types, manual stages, automatic stages, and built-in types.



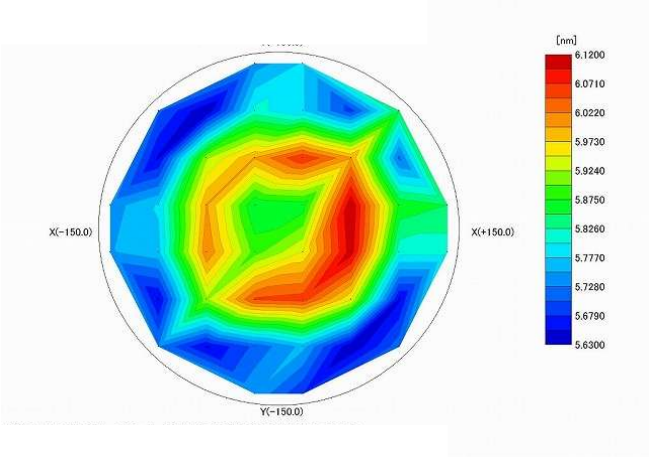
Configuration of emitter and receiver sensor

Spectroscopic Ellipsometer Model : UNECS

■With high-speed mapping measurement, film thickness distribution can be evaluated in a short time



169 points measurement for SiO2_100nm film on Φ300mm wafer



44 points measurement for HfO2_5nm film on Φ300mm wafer

Only 133 sec

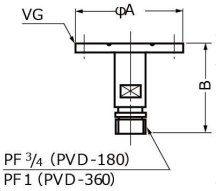
Model		Model:UNECS-Portable	Model:UNECS-1500M	Model:UNECS-1500A	Model:UNECS-2000A	Model:UNECS-3000A
Measurement method		Spectroscopic ellipsometry (spectral ellipsometry)				
Measureable film		Transparent film or semitransparent film				
Wavelength range		530 to 750nm or 380 to 760nm				
Light source		Halogen lamp or xenon lamp				
Spot diameter		Φ1mm or Φ0.3mm				
Multilayer film measurement		Maximum 6 layers (film thickness) Simultaneous analysis of film thickness and optical parameter (N,K) is only the top layer				
Incidence angle		70°				
Film thickness repeatability		0.1nm				
Film thickness measurement range		1nm to 2μm				
Scanning time		20ms to 3000ms (configurable)				
Calculation time		300ms				
Sample stage		Approx. Φ150mm (detachable)	Φ150mm		Φ200mm	Φ300mm
Stage moving range	R	–	100mm: manual	0 to 75mm: programmable (resolution 0.1mm)	0 to 100mm: programmable (resolution 0.1mm)	0 to 150mm: programmable (resolution 0.1mm)
	θ	–	360°: manual	0 to 359.9°: programmable (resolution 0.1°)		
Automatic multiple point measurement		–		200 points (optional 2,000 points)		2,000 points
Focus (Z- axis) adjustment		Manual		Automatic		
Maximum sample thickness		10mm		30mm		
Maximum sample weight		10kg				
Measurement・analysis function		①Ψ (λ) and Δ (λ) ②film thickness (D), refractive index (N), extinction coefficient (K)				
Mapping display		–		2D color map display (Optional: 3D display)		
Control and analyzing PC		Laptop type, Windows 11				
Dimensions W x D x H	Main unit	220 x 268 x 244mm	300 x 400 x 384mm	400 x 525 x 370mm		450 x 620 x 370mm
	Controller	–	–	204 x 500 x 509mm		
Weight	Main unit	2.2kg	10.3kg	24kg		31kg
		Stage: 1.3kg	–	Controller: 19kg		
Utility	Power	AC100 /200V Max 3A 50/60Hz		AC100 /200V Max 6A 50/60Hz		
	Vacuum	–		75kPa or less (necessary when using vacuum chuck)		
Applicable standard		CE		–		CE

Vacuum parts such as piping, bellows, etc.

Various kinds of optional accessories are available.

Unit : mm

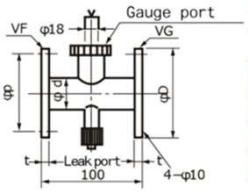
Rotation type suction piping with flange



■Material Stainless Steel, Gasket (FPM)

Model	Applicable pumps	A	B	C
RF-1	PVD-180	dia. 80	72	315
RF-2	PVD-180 with TMX		235	478
RF-3	PVD-360	dia. 90	72	315
RF-5	PVD-360 with TMX		285	528

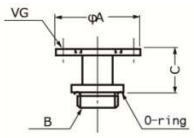
Short piping with gauge port



■Material Stainless Steel, Gasket (FPM)

Model	Applicable pumps	dia. D	dia. d	dia. p	t
TP-20	PVD-180 (B)	80	27.2	60	8
TP-25	PVD-360 (B)	90	34.0	70	8
TP-40	VD301,VD401	105	48.6	85	10
TP-50	VD601,VD901	120	60.5	100	10

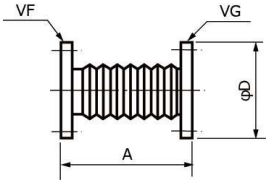
Rotation type exhaust piping with flange



■Material Stainless Steel, Gasket (FPM)

Model	Applicable pumps	A	B	C
RF-7	PVD-180	dia. 80	PF3/4"	50
RF-8	PVD-360	dia. 90	PF1"	80
RF-9	PVD-180 with TMX	dia. 80	PF1・1/2"	50
RF-10	PVD-360 with TMX	dia. 90		

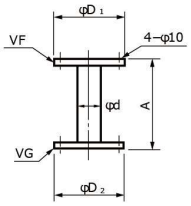
Bellows joints BJ series



■Material Stainless Steel, Gasket (FPM)

Model	A	B
BJ-25A	65	90
BJ-40A	90	105
BJ-50A	105	120
BJ-80A	110	160
BJ-100A	110	185
BJ-150A	100	235

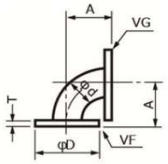
I Piping



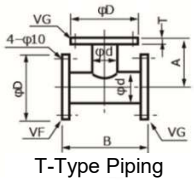
■Material Stainless Steel, Gasket (FPM)

Model	dia. D_1	dia. D_2	dia. d	A
I-VF20xVG20	80	90	27.2	100
I-VF20xVG25		90		
I-VF20xVG40		105		
I-VF20xVG50		120		
I-VF25xVG25	90	90	34.0	100
I-VF25xVG40		105		
I-VF25xVG50		120		
I-VF40xVG40	105	105	48.6	100
I-VF40xVG50		120		
I-VF50xVG50	120	120	60.5	100

L piping ／ T piping



L-Type Piping



T-Type Piping

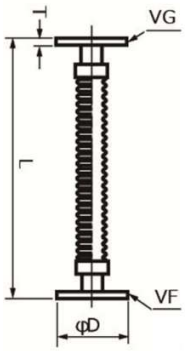
■L piping Material Stainless Steel, Gasket (FPM)

Model	dia. D	dia. d	A	T
L-20	80	27.2	60	8
L-25	90	34.0	65	8
L-40	105	48.6	80	10
L-50	120	60.5	90	10

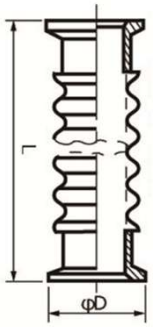
■T piping Material Stainless Steel, Gasket (FPM)

Model	dia. D	dia. d	A	B
T-20	80	27.2	50	100
T-25	90	34.0	55	100
T-40	105	48.6	60	130
T-50	120	60.5	60	150

Flexible hose



JIS standard vacuum flange model



ISO standard KF flange model

■Material Stainless Steel

■JIS standard vacuum flange model

Model	D	L	T
VFH-20-200	80	200	8
VFH-20-500		500	
VFH-20-1000		1000	
VFH-25-200	90	200	8
VFH-25-500		500	
VFH-25-1000		1000	
VFH-40-500	105	500	10
VFH-40-1000		1000	
VFH-40-2000		2000	
VFH-50-500	120	500	10
VFH-50-1000		1000	
VFH-50-2000		2000	

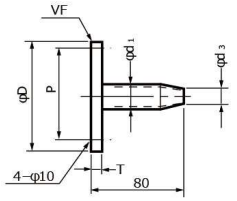
■ISO standard KF flange model

Model	D	L
KFH-20-200	40	200
KFH-20-500		500
KFH-20-1000		1000
KFH-25-200	40	200
KFH-25-500		500
KFH-25-1000		1000
KFH-40-500	55	500
KFH-40-1000		1000
KFH-40-2000		2000
KFH-50-500	75	500
KFH-50-1000		1000
KFH-50-2000		2000

Vacuum parts such as piping, bellows, etc.

Unit : mm

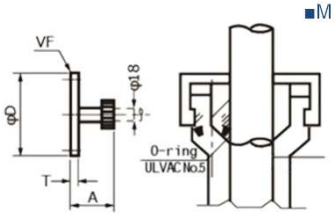
Flange with suction piping



■Material Stainless Steel

Model	P	dia. D	T	dia. D1 external diameter	dia. D2 Internal diameter	dia. d3	Connecting Rubber hose
VF20x15A	60	80	8	21.7	16.1	18	dia. 15 x dia. 36
VF20x20A				27.2	21.6	24	dia. 18 x dia. 42
VF20x25A				34.0	27.6	30	dia. 25 x dia. 55
VF25x15A	70	90	8	21.7	16.1	18	dia. 15 x dia. 36
VF25x20A				27.2	21.6	24	dia. 18 x dia. 42
VF25x25A				34.0	27.6	30	dia. 25 x dia. 55
VF40x15A	80	105	10	21.7	16.1	18	dia. 15 x dia. 36
VF40x20A				27.2	21.6	24	dia. 18 x dia. 42
VF40x25A				34.0	27.6	30	dia. 25 x dia. 55
VF50x15A	100	120	10	21.7	16.1	18	dia. 15 x dia. 36
VF50x20A				27.2	21.6	24	dia. 18 x dia. 42
VF50x25A				34.0	27.6	30	dia. 25 x dia. 55

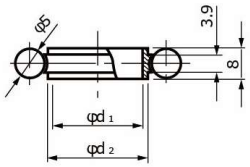
Flange with gauge port



■Material Stainless Steel, Gasket (FPM)

Model	dia. D	A	T
GF-20	80	60	8
GF-25	90	60	8
GF-40	105	62	10
GF-50	120	62	10
GF-80	160	64	12
GF-100	185	64	12

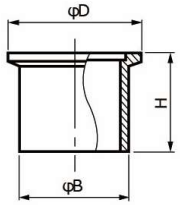
O-Ring seat



■Material Stainless Steel, Gasket (FPM)

Model	Nominal diameter
KBR-10	KF10
KBR-16	KF16
KBR-25	KF25
KBR-40	KF40
KBR-50	KF50

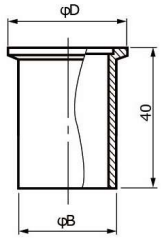
Coupling (Short)



■Material Stainless Steel

Model	Nominal diameter	dia. B	dia. D	H
KSC-10	KF10	15	30	16
KSC-16	KF16	20	30	16
KSC-25	KF25	30	40	20
KSC-40	KF40	45	55	20
KSC-50	KF50	56	75	20

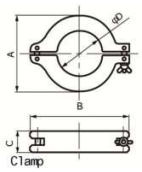
Coupling (Long)



■Material Stainless Steel

Model	Nominal diameter	dia. B	dia. D
KLC-10	KF10	15	30
KLC-16	KF16	20	30
KLC-25	KF25	30	40
KLC-40	KF40	45	55

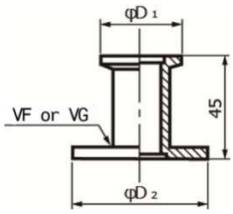
Clamp



■Material Aluminum Alloy

Model	Nominal diameter
KQC-16	KF10/16
KQC-25	KF25
KQC-40	KF40
KQC-50	KF50

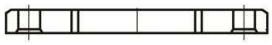
Quick coupling connection adapter



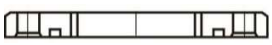
■Material Stainless Steel

Model	D1	D2	D1 Part	D2 Part
KCG-10	30	80	KF10	VG20
KCG-16	30	80	KF16	VG20
KCG-25	40	90	KF25	VG25
KCG-40	55	105	KF40	VG40
KCG-50	75	120	KF50	VG50
KCF-10	30	80	KF10	VF20
KCF-16	30	80	KF16	VF20
KCF-25	40	90	KF25	VF25
KCF-40	55	105	KF40	VF40
KCF-50	75	120	KF50	VF50

Vacuum flange



Flat surface seated



Groove seated

■Material Stainless Steel

Nominal diameter		External diameter of connecting pipe	Q'ty of bolt hole	Bolt size
10	3/8B	17.3	4	M8
20	1/2B	27.2	4	M8
25	1B	34	4	M8
40	1･1/2B	48.6	4	M8
50	2B	60.5	4	M8
65	2･1/2B	76.3	4	M10
80	3B	89.1	4	M10
100	4B	114.3	8	M10
125	5B	139.8	8	M10
150	6B	165.2	8	M10
200	8B	216.3	8	M12
250	10B	267.4	12	M12
300	12B	318.5	12	M12
350	14B	355.6	12	M12
400	16B	406.4	12	M16
450	18B	457.2	12	M16
500	20B	508.0	12	M16
550	22B	558.8	12	M16

Vacuum Transfer Robot Model : ELEC/COVOT

Clean and high reliable vacuum transfer robot.

ELEC-RZ

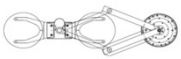
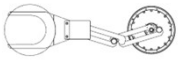
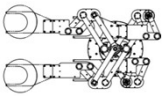
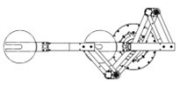
COVOT-6-X5

COVOT-CR4

- Various models are available for different kind of vacuum systems.
- Various kinds of arms are available to meet specification of vacuum systems.
- Highly rigid arm and reliable actuator makes wafer transfer stable.
- Model ELEC-RZ and COVOT-CR4 are for high vacuum application, up to 1 x 10^{-6}Pa

Model		ELEC-RZ	COVOT-6-X5	COVOT-CR4
Working pressure area		1.0×10^{-6}Pa	1.0×10^{-1}Pa	1.0×10^{-6}Pa
Wafer size		200mm / 300mm	200mm / 300mm	200mm / 300mm
Number of wafers held		1 or 2	4	2
Maximum Reach *It varies depending on the installation arm and hand.		1050mm	880mm	1050mm
Rotation angle		±210°	360°endless	±180°
Lifting stroke		50mm	110mm	120mm
Minimum Swiveling Diameter *It varies depending on the installation arm and hand.		964mm Depend on arm	980mm	960mm
Payload capacity (including hands)		1kg	1kg	1kg
Operating speed Telescopic	Telescopic	Max 2.5sec / Full stroke	Max 1.5sec / Full stroke	Max 1.5sec / 780mm
	Turning	Max 3.0sec / 180°	Max 2.0sec / 180°	Max 2.0sec / 180°
	Lifting	Max 1.5sec / 20mm	Max 1.5sec / 20mm	Max 3.5sec / 105mm
Repeatable Position Accuracy	Telescopic	±0.1mm	±0.1mm	±0.1mm
	Turning	±0.1mm	±0.1mm	±0.1mm
	Lifting	±0.1mm	±0.1mm	±0.1mm
Vacuum seal		Magnetic fluid seal	Contact seal	Magnetic fluid seal
Teaching Pendant		Accessory	Accessory	Accessory
Controller		Separate	Separate	Separate

List of supported arms

	Standard arm					Dedicated arm		
Arm model	252	271	325	419	424	FRV	CV6	CR4
Maximum distance(mm)*1	700	760	880	1040	1050	740	880	1050
Minimum rotation diameter(mm)*1	606	644	802	940	964	600	980	960
Number of hands	1 or 2				1 or 2	1	4	2
Outline*2								
ELEC-RZ	○	○	○	○	○	○	×	×
COVOT-6-X5	×	×	×	×	×	×	○	×
COVOT-CR4	×	×	×	×	×	×	×	○

*1,*2 When optional ULVAC standard hand(s) for 300mm is used.Contact us for requirement of other hand.

Platform Model : NCH

A vacuum transport platform for Φ200mm / 300mm wafers.

NCH-4000

NCH-5000

- For 4 to 8 connection ports.
- Equipped with 25 slot cassette lifting type load lock chamber.
- Vacuum pumps and gauges are available as option.

Wafer size	200mm / 300mm
Connection ports	4 to 8 ports
Standard transfer robot	ELEC-RZ (Option: COVOT)
Load lock	25 slot cassettes lifting type (in-line type available)
Vacuum pump and gauge	Option

LN2 Generator EMP series

EMP-20W

Model	EMP-07A / EMP-07W
LN_2 Production Capacity	8L / day (60Hz) 6L / day (50Hz)
Air processing Capacity	5.2㎥ / day

	EMP-07A	EMP-07W
LN_2 Production Capacity	8L / day (60Hz) 、6L / day (50Hz)	
LN_2 Storage Capacity	40L	
Dimensions (W×D×H)	600 × 750 × 1628mm	
Weight	Approx.220kg	Approx.230kg
Power Supply	AC100V Single phase Approx.1.2/1.4kW (50 / 60Hz) Breaking capacity 20A	
Cooling Water	Not needed (Air cooled)	Entrance:5 to 35℃ Flow rate:2to5L/min Pressure:<0.8MPa Water quality: Tap water equivalent

Nitrogen gas generator:GN-10i

Model	EMP-14A / EMP-14W
LN_2 Production Capacity	14L / day (60Hz) 14L / day (50Hz)
Air processing Capacity	9.1㎥ / day

	EMP-14A	EMP-14W
LN_2 Production Capacity	14L / day (60Hz)、14L / day (50Hz)	
LN_2 Storage Capacity	40L	
Dimensions (W×D×H)	600 ××750 × 1688mm	
Weight	Approx.235kg	Approx.230kg
Power Supply	AC200V Three phase Approx.1.7 / 2.0kW (50Hz / 60Hz) Breaking capacity 20A	AC200V Three phase Approx.1.6 / 1.9kW (50Hz / 60Hz) Breaking capacity 20A
Cooling Water	Not needed (Air cooled)	Entrance:5 to 35℃ Flow rate:2to6L / min Pressure:<0.8MPa Water quality: Tap water equivalent

Nitrogen gas generator:GN-10i

Model	EMP-20W
LN_2 Production Capacity	20L / day (60Hz) 19L / day (50Hz)
Air processing Capacity	13.0㎥ / day

	EMP-20W
LN_2 Production Capacity	20L / day (60Hz)、19L / day (50Hz)
LN_2 Storage Capacity	80L
Dimensions (W×D×H)	930 ××740 × 1661mm
Weight	Approx.340kg
Power Supply	AC200V Three phase Approx.3.3 / 4.1kW (50Hz / 60Hz) Breaking capacity 30A
Cooling Water	Entrance:10 to 30℃ Flow rate:3to6L / min Pressure:<0.8MPa Water quality:Tap water equivalent

Nitrogen gas generator:GN-15i

Model	MP-300K
LN_2 Production Capacity	30L / day (60Hz) 28L / day (50Hz)
Air processing Capacity	19.4 ㎥ / day

	MP-300K
LN_2 Production Capacity	30L / day (60Hz)、28L / day (50Hz)
LN_2 Storage Capacity	100L
Dimensions (W×D×H)	1050 ××740 ××1795mm
Weight	Approx.430kg
Power Supply	AC190～220V (50Hz) Three phase AC200～230V (60Hz) Three phase Approx.4.3 / 5.2kW (50Hz / 60Hz) Breaking capacity 30A
Cooling Water	Entrance:10 to 30℃ Flow rate:5to12L / min Pressure:<0.8MPa Water quality:Tap water equivalent

Nitrogen gas generator:GN-20i

Typical Usage

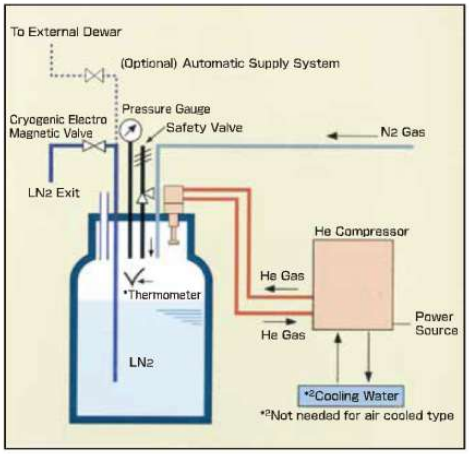
Vacuum Evacuation Device LN_2 Cold Trap

Material Analyzing Device

Electron Microscope EDS(EDX) Detector

Cryopreservation Container (Biological・Sample)

Flow Diagram inside EMP



* A thermometer is needed in some cases.

OPERATING PRECAUTIONS

- When installing EMP in a room without appropriate size windows, a ventilating fan of above 1,000 m^3/h (2,000 m^3/h or above for EMP-20W) must be furnished to prevent oxygen shortage. It is recommended to install an oxygen alarm as well.
- LN2 is ultra low temperature liquefied gas. Always handle with care.
- Touching LN2 or cryogenic part like LN2 exit may result in low temperature burns. Make sure to wear protective gloves such as leather gloves.
- EMP must not be operated in organic solvent atmosphere.
- Maintenance is necessary according to the time used.

Service Base

【 Japan 】

ULVAC, Inc.
(Worldwide Headquarters)
2500 Hagisono, Chigasaki, Kanagawa
253-8543, Japan
TEL: +81-467-89-2261

【 North America 】

ULVAC Technologies, Inc.
(Headquarters)
401 Griffin Brook Drive Methuen,
MA 01844, U.S.A.
TEL : +1-978-686-7550

【 Germany 】

ULVAC GmbH (Head Office)
Klausnerring 4
85551 Kirchheim b. München Germany
TEL : +49-89-960909-0

【 China 】

ULVAC (Shanghai) Trading Co., Ltd.
(Head Office)
No.1000, Qixin Road, Minhang District,
Shanghai, 201100, China
TEL : +86-21-6127-6618

(Beijing Branch)
Building C-1F, Xingye Road 2, BDA, Beijing,
100176 China
TEL : +86-10-5157-0125

(Shenzhen Branch)
1F,B Zhongkenuo Building, Seventh Rd. No.7,
Tongguan road, Tianliao Street, Guangming
District, Shenzhen, 518107 China
TEL : +86-755-8614-9393

(Dalian Branch)
A-105, Dalian Economic and Technological
Development Zone DD Port Business incubator,
20Liaohe Eastern Road, Dalian, 116620 China
TEL : +86-411-8740-7180

(Suzhou Branch)
No.277, Suhong East Road, Suzhou
Industrial Park, Suzhou, 215026, China
TEL : +86-512-8917-9891

(Chengdu Branch)
No.229, Teng Fei Road, Qinyang, Chengdu,
610091, China
TEL : +86-28-6551-8700

(Wuhan Branch)
Room 402, Building 1,East lake net valley ,
No.5 middle maodianshan road,
East Lake High-Tech Development Zone,
Wuhan City, Hubei Province
TEL : +86-28-6551-8700

(Hefei Branch)
Botong Creative Industry Park,
Xinzhan District,Hefei City, AnHui Province
TEL : +86-551-6384-7828

ULVAC (NINGBO) Co., Ltd.
(Head Office)
No.888, Tonghui Road, Jiangbei District, Ningbo,
China
TEL : +86-0574-87905551

【 Taiwan 】

ULVAC TAIWAN Inc.
(Hsinchu Head Office)
8F., No.5, Keji Rd., Hsinchu Science Park,
Hsinchu City 300092 Taiwan
TEL : +886-3-579-5688

(Taichung Office)
1F., No.37, Keya Rd., Daya Dist., Taichung City
428015, Taiwan
TEL : +886-4-2565-3600

(Tainan Office)
No.27, Nanke 2nd Rd., Xinshi Dist., Tainan City
744092, Tainan Science Park, Taiwan
TEL : +886-6-505-8080

ULTRA CLEAN PRECISION TECHNOLOGIES CORP.
No.27,sec.1,HuanDong Rd.,Southern Taiwan
Science Park, Xinshi Dist.,Tainan City
744092,Taiwan (R.O.C.)
TEL : +886-6-505-8888

(Taoyuan Branch)
No.20, Ln. 211, Puzhong Rd.,Zhongli Dist.
Taoyuan City 32083,Taiwan (R.O.C.)
TEL : +886-3-286-0998

【 Korea 】

ULVAC KOREA, Ltd.
(Headquarters/Pyeongtaek Factory)
5, Hansan-gil, Cheongbuk-eup, Pyeongtaek-si,
Gyeonggi-do, Republic of Korea 17792
TEL: +82-31-683-2922

(Bundang Technology Development Center)
27F B Kins Tower, 8, Seongnam-daero
331beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea 13558
TEL: +82-31-8023-9890

(Busan Branch)
T-PLEX 206-109, 50, Yutongdanji 1-ro,
Gangseo-gu, Busan, Republic of Korea 46721
TEL:+82-51-317-2920

(Gumi CSC)
302-7, 3gongdan 1-ro, Gumi-si,
Gyeongsangbuk-do, Republic of Korea
39391
TEL: +82-54-471-3567

【 Singapore 】

ULVAC SINGAPORE PTE LTD
(Head Office)
11 Tampines Street 92, Tampines Biz-Hub
#02-08, Singapore 528872
TEL : +65-6542-2700

【 Malaysia 】

ULVAC MALAYSIA SDN. BHD.
(Head Office)
No.8 Jalan Gitar 33/3, Elite Industrial
Estate Off Jalan, Bukit, Kemuning 40350,
Shah Alam, Selangor Darul Ehsan, Malaysia
TEL : +60-3-5121-4700

(Kulim Branch)
2,Lorong Perusahaan 6C,Kawasan MIEL,
Kulim Industrial Estate,09000,Kulim,Kedah, Malaysia
TEL : +60-4-484-8006

【 Thailand 】

ULVAC (THAILAND) LTD.
(Head Office)
110/6 Moo 13,Soi 25/2, Kingkaew Road,
Tambol Rachathewa, Amphur Bangplee
Samutprakarn 10540, Thailand
TEL : +66-2-738-8883

【 India 】

ULVAC SINGAPORE PTE LTD
(INDIA Branch)
301, Tara Tycoon 12-13-97, Tarnaka
Secunderabad - 500 017, India
TEL : +91-40-27007006

【 Philippines 】

ULVAC SINGAPORE PTE LTD
(PHILIPPINES Branch)
Panorama Compound 2, Lot 2, Block 22,
Phase 4, Building 1B, EPZA, Rosario, Cavite,
4106, Philippines
TEL : +63-46-437-7700

【 Vietnam】

ULVAC SINGAPORE PTE LTD
(Vietnam Representative Office)
4F,43 Le Thi Hong Gam street, Nguyen Thai
Binh ward,district 1,Ho Chi Minh City, Vietnam
TEL : +84-28-3821-2367

【 Brazil 】

Sales Representative
(TC SOLUCOES EM COMPONENTES E SISTEMAS DE VACUO EIRELI)
Rua Ibitirama, 1820 CJ105 – Vila Prudente,
São Paulo – SP – Brasil.
TEL : +55-11-99816-6339

https://showcase.ulvac.co.jp/

ULVAC

Components Business HQ ULVAC, Inc.
ULVAC CRYOGENICS, Inc.

Nov. 2016 Vol.01
Jul. 2017 Vol.02
May 2018 Vol.03
Sep. 2018 Vol.04
Jan. 2020 Vol.05(R01)
Dec. 2020 Vol.06
Mar. 2023 Vol.08
Nov. 2023 Vol.09
Jul. 2024 Vol.10
Jul. 2025 Vol.11