

# I. Glove Box System Technology Agreement

Model No.: 2GBS-GC



## HOW GLOVE BOX WORK

- ✧ Box and gas purification system, form a sealed environment, filled with Inert gas or nitrogen to the cabinets, and circulation to remove internal active substances, allowing the system always maintain high cleanliness and high purity inert gas environment (water, oxygen are equipment a 1 ppm below according to ISO 10648-2 ).
- ✧ Controlled by microcontroller for all application, such as regeneration, circulation, vacuum, display the values on touch screen.

## GLOVE BOX APPLICATIONS

- ✧ Anhydrous, anaerobic and clean, ultra-clean work environment
- ✧ The R&D and production of batteries and battery materials (lithium-ion battery, battery, solar cell, the lithium iron phosphate, etc.)
- ✧ The R&D and manufacturing of special lamps: HID lamps, metal halide, ceramic metal halide.
- ✧ Welding: resistance welding, TIG welding, laser welding, plasma welding, brazing.
- ✧ OLED R&D and production.
- ✧ The development and production of medical supplies.
- ✧ Development and production of the super capacitor.
- ✧ Fine chemicals, nuclear industry.
- ✧ The new energy and new materials development and production.

# Technical Parameters

## Basic equipment

### Part 1: The body of the glove box

Configuration and Quantity	Technical parameters	Remark
1 Main Chamber	Stainless steel 304	Interior dimensions L1200 x D750 x H900 mm, External dimensions L1206 x D756 x H906 mm, Stainless steel 304 with 3 mm thickness, acid resistant.
1 transparent visualization panel	thickness: 12mm	Inclined panel of polycarbonate glass with thickness of 12mm, with scratch-resistant film inside;
1 standard support	H = 900mm	Carbon steel,with casters (with support feet), convenient mobile glove box, fine-tune the level;
2 Glove Ports	220mm diameter	Material: Aluminum alloy <i>Option material: stainless steel / Polyoxymethylene polymer</i>
1 Pair of Gloves	Cuff diameter 8", Length 800mm, Thickness: 0.4mm	Material: butyl rubber; O-ring sealed  <i>Option material: Neoprene / Rubber</i>
2 Shelves	Stainless steel 304	dimensions L500 x D200 mm, height adjustable type
1 Power Board Feedthrough	230 VAC	230 VAC, 15A, single phase, installed on 4 KF40 connector.
1 Lighting system	Lamp, ballast	Built-in fluorescent lamp
2 HEPA filters	Subject to HEPA standards	Inlet and outlet filter can eliminate particle size >0.3 μm, installed in the cabinets,
4 KF40 Spare connectors	KF40	Configuration quick connector, located on the box rear panel, so that the liquid or gas can be easily and safely in and out of the cabinet. Material: SUS304 stainless steel
1 Electrical Feedthrough	Spare Use	Installed on one of 4 KF40 Spare connectors
1 Gas Feedthrough	Spare Use	Installed on one of 4 KF40 Spare connectors

## Part 2: Gas purification system

Configuration and Quantity	Technical parameters	Remark
1 Gas purification system	Single purification column (GPS-1)	<p>◎ <b>Absorbing Capacity:</b> 60 liters of oxygen, and 2000 g of moisture.</p> <p>◎ <b>Material:</b> German BASF copper catalyst materials, USA UOP efficient absorbent molecular sieve materials.</p> <p>◎ <b>Regeneration:</b> The purification system of regeneration process automatically control.</p> <p>◎ <b>H<sub>2</sub>O &amp; O<sub>2</sub> Level:</b> Long-term, continuing to maintain gas purity: H<sub>2</sub>O &lt; 1ppm, O<sub>2</sub> &lt; 1ppm.</p>
1 Foot controller	Waterproof Double pedal	Control purification system to increase the pressure and decrease the pressure in the cabinet.
7 solenoid valves	Solenoid valves	Automatic electro-pneumatic valve
1 Circulating Blower	High-speed frequency blower	The speed of the gas circulation unit (blower) is 90m <sup>3</sup> /h, with variable speed and its speed is adjustable.
2 Pipe line	Stainless steel SUS304	Stainless pipe lines
1 Gas Cooling System	Include 1 air cooled system	Used for high temperature operation of users in the main chamber, includes the compressor and cooling refrigerant.
Pressure Control unit	+15 mbar to -15mbar (relative pressure)	Box pressure with Automatic control; Manual pressure control is allowed with foot pedal switch (from +15 mbar to -15 mbar)
Display unit	PLC controller 7" Color Touch Screen Monitor	Auto Display of moisture and oxygen level during working conditions
Moisture & Oxygen control system	New Upgraded Color touch screen: 7 inch	<p>PLC control system, touch-screen operation,</p> <p>* Moisture concentration: 0~1000ppm, with an accuracy of 0.1ppm.</p> <p>* Oxygen concentration: 0~1000ppm, with an accuracy of 0.1ppm.</p> <p>* Automatic system data logging.</p>

### Part 3: Main and Mini Antechambers

Configuration and Quantity	Technical parameters	Remark
1 Large Vacuum Antechamber	DN360 × 600 mm 2.5 mm thickness	Cylindrical type antechamber, right side. Automatically operated controlled by touch screen. Minimum vacuum value: 10 <sup>-5</sup> mbar L/S
	Stainless steel 304	Antechamber material: stainless steel 304, Doors material: Aluminum, anodized, thickness ~ 10 mm and easy to operate.
1 Small Vacuum Antechamber (for tools)	DN150 x 400 mm	Cylindrical type antechamber, right side. Manually operated by 3-way gas valve, vacuumed and filled with inert gas. Minimum vacuum value: 10 <sup>-5</sup> mbar L/S
	stainless steel 304	Antechamber material: stainless steel 304, Doors material: stainless steel 304. Hinged cover inside and outside for easy handling.
2 Vacuum gauges	Mechanical dial display	Used to measure the vacuum value of the large vacuum antechamber and tool vacuum antechamber.

### Part 4: Accessories

Configuration and Quantity	Technical parameters	Remark
1 Oxygen Analyzer	0~1000ppm, with an accuracy of 0.1ppm	<ul style="list-style-type: none"> <li>◎ Touch-screen display;</li> <li>◎ Directly connected to the PLC controller and all values could be monitored continuously.</li> <li>◎ Oxygen sensor could detect less than 1ppm.</li> </ul>
1 Moisture Analyzer	0~1000ppm, with an accuracy of 0.1ppm	<ul style="list-style-type: none"> <li>◎ Touch-screen display;</li> <li>◎ Directly connected to the PLC controller and all values could be monitored continuously.</li> <li>◎ Moisture sensor could detect less than 1ppm.</li> </ul>

<b>1 Vacuum Pump</b>	18m <sup>3</sup> /hour	<b>Pump features:</b> <ul style="list-style-type: none"> <li>⊙ Motor power 750W</li> <li>⊙ Engine speed 1440 rpm</li> <li>⊙ Oil capacity 1.0~1.5 liter</li> <li>⊙ Noise level up to 55 dB (A)</li> <li>⊙ Its speed is 18m<sup>3</sup>/hour</li> <li>⊙ Ultimate vacuum level up to 6.0x10<sup>-3</sup> mbar</li> <li>⊙ The maximum inlet pressure for water vapor 30mbar.</li> <li>⊙ There are oil filter and oil recycling kit suitable for the pump capacity on the vacuum pump.</li> </ul>
----------------------	------------------------	--

## II. Performance Description

### Part 1: Functional Description

- ⊙ Automatic control system pressure;
- ⊙ Automatic control system purge state;
- ⊙ Automatic control system circulation use;
- ⊙ Automatic control of the regeneration process of the gas purification system;
- ⊙ Automatically prompts alarm function (for example: Humidity (H<sub>2</sub>O) and Oxygen (O<sub>2</sub>) levels rise to the limit values);
- ⊙ System control parameter settings;
- ⊙ Data logging record system parameters;
- ⊙ System condition monitoring;
- ⊙ Automatic gas leakage / pressure test, thus reducing the gas consumption

### Part 2: Working conditions and performance indicators

Working Voltage	220 VAC, 50 Hz, single phase
Max. Power	≈2.0KW
Working Gas	Operating gas: Inert gas such as N <sub>2</sub> , Ar, He
	Regenerating gas: For regenerating both oxygen and H <sub>2</sub> O remover, use mixture of H <sub>2</sub> (5-10%) and operating gas
Water concentration	<1 ppm (20 °C, 1 atm)
Oxygen concentration	<1 ppm (20 °C, 1 atm)
Antechamber withstand a minimum vacuum value	10 <sup>-5</sup> mbar L/S

The ultra low leak rate technology

<0.001 vol% / hr (depending on oxygen concentration inside the glove box)

**Working Voltage: 220 VAC, 50 Hz, single phase, Max. Power: 2.0KW**