

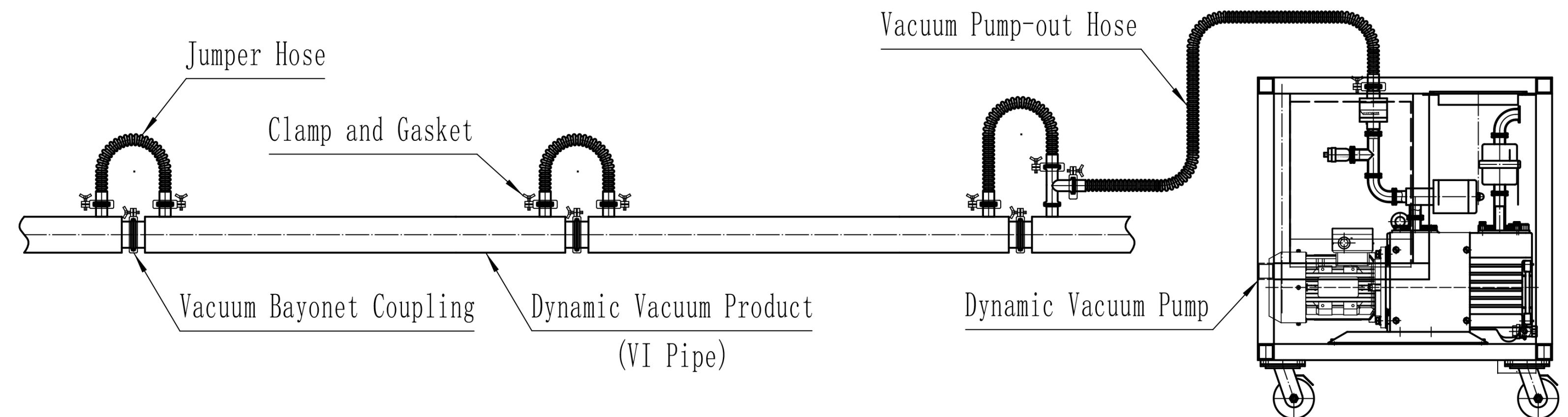
DYNAMIC VACUUM SYSTEM INTRODUCTION

Vacuum Insulated Piping System

Vacuum insulated pipes and vacuum insulated products are essentially composed of inner pipe and outer jacket. The vacuum chamber (vacuum jacket) formed by the inner pipe and outer jacket is subjected to perform vacuum treatment. When cryogenic liquids flow through the inner pipe, the vacuum jacket provides insulation effect, preventing influence from external environmental temperatures.

Usually, vacuum insulated products (VI products) include vacuum insulated pipes, vacuum insulated flexible hoses, vacuum insulated valves, vacuum insulated phase separators, and so on.

There are two methods of vacuum treatment for vacuum chamber (vacuum jacket): **Static Vacuum Systems** and **Dynamic Vacuum System**.



Dynamic Vacuum System

In this system, the vacuum products don't perform vacuum treatment in the factory. After installation at the user's site, independent vacuum chambers of each VI product are connected together with jumper hoses and vacuum pump-out hoses, and then connected to a vacuum pump. The vacuum pump continuously maintains a stable vacuum level for the VI products in long-term.



Static Vacuum System

In this system, VI products perform vacuum treatment in the factory. Each VI product has an independent vacuum chamber. After the products are delivered from the factory, the vacuum level gradually degrades over time until a secondary vacuum treatment at user's site is required.

Comparison Between Static and Dynamic Vacuum System

	Static Vacuum System	Dynamic Vacuum System
Vacuum Treatment	Performed at the factory before deliver.	Performed at user's site with vacuum pumps.
Advantage	Lower initial cost.	More stable vacuum level, less cold loss, and no condensation or frost on the VI product surface. Easier maintenance — only for the vacuum pump.
Disadvantage	Vacuum level gradually decreases over time, increasing cold loss. When the vacuum level drops significantly, secondary vacuum treatment is required, leading to higher maintenance costs in the future.	Higher initial cost.
Vacuum Port	Usually, each VI product has one vacuum port.	Each VI product has at least two vacuum ports, which are set near adjacent VI products for jumper hose installation.
Main Applications	Air Separation Plants, Chemical Plants, Steel Plants, LNG Plants, Manufacturing Industry, and so on.	Electronic Industry,Chip Industry,biopharmaceutical Industry, laboratories,and so on.



Dynamic Vacuum System



In the Dynamic Vacuum System, one or more vacuum pumps are installed at the user's site to continuously or alternately provide a stable vacuum level for all vacuum chambers in the vacuum insulated piping system.

Therefore, the system maintains a higher vacuum level and less cold loss in long-term. As for indoor environments or areas with high humidity, it minimizes the risk of condensation and frost on the VI product surface.

The Dynamic Vacuum System is easier to maintain in the future, requiring only regular maintenance of the vacuum pump. Additionally, when the VI product is installed in a confined space etc., there may be difficulties in maintaining the VI product itself in the future. The Dynamic Vacuum System eliminates this potential challenge and instead only requires maintenance work on the vacuum pump.

When installing VI products on-site, each product is equipped with two vacuum ports. The vacuum ports of adjacent VI products are connected with jumper hoses to connect all vacuum chambers together. Then these chambers are connected to one or more vacuum pumps by vacuum pump-out hoses.



Vacuum Pump

Design Pumping Speed	8 L/s
Rotational Speed	1500-1800 r/min
Ultimate Pressure	1X10 ⁻¹ Pa
Drive Voltage	380V 3-phase power supply, 380V 3-phase electrical wiring
Motor Power	1.1kW 4P
Cooling Method	Air-cooled
Vacuum Oil Capacity	1-2.5 L

Jumper Hose and Vacuum Pump-out Hose

Made of flexible stainless-steel hoses with clamp fittings.



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Whether an already installed Static Vacuum Insulated Piping System can be converted to a Dynamic Vacuum Insulated Piping System?



Yes, it is possible.

From the exterior, STATIC VI products mainly lack a vacuum port, so we need more vacuum hoses to connect all the independent vacuum chambers of VI products together.

From interior, STATIC VI products have slight differences in the amount and placement of insulation materials, getters, and adsorbents compared to DYNAMIC VI products. However, these differences are not significant.

HL CRYO can retrofit STATIC VI product from other manufacturers. HL CRYO has capability to achieve nearly 100% reuse of the original VI products, and add the necessary vacuum pump-out hoses and vacuum pumps to complete the conversion from a Static to a Dynamic Vacuum System.

It is important to note that the performance of a retrofitted Dynamic Vacuum System might be slightly inferior to a system originally designed as a Dynamic Vacuum System.



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The Reasons of Choosing HL CRYO.

The customized coupling which is on the basis of the welded coupling, any joint can be re-welded to its inner pipe, like Flange, Screw Thread or any customized joint.

The customized couplings is mainly used for connecting VI Piping to user equipment. Most of customized couplings require on-site insulation treatment.

The Scope of Supply.

The following equipment is suitable for cryogenic services.

- Vacuum Insulated/Jacketed Pipe Series
- Phase Separator/Degasser Series
- Dynamic Vacuum Pump Unit Series
- Other cryogenic support equipment related to VI piping, such as Safety Relief Valve, Filter, Heater of Venting Pipe, Pressure Control System etc.
- Vacuum Insulated/Jacketed Flexible Hose Series
- Vacuum Insulated Valve Series
- PLC Automatic Control System for VI Piping

The Main Service Areas.

- Air Separator/ Cold Box
- Aerospace Industry
- Biostorage/Biobank and Pharmaceutical
- Aluminum Extrusion
- Bulb Production
- Rare Gas
- Test Platform
- Chip: MBE and Packaging&Testing
- Liquid Hydrogen & Liquid Helium
- Motor and Engine
- Food & Beverage Production
- Rubber Tyre Production
- Receiving and Filling Station
- Research Institute Project

Getting A Quotation

Provide the following information as much detail as possible in order to get an accurate quotation quickly.

1. Industry/product application, and medium.
 2. Pipe specifications and quantity, or quantity of flow.
 3. Work pressure or design pressure.
 4. Material of piping system.
 5. If valves, phase separator and other equipment are needed, it is recommended to provide drawings.
 6. Commercial terms, including currency, country/port, and the Incoterm (EXW, FOB or CIF) etc.
 7. Other requirements.
- If not sure about any above information, please contact HL CRYO.



The Manufacture Standard.

ASME B31.3

The Raw Materials.

Usually, ASTM/ASME 300 Series Stainless Steel (Acid Pickling, Mechanical Polishing, Bright Annealing and Electro Polishing).

The Minimum Order.

There is no limited for minimum order.



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