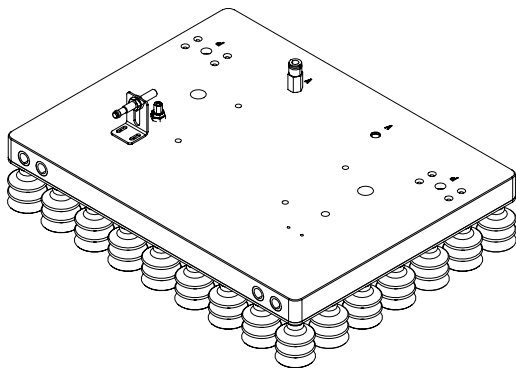


HVG

Please keep this manual for maintenance and use!



Instruction manual

Catalogue

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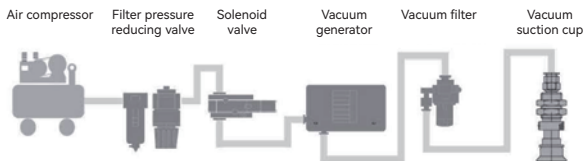


1.1 Summary

- ⇒ These operating instructions contain important information about using vacuum suction tools. Please read the operating manual carefully and keep it for future reference!
- ⇒ The operation manual is customized according to the delivery scope of Hanwa Vacuum Company. Not considering the modification of the gripper system requested by the customer!

- ⇒ Only after reading and understanding the operating instructions can the system be connected and debugged!
- ⇒ This device can only be operated with the specified operating voltage!
- ⇒ Installation can only be carried out by qualified professionals!
- ⇒ General safety instructions and European standards must be considered and followed!
- ⇒ This system can only be operated by well-trained personnel!




Working principle of vacuum system



Safety precautions for use

Please make sure to read this article before use.

Please also confirm the common precautions and individual precautions for each series.

 Danger	 Warning	 Attention
When the danger of death or serious injury is imminent due to operational errors.	There is a risk of death or serious injury when there is an operational error.	There is a risk of personal injury and property damage when there is an operational error.

The precautions recorded here are for the safe and correct use of our company's products to prevent personal injury and property damage.

Precautions based on the potential harm to personal health caused by accidental operation, and The degree and urgency of property damage can be divided into three descriptions: "danger", "warning", and "attention". Each description contains important content about safety, please be sure to follow it.

Additionally, please be sure to comply with JIS B8370*¹ Or ISO 4414*², Labor Safety and Health Law, High Pressure Gas Security Law and other safety regulations.

*¹ JIS B8370 :General rules for air compression systems

*² ISO 4414 : Pneumatic fluid power-Recommendations for the application of equipment to transmission and control systems

In addition, even content items marked with "attention" may cause significant accidents depending on the situation. So all of them are important content, please be sure to comply.



Vacuum • Suction device / common precautions

Please make sure to read this article before use.
Please also confirm the common precautions and individual precautions for each series.

The precautions recorded here are for the safe and correct use of our company's products to prevent personal injury and property damage.

According to the degree and urgency of personal harm and property damage caused by misoperation, precautions can be classified into three descriptions: "danger", "warning", and "attention". Each description contains important content about safety, please be sure to follow it.

Air quality

Warning

Please use clean air.

If compressed air contains corrosive gases, chemicals, and salts, it can cause damage or poor operation, so please avoid using unclean air.

Attention

Please install an air filter.

Please use a filtering accuracy of 5 μ m Air filters below m.

Please configure an air dryer.

Compressed air containing a large amount of condensate can cause poor machine operation. So please configure an air dryer to lower the temperature and reduce the occurrence of condensation water.

Please take measures to prevent oil sludge.

Once the deterioration substance (sludge) of

compressor oil is mixed into the air compressor machine, it will cause poor operation of the machine. Please use air compressor oil that is not prone to oil sludge. Alternatively, a coalescence filter can be installed to prevent oil sludge from flowing into the air pressure machine.



过滤器

聚结过滤器

减压阀

Wiring

Warning

Please make sure to cut off the vacuum, compressed air, and power before wiring. Wiring without cutting off air and power can cause electric shock or poor product operation, resulting in personal injury or property damage.

Please be careful not to make incorrect wiring.

There may be polarity differences between DC

specification display lights and electromagnetic valves for surge protection circuits.

When wiring the solenoid valve, it is necessary to confirm whether there is polarity. If there is polarity, the wire color and marking used for differentiation should be confirmed according to the product catalog and physical confirmation, and the correct wiring should be carried out. Once there is a wiring error, the following situations may occur.

When there is no built-in polarity protection diode

If the polarity is wrong, it can cause the diodes inside the solenoid valve, as well as the switch components or power supplies on the control machine side to burn out.

When there is a built-in polarity protection diode

When the polarity is wrong, the electromagnetic gate will not switch.

Please be careful not to apply repeated bending stress and tensile force to the wires.

Applying repeated bending stress and tensile force can cause wire breakage, so please leave room for error when wiring.

Please confirm that there is no poor insulation.

Poor insulation at the connection points of the wires, extension wires, and terminal blocks can cause excessive current on the switching components of the solenoid valve or control machine, resulting in damage.

Please do not mistake the applied voltage.

When wiring the solenoid valve, if the applied voltage is mistakenly applied, it can cause poor operation or coil burnout.

After the wiring is completed, please confirm that the wiring is correct before connecting to the power supply.

Usage environment

Danger

Please do not use in explosive environments.

Warning

- Please do not use in environments with corrosive gases, chemicals, seawater, water, water vapor, or environments with the aforementioned substances.
- When there is direct sunlight, please use a protective cover to block the sunlight.
- When there is a heat source around, please cut off the radiation heat.
- When installing the solenoid valve on the control panel, please take heat dissipation measures to meet the temperature range required by the specifications.
- Places with sparks flying during welding should be protected with protective covers. Sparks can burn out the plastic parts of the solenoid valve, which can easily cause a fire.
- When water droplets directly fall onto the solenoid valve, it can cause electric leakage and burn out the coil.
- Please pay attention to protection and install a protective cover or set it inside the panel for the solenoid valve.

 **Attention****Used in low-temperature environments**

When using vacuum suction products in environments below 5 °C, measures such as installing air drying should be taken to prevent condensation, moisture, and other solidification or freezing of compressed air.

Impact and vibration

The impact applied to the vacuum suction product should be at 150m/s². The vibration should be within 40m/s². Below. If the value is exceeded, it will cause misoperation.

When wiring pressure sensors and other wires, they should be kept away from high-voltage power machines, high-voltage lines, and power lines with significant interference.

Otherwise, it may cause misoperation or malfunction.

Maintenance inspection points

 **Warning****Inspection points before maintenance**

After confirming that measures have been taken to prevent load drop, cut off the power supply to the gas supply and equipment, and discharge the residual pressure in the system before conducting a point check.

Inspection points after maintenance

When restarting, connect the compressed air and power supply, properly inspect the

function and leakage, confirm correct installation, and operate safely and stably before restarting the system.

Manual operation

Manually operating the solenoid valve will activate the connected device, so please confirm safety before operating.

After manually operating through the lock button, be sure to unlock it. If you forget to unlock the solenoid valve and keep it in the ON state, the device will not function properly and there is a possibility of danger.

Disassembly of vacuum suction products

When disassembling vacuum suction products, please carefully read the operating manual before proceeding correctly.

Disassembly and assembly should be carried out by professionals with specialized knowledge.

Please do not lose components during disassembly and assembly.

Otherwise, it will cause air leakage or poor operation, and performance cannot be guaranteed.

Dismantling of condensate discharge

To ensure air quality, please regularly discharge the condensate from the air filter.

The filters and silencers of vacuum suction products should be regularly inspected, cleaned, and the filter elements replaced regularly.

Once blocked, it will reduce performance.



Vacuum • Suction device / common precautions

Please make sure to read this article before use.
Please also confirm the common precautions and individual precautions for each series.

Warning

To avoid loosening, please firmly install the fixed and connecting parts.

If the installation strength is not sufficient, it will cause the vacuum product to fall off.

Please do not start the product until it is confirmed that it can operate correctly.

After installation, connect the compressed air and power supply for appropriate functional and leakage checks. After confirming that the installation is correct, the system can be started safely and accurately.

During painting

When painting the resin part, the paint and solvents may have adverse effects on the resin. Therefore, please consult our company in advance if painting is possible. Also, please be careful not to erase the text of the trademark affixed to the product.

Please ensure that a certain amount of space is available for equipment inspection

Maintain pressure (vacuum).

Electromagnetic valves (including vacuum switching valves) allow for a small amount of leakage. If used for a long time to ensure the

pressure of the container (including vacuum), it can easily cause machine malfunctions.

Attention

Please do not use organic solvents or other materials to wipe product trademarks or logos with model numbers written on them. Otherwise, the content of the logo will be erased.

Attention

Do not spiral piping.

If spiral piping is used in the vacuum circuit, it will cause a delay in vacuum arrival time and a decrease in flow rate due to piping resistance, resulting in low vacuum pressure on the suction cup side and incorrect operation of the straight air sensor.

Vacuum combination container type, please pay attention to the diameter of the piping.

If there are multiple connections in the containerized model, insufficient flow may occur. Please supply and exhaust from both sides of the base.

In addition, when conducting centralized exhaust, there may be a significant decrease in vacuum pressure due to piping resistance, so

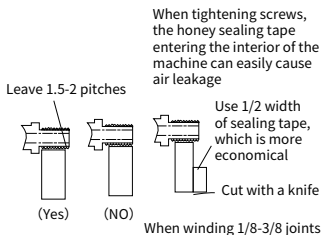
please make the diameter of the piping thicker as much as possible.

Preparation before piping

Before piping, please remove any cutting powder, grease, and debris from the sealing tape inside the piping.

The winding method of sealing tape for joints

The front end of the threaded part should leave 1.5-2 pitches without winding, and the sealing tape should be wound in the direction of screwing in.

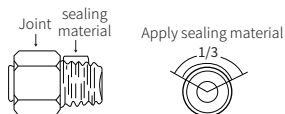


Application method of liquid sealing material

When applying liquid sealing material to the threads of the joint, apply an appropriate amount to about one-third of the outer circumference of the thread, and then tighten the screws.

Please be careful not to apply too much, otherwise excess sealing material may enter the machine, causing poor sealing such as leakage.

According to the type of surface treatment, there is a possibility that the sealing material is not easy to harden. Please note.



Piping

⚠ Attention

The sealing of M5 and M3 joints is end face sealing, and the threaded part does not require sealing tape or sealing fluid.

Please do not mix the wrong pipes

When piping various products, please refer to the product catalog and the label attached to the product. Please be careful not to mistake the compressed air supply port and vacuum port.

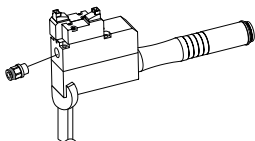
Tube and joint installation

When installing piping and fittings, please do not mix cutting powder and sealing materials. Additionally, please tighten the torque within an appropriate range.

Interface size	Tightening torque (N·m)
M3	0.3-0.5
M5	1.0-1.5
R, Rc1/8	3-5
R, Rc1/4	6-8
R, Rc3/8	13-15
R, Rc1/2	16-18

When installing the joint for the generator assembly, please fix the wrench on the metal part before proceeding.

If the wrench is fixed on the resin part, it will cause leakage and damage.



Materials for piping

Please use a hose that can withstand pressure above 3MPa.

The bending method of piping

Please use a gentle angle when bending the piping. Otherwise, it will increase the resistance of the piping, and the positive pressure side will use this as the boundary, causing a decrease in pressure and slowing down the exhaust on the negative pressure side.

Piping

⚠ Attention

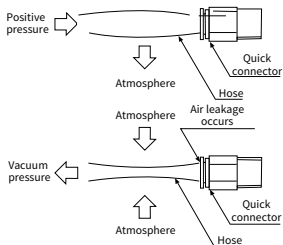
When using quick connectors

When applying positive pressure to the hose, it will expand and be sealed and clamped by the joint. When applying vacuum pressure, the hose contracts due to atmospheric pressure.

Therefore, malfunctions such as poor sealing, decreased vacuum pressure, and detachment of hoses may occur.

The material of the hose, except for polyurethane and polyamide (nylon, soft nylon), should pay attention to shrinkage during use.

< Example of piping failure >



Control

⚠ Attention

When vacuum breaking occurs, please do not perform vacuum breaking when the suction cup is pressed against an object.

When the attached filter is empty or there is a filter in the circuit, it will increase the burden on the filter's filtration and is prone to damage.

When using pneumatic control specifications

After vacuum occurs or is broken, please discharge the pilot air flow from the exhaust port of the solenoid valve. If a 3-position dual electronic control center enclosed solenoid valve is used, it cannot exhaust and the action cannot be stopped.

The principle of sponge vacuum suction tool:

After the compressed air passes through the contracted nozzle, the high-speed airflow ejected from the nozzle entrains the surrounding stationary fluid and flows forward together, forming a negative pressure when received, inducing a secondary vacuum. This type of vacuum system demonstrates

its superiority, especially for working conditions that do not require high flow rate vacuum. By using a combination of vacuum generators and vacuum suction tools to grasp objects, it is possible to achieve arbitrary angle transfer according to the different shapes of the objects.

Sponge vacuum suction application:

Automatic stacking, unpacking, and sorting of various sizes of goods, handling different materials such as paper, wood, perforated or unperforated, uneven and dry metal plates, plastic or sheet metal, etc. The modular design can combine several vacuum suction tools to form a complete system that meets different handling requirements. In addition, the sponge vacuum suction tool is also equipped with a vacuum generator, and the intelligent vacuum generation device can achieve energy-saving effects, making the cycle cycle extremely short. Each hole of the sponge suction cup is equipped with an independent one-way valve to prevent vacuum leakage when the object is smaller than the sponge suction cup or the sucked object is not completely covered in the suction cup. The one-way valve will automatically close when there is no contact with the object, which does not affect its operation. The sponge suction tool handling system is low-cost, and the suction pad can be quickly replaced after wear, which is simple, fast, and cost-effective. The control valve is protected from dust, making it easy to clean and safe to operate.

The application industry of sponge vacuum suction tools:

① Woodworking industry:

1. Incoming/outgoing materials in the production line
2. Discharge or removal of small wooden sticks in the wood room during entering and exiting the kiln
3. Cutting material for band saw
4. Install logs or materials for general woodworking machinery

5. Loading and unloading materials for CNC router

② **General industries:**

1. Handling of cardboard boxes
2. Stacking of cans and barrels
3. Stacking of the entire layer of cans
4. Handling glass jars
5. Feed and discharge materials into the high-pressure steam sterilization room
6. Handling building materials
7. Pharmaceutical industry, automotive industry, food, plastics, others, etc.

1. Air quality



- ◆ Please use clean air.
- ◆ If compressed air contains corrosive gases, chemicals, and salts, it can cause damage or poor operation, so please avoid using unclean air.

2. Usage environment



- ◆ Please do not use in explosive environments.
- ◆ When using vacuum suction products in low temperature environments and below 5 °C, measures such as installing air drying should be taken to prevent condensation, moisture, etc. from solidifying or freezing in compressed air.

3. Use pressure



- ◆ The downward pressure speed of the sponge suction tool is too high (using the sponge as a buffering device), which affects the lifespan of the sponge.

4. Usage suggestions



- ◆ There is no backflow, and residual vacuum causes some pulling between the material and sponge, which affects the lifespan. It is recommended to add backflow.

5. Absorbed materials



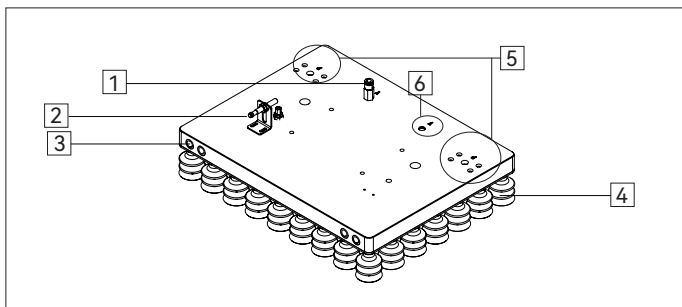
- ◆ The surface of the material must not have oil or corrosive substances.

Please bring your own tools in advance for use

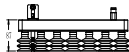
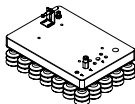
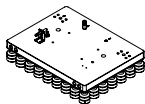


- ❶ Goggles, earplugs, protective gloves
- ❷ Internal hexagonal wrench (one set)
- ❸ Matching vacuum connector
- ❹ Supporting vacuum tube

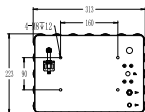
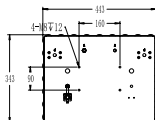
Before installation, please take self-protection measures and prepare the necessary tools. If you encounter any problems, please contact us in advance.



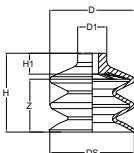
Number	Name	Module Description	Operation steps
1	valve detection module	Vacuum release valve and blowback port	Vacuum module after installation and testing The system can directly connect the vacuum tube Install to P (compressed air inlet), Start after installation.
2	generator module	Drop detection	
3	Suction cup module	Built in vacuum generator	
4	P	Absorb materials	
5	V	Compressed air inlet	
6		Vacuum detection port	



Suction nozzle model HSC42
Lifetime: Vacuum degree -60KPa, 5 million cycles



Model	Gas consumption L/min	Maximum vacuum flow rate L/min	vacuum degree Bar	Theoretical suction Kg	Safety factor	Weight Kg
HVG435X335V-S40-NA	440	1400	0.5	63	4	6
HVG305X215V-S40-NA	220	700	0.5	35	4	3



Model	Suction[N] -60Kpa	Pulling off -60Kpa	内部体积 [cm ³]	D	H	H1	DS	D1	Z	Weight [g]
HSC42	13.6	44	0.5	44	48	13	43	19	30	22.46

Daily maintenance issues with suction cups and tools	Time interval				
	daily	weekly	monthly	semi annual	annual
Can the vacuum generator generate sufficient vacuum? (Absorb moving materials with a vacuum degree of at least 75%)		○			○
Check if the vacuum suction tool is deformed, worn or otherwise damaged?			○		○
Check if the sealing gasket is worn, cracked, or leaking (replace or contact HANWHA staff)		○			○
Check if there is dirt or blockage in the insulation muffler (no need to check if there is no muffler)?					○
Check if there is dirt or blockage in the suction cup hole position?		○			○
Overview of vacuum module inspection?					○
Check for air leakage?			○		○
Check if the operator understands the content and precautions of the manual?					○
Use a soft brush and vacuum cleaner to clean dirt on the suction cup, such as wood shavings, paper scraps, or dust?	○				
Check if all connecting components and screws are tightened?			○		
Check the airtightness of all hoses and connecting components?			○		
Check the air pressure at the vacuum inlet?			○		

Maintenance of suction cups and tools |

- Clean the external dirt and wipe it with a soft cloth dipped in clean water (the water temperature should not exceed 60 ° C).
- The suction system may inhale dust during use and should be cleaned regularly to prevent clogging of the holes, which may affect usage.
- Optimize the operating program to only activate the vacuum when the workpiece is being sucked in, to avoid more dust being sucked in.
When compressed air is blown out, it will blow out the dust in the suction cup.
- With each compression use of the suction cup, if the suction cup is severely stained, it will affect its performance. (We suggest you contact Hanwa) working personnel
- In case of physical damage to the suction cup (it is recommended that you contact the HANWHA staff).
- It is recommended to replace the damaged suction cup body.

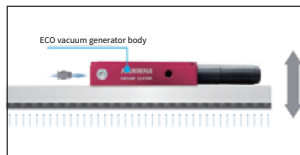
Daily maintenance issues with sponge suction tools	Time interval				
	daily	weekly	monthly	semi annual	annual
Can the vacuum generator generate sufficient vacuum? (Absorb moving materials with a vacuum degree of at least 75%)		○			○
Check if the vacuum suction tool is deformed, worn or otherwise damaged?			○		○
Check if the sealing gasket is worn, cracked, or leaking (replace or contact HANWHA staff)		○			○
Check if there is dirt or blockage in the insulation muffler (no need to check if there is no muffler)?					○
Check if there is dirt or blockage in the suction cup hole position?		○			○
Overview of vacuum module inspection?					○
Check for air leakage?			○		○
Check if the operator understands the content and precautions of the manual?					○
Use a soft brush and vacuum cleaner to clean dirt on the suction cup, such as wood shavings, paper scraps, or dust?	○				
Check if all connecting components and screws are tightened?			○		
Check the airtightness of all hoses and connecting components?			○		
Check the air pressure at the vacuum inlet?			○		

Maintenance of suction cups and tools |

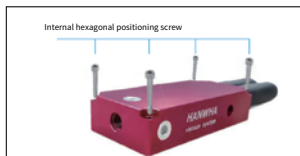
1. Clean the external dirt and wipe it with a soft cloth dipped in clean water (the water temperature should not exceed 60 ° C).
2. The suction system may inhale dust during use and should be cleaned regularly to prevent clogging of the holes, which may affect usage.
3. Optimize the operating program to only activate the vacuum when the workpiece is being sucked in, to avoid more dust being sucked in.
When compressed air is blown out, it will blow out the dust in the suction cup.
5. With each compression use of the suction cup, if the suction cup is severely stained, it will affect its performance. (We suggest you contact Hanwa) working personnel
6. In case of physical damage to the suction cup (it is recommended that you contact the HANWHA staff).
7. It is recommended to replace the damaged suction cup body.



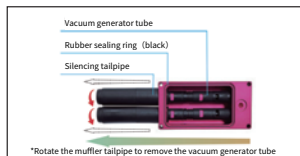
1. Daily cleaning: Use a high-pressure air gun or brush to clean each cavity step by step.



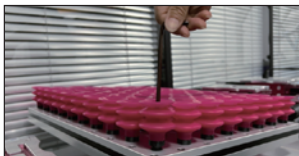
2. Check the connection between the generator theme and the vacuum module, and remove the vacuum interface.



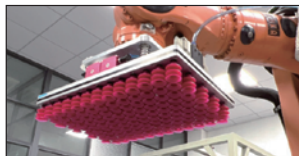
3. Unscrew the four positioning screws connecting the generator and the suction tool using an internal hexagon.



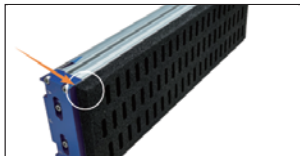
4. If you find any irreparable damage to the sealing ring, please contact us promptly.



5. The damaged suction cup can be replaced by removing the aged and damaged suction cup through the inner hexagon (as shown in the picture).

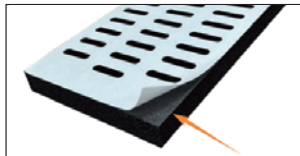


6. Pay attention to the sealing ring and vacuum tube dust film. Install it as is and use it after testing.



1. Remove the old sealing gasket and use an art knife to open it from any corner of the top of the sealing gasket.

- Be careful not to damage the blue buckle and sensing film on the suction cup.



2. Peel off the release paper from the new sealing gasket and let it stand still. During installation, the hole arrangement on the body corresponds to the sealing gasket.

- Pay attention to aligning the sealing gasket with the edge of the suction cup for installation.
- The arrangement of holes is asymmetric, please pay attention to the correct installation position.
- Do not compress the sealing gasket during installation to prevent wrinkling.



3. Remove residual adhesive and dust residue on the suction device body or sensing membrane.

- Please carefully check each one-way valve on the suction device body. No completeness, no damage.
- Friendly reminder: Do not remove the sensing membrane to ensure suction performance. The completeness of capability.
- Check that the holes on the suction tool body are not blocked by residual adhesive; If there is any blockage, please clean it up promptly.



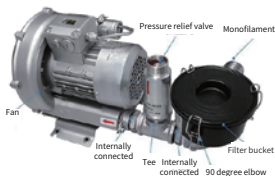
4. Fix the new sealing gasket onto the suction tool body flat and without wrinkles, and compact the sealing gasket with a roller.

- After the new sealing gasket is fixed and bonded, it should not be used for at least 6 hours to ensure that the adhesive has enough time to solidify.

Fault	Reason	Solution
Low vacuum degree or Vacuum generation time too long	Air pressure pipe leakage	Check the hose connector
	The diameter of the pressure hose is too small	Replace the pressure hose with a larger inner diameter
	Operating pressure too low	Increase pressure
	Generator blockage	Cleaning or replacing the generator
Unable to suck the workpiece	Vacuum degree too low	Increase pressure
	The suction is not suitable for the load	Install another identical generator
	Check and throttle valves have dirt	Blow compressed air from the outside of suction cup and from the bottom of the valve
	Blocked suction cup hole position	Clean the suction cup hole position
	Insufficient pressure to clamp the workpiece	Increase pressure
	Insufficient suction time for the workpiece by the suction tool	Ensure that the suction tool exerts pressure on the workpiece for a longer period of time
	The workpiece suddenly rises or rises too quickly	Optimize operating procedures to avoid sudden and rapid changes in the short term (especially when lifting workpieces)
Elevated workpieces are not suitable for use with large-area suction cups and tools for suction	Choose different types of suction tools and contact HANWHA staff for assistance	
The suction cup is damaged quickly	When the suction cup absorbs the workpiece, it only covers the edges and corners of the workpiece or does not undergo daily maintenance and cleaning of the suction cup surface and internal components	Ensure that the suction tool vertically absorbs the workpiece and perform daily maintenance

Fault	Reason	Solution
Low vacuum degree or Vacuum generation time too long	Vacuum hose leakage	Check the vacuum hose connecting the fan
	The diameter of the pressure hose is too small	Replace the pressure hose with a larger inner diameter
	Operating pressure too low	Increase pressure
	Blocked filter bucket at fan outlet	Clean or replace the filter drum
Unable to suck the workpiece	Vacuum degree too low	Increase pressure
	The suction is not suitable for the load	Replace with a high flow fan
	Check and throttle valves have dirt	Blow compressed air from the outside of suction cup and from the bottom of the valve
	Blocked suction cup hole position	Clean the suction cup hole position
	Insufficient pressure to clamp the workpiece	Increase pressure (seal gasket should be compressed by at least 50%)
	Insufficient suction time for the workpiece by the suction tool	Ensure that the suction tool exerts pressure on the workpiece for a longer period of time
	The workpiece suddenly rises or rises too quickly	Optimize operating procedures to avoid sudden and rapid changes in the short term (especially when lifting workpieces)
Elevated workpieces are not suitable for use with large-area suction cups and tools for suction	Choose different types of suction tools and contact HANWHA staff for assistance	
The suction cup is damaged quickly	When the suction cup absorbs the workpiece, it only covers the edges and corners of the workpiece or does not undergo daily maintenance and cleaning of the suction cup surface and internal components	Ensure that the suction tool vertically absorbs the workpiece and perform daily maintenance

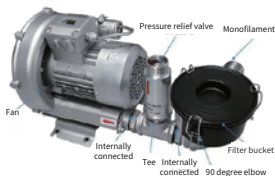
Fan schematic diagram



Fault	Reason	Solution
Low vacuum degree or Vacuum generation time too long	Air pressure pipe leakage	Check the hose connector
	The diameter of the pressure hose is too small	Replace the pressure hose with a larger inner diameter
	Operating pressure too low	Increase pressure
	Generator blockage	Cleaning or replacing the generator
Unable to suck the workpiece	Vacuum degree too low	Increase pressure
	The suction is not suitable for the load	Install another identical generator
	Check and throttle valves have dirt	Blow compressed air from the outside of suction cup and from the bottom of the valve
	Blocked suction cup hole position	Clean the suction cup hole position
	Insufficient pressure to clamp the workpiece	Increase pressure
	Insufficient suction time for the workpiece by the suction tool	Ensure that the suction tool exerts pressure on the workpiece for a longer period of time
	The workpiece suddenly rises or rises too quickly	Optimize operating procedures to avoid sudden and rapid changes in the short term (especially when lifting workpieces)
Elevated workpieces are not suitable for use with large-area suction cups and tools for suction	Choose different types of suction tools and contact HANWHA staff for assistance	
The sealing gasket wears out quickly	When the sealing gasket absorbs the workpiece, it only covers the corners of the workpiece or moves on the surface of the workpiece	Ensure that the suction tool is vertically drawn onto the workpiece

Fault	Reason	Solution
Low vacuum degree or Vacuum generation time too long	Vacuum hose leakage	Check the vacuum hose connecting the fan
	The diameter of the pressure hose is too small	Replace the pressure hose with a larger inner diameter
	Operating pressure too low	Increase pressure
	Blocked filter bucket at fan outlet	Clean or replace the filter drum
Unable to suck the workpiece	Vacuum degree too low	Increase pressure
	The suction is not suitable for the load	Replace with a high flow fan
	Check and throttle valves have dirt	Blow compressed air from the outside of suction cup and from the bottom of the valve
	Blocked suction cup hole position	Clean the suction cup hole position
	Insufficient pressure to clamp the workpiece	Increase pressure (seal gasket should be compressed by at least 50%)
	Insufficient suction time for the workpiece by the suction tool	Ensure that the suction tool exerts pressure on the workpiece for a longer period of time
	The workpiece suddenly rises or rises too quickly	Optimize operating procedures to avoid sudden and rapid changes in the short term (especially when lifting workpieces)
Elevated workpieces are not suitable for use with large-area suction cups and tools for suction	Choose different types of suction tools and contact HANWHA staff for assistance	
The sealing gasket wears out quickly	When the sealing gasket absorbs the workpiece, it only covers the corners of the workpiece or moves on the surface of the workpiece	Ensure that the suction tool is vertically drawn onto the workpiece

Fan schematic diagram





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