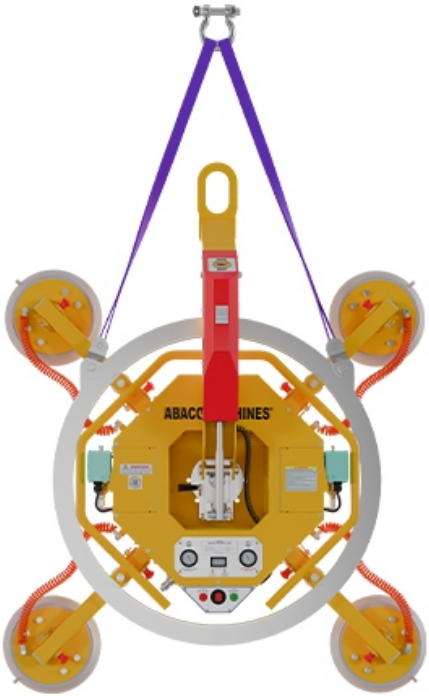
ABACO MACHINES

OPERATION MANUAL

ABACO ROTARY VACUUM LIFTER

(ARVL500)



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APPLICABLE MODEL
of this ROTARY VACUUM LIFTER:

ARVL500

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Item **Page**

General Safety Operation Manual Instructions Summary:

It is essential to review carefully and understand this Operation Manual before operating the equipment. Failing to read and understand this entire manual may cause injury or death to personnel, or damage to the equipment and the products that are being handled by this equipment if not properly followed. This safety summary includes general safety precautions and instructions that must be understood and applied before, during, and after operations, as well as maintenance to ensure personnel safety and protection of this equipment. Prior to performing any task, the contents included in this manual should be reviewed and fully understood.

This manual explains some essential operating or maintenance procedures, practices, conditions, statements, etc. that if those are not strictly followed, it could result in injury, or death by chance in the worst case. And there might be some chances of damaging or destructing materials or machine component itself. In order to avoid or eradicate such worst coincidences and happenings, it is essential to read through this manual and follow accordingly. It is also important to comprehend the functions of this equipment thoroughly for your safe and efficient operations.

For any question, please contact your local dealer or distributor.

I. EQUIPMENT GENERAL INFORMATION:

- Rotary Vacuum Lifter (ARVL500) is designed to lift, move and install large glass sheet within the specified work load limit.
- The lifter can rotate 360° to the left or right and tilt 90° vertically or vice versa during operation, thanks to the electric cylinder, enabling convenient and flexible handling and transportation.
- The lifter operates on a 12V voltage, ensuring safety for both users and glass sheets during operation.
- The lifter uses a battery system for versatility in production.
- The lifter is designed with multiple layouts of vacuum pads to handle various sheet sizes (Figure 1).

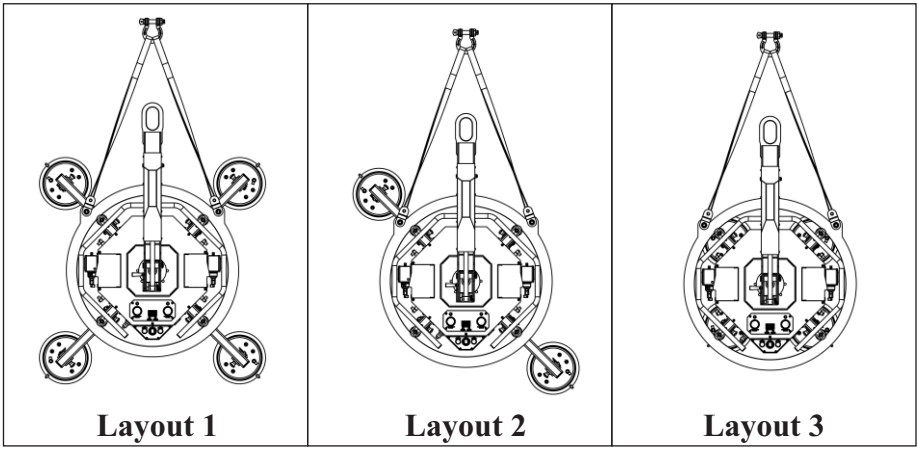
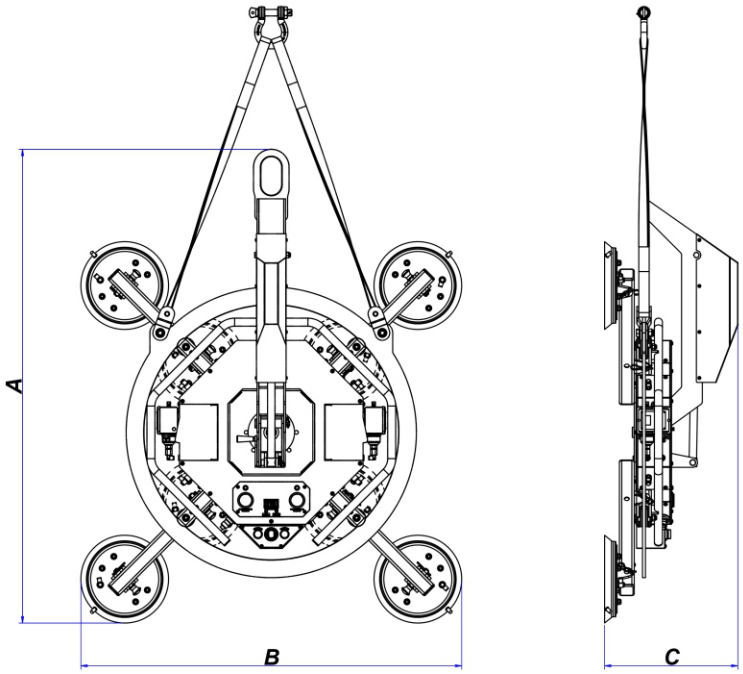


Figure 1

II. TECHNICAL SPECIFICATIONS:

- ARVL500 includes a main frame to be connected with vacuum pads by connecting bars.
- The main frame is connected with lever arm by rotatable joint.
- The main frame is equipped with control system including electric box, vacuum pump, and battery system.
- The lifter is designed with 2 independent vacuum systems to increase safety during operation.

1. Dimensions:

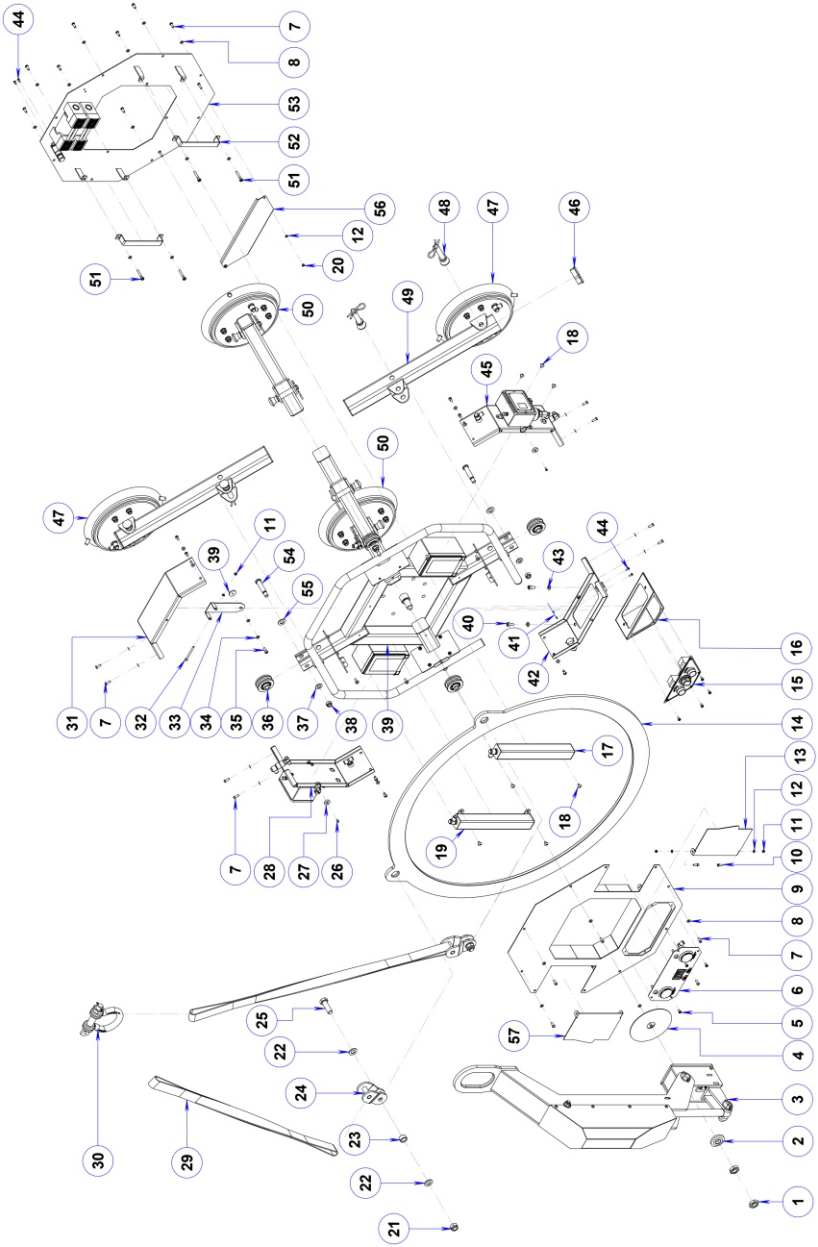


Length (A) inches (mm)	Width (B) inches (mm)	Height (C) inches (mm)
62 7/8 (1597)	50 5/8 (1286)	17 11/16 (450)

Work Load Limit (W.L.L)	1100 lbs (500 kg)
Diameter of vacuum pad	11 13⁄16 inch (300 mm)
Number of vacuum pad	4 pcs
Minimum applicable size of glass sheet	1000 x 1000 (mm) 2000 x 400 (mm)
Input voltage of charger	220V - 50Hz and 110V - 60Hz
LiFePO4 Battery	12V - 24Ah
Battery charge time	5 hours 30 mins
Continuous pump running time (pump test)	2 hours 15 mins
Maximum lead time to achieve the required vacuum pressure (-60 ~ -80 kPa)	10 seconds
Lead time to achieve the vacuum pressure from 0 ~ -80 kPa	30 seconds

2. Spare part list:

2.1. Spare part list - Overall:



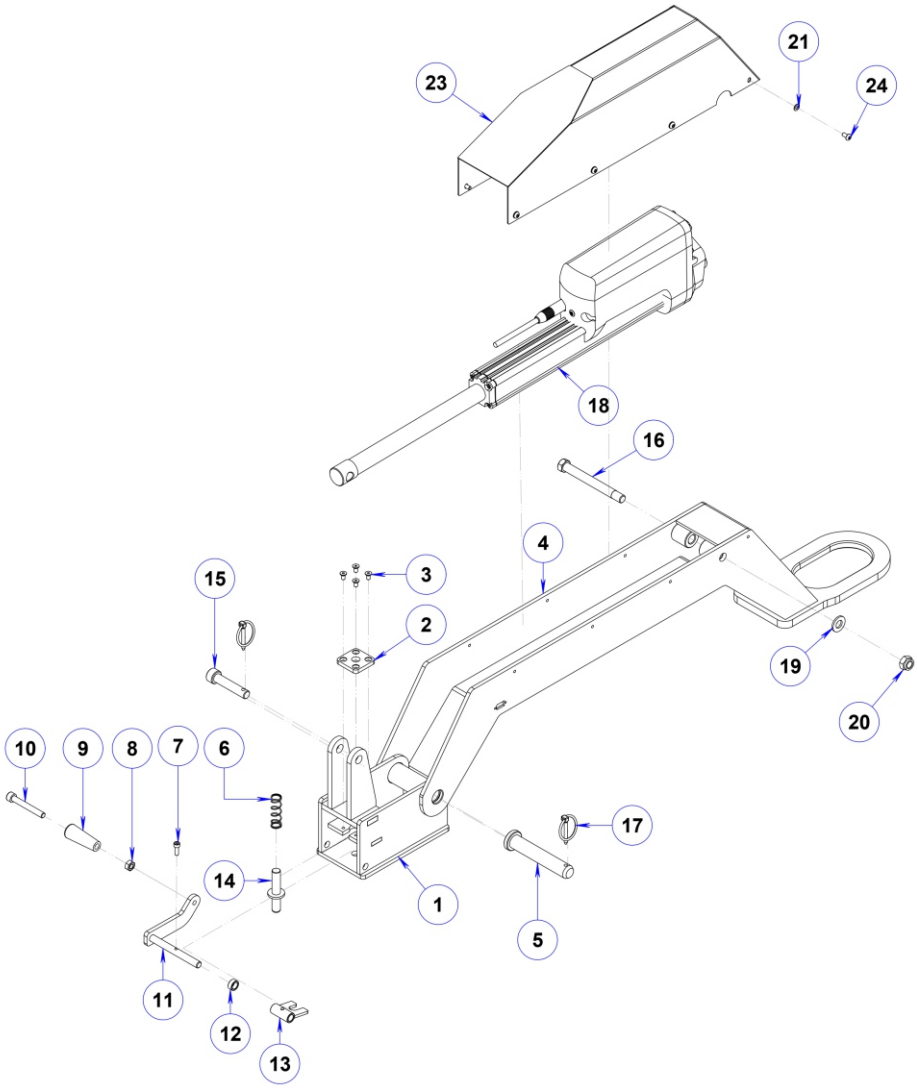
SPARE PART LIST

DESCRIPTION	PART NUMBER	QTY.
Nut M20	ARVL500-01	2
Bushing	ARVL500-02	1
Swivel hook assembly	ARVL500-03	1
Pad of swivel hook assembly	ARVL500-04	1
Screw M5 x 10	ARVL500-05	8
Cover of electrical panel	ARVL500-06	1
Hexagon socket button head cap screw M6 x 16	ARVL500-07	38
Washer Ø6	ARVL500-08	43
Lid 1	ARVL500-09	1
Hexagon socket head cap screw M5 x 15	ARVL500-10	4
Lock nut M5	ARVL500-11	5
Washer Ø5	ARVL500-12	7
Lid 2	ARVL500-13	1
Rotary frame	ARVL500-14	1
Button panel	ARVL500-15	1
Box of button panel	ARVL500-16	1
Compressed air tank 1	ARVL500-17	1
Screw M6 x 10	ARVL500-18	10
Compressed air tank 2	ARVL500-19	1
Nut M5	ARVL500-20	2
Lock nut M16	ARVL500-21	2
Washer Ø16	ARVL500-22	4

DESCRIPTION	PART NUMBER	QTY.
Spacer	ARVL500-23	2
Hanger bracket	ARVL500-24	2
Bolt M16 x 50	ARVL500-25	2
Hexagon socket countersunk head cap screw M4 x 10	ARVL500-26	2
Magnet	ARVL500-27	2
Cover plate 1	ARVL500-28	1
Strap	ARVL500-29	2
Bow shackle	ARVL500-30	1
Cover plate 2	ARVL500-31	1
Hexagon socket head cap screw M5 x 60	ARVL500-32	1
Support plate	ARVL500-33	1
Spring washer Ø6	ARVL500-34	1
Hexagon socket head cap screw M6 x 15	ARVL500-35	1
Pulley assembly	ARVL500-36	4
Washer Ø12	ARVL500-37	4
Lock nut M12	ARVL500-38	4
Main frame	ARVL500-39	1
Hexagon socket head cap screw M8 x 16	ARVL500-40	2
Nut M4	ARVL500-41	2
Cover plate 3	ARVL500-42	1
Washer Ø8	ARVL500-43	2
Screw M4 x 10	ARVL500-44	4

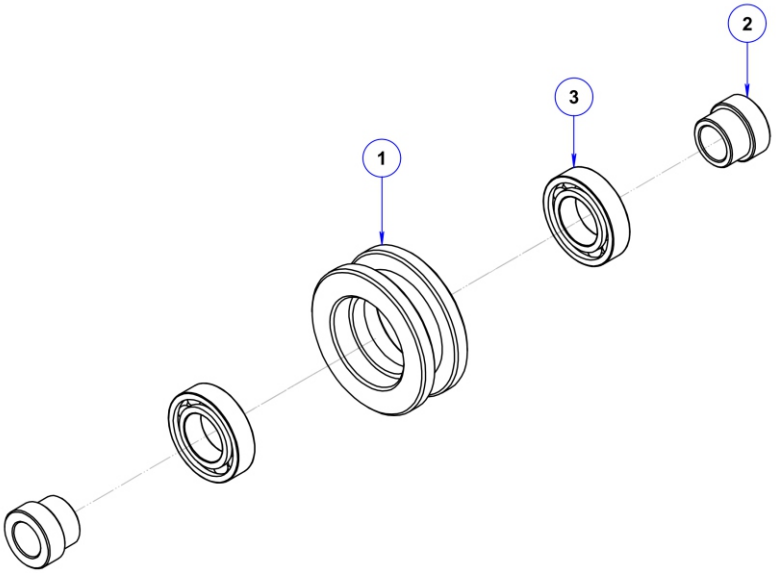
DESCRIPTION	PART NUMBER	QTY.
Cover plate 4	ARVL500-45	1
Rubber cap	ARVL500-46	4
Vacuum pad 1	ARVL500-47	2
Locking pin	ARVL500-48	8
Connecting bar	ARVL500-49	4
Vacuum pad 2	ARVL500-50	2
Screw M6 x 40	ARVL500-51	4
Bracket, battery	ARVL500-52	2
Lid 3	ARVL500-53	1
Pin, pulley	ARVL500-54	4
Washer Ø14	ARVL500-55	4
Plate of electric box	ARVL500-56	1
Lid 4	ARVL500-57	1

2.2. Spare part list - Swivel hook assembly (ARVL500-03):



DESCRIPTION	PART NUMBER	QTY.
Base	ARVL500-03.1	1
Flange	ARVL500-03.2	1
Hexagon socket countersunk head cap screw M5 x 10	ARVL500-03.3	4
Hanger bar	ARVL500-03.4	1
Shaft	ARVL500-03.5	1
Spring Ø16	ARVL500-03.6	1
Hexagon socket head cap screw M5 x 15	ARVL500-10	1
Nut M8	ARVL500-03.8	1
Handle	ARVL500-03.9	1
Hexagon socket head cap screw M8 x 60	ARVL500-03.10	1
Lever	ARVL500-03.11	1
Spacer, lever	ARVL500-03.12	1
Damping hinge	ARVL500-03.13	1
Rotary pin	ARVL500-03.14	1
Cylinder pin 1	ARVL500-03.15	1
Cylinder pin 2	ARVL500-03.16	1
Lynch pin	ARVL500-03.17	2
Electric cylinder	ARVL500-03.18	1
Washer Ø12	ARVL500-37	1
Lock nut M12	ARVL500-38	1
Washer Ø5	ARVL500-12	8
Cover of cylinder	ARVL500-03.23	1
Hexagon socket button head cap screw M5 x 10	ARVL500-03.24	8

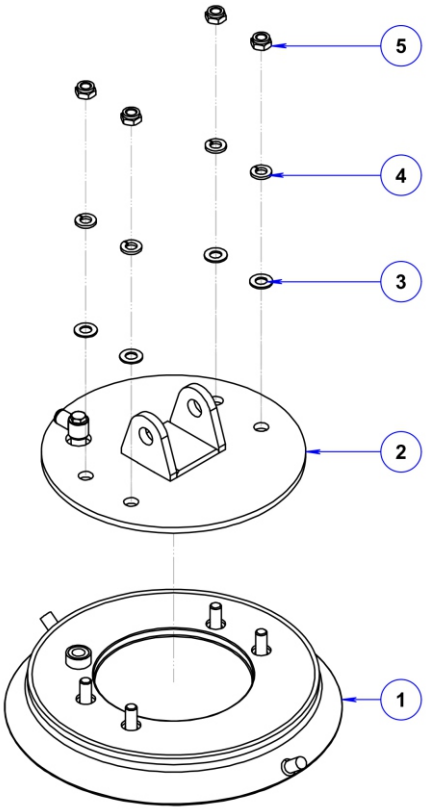
2.3. Spare part list - Pulley assembly (ARVL500-36):



SPARE PART LIST

DESCRIPTION	PART NUMBER	QTY.
Pulley	ARVL500-36.1	1
Bushing	ARVL500-36.2	2
Bearing	ARVL500-36.3	2

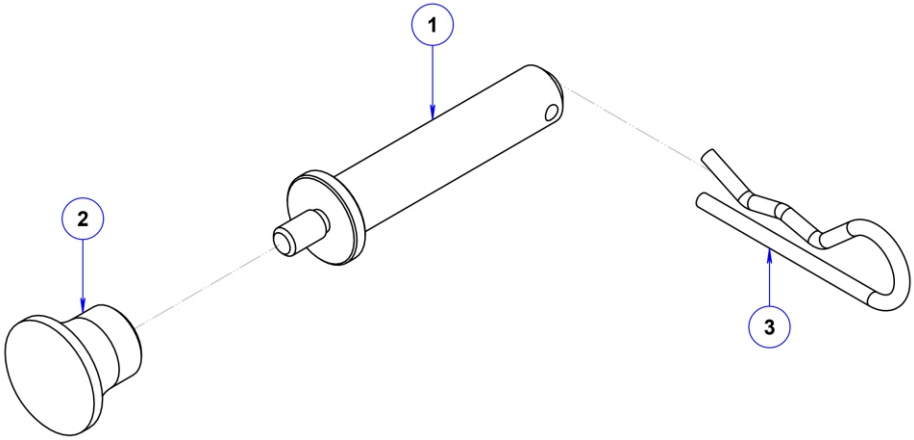
2.4. Spare part list - Vacuum pad 1 (ARVL500-47):



SPARE PART LIST

DESCRIPTION	PART NUMBER	QTY.
Vacuum pad	ARVL500-47.1	1
Base	ARVL500-47.2	1
Washer Ø10	ARVL500-20.6	4
Spring washer Ø10	ARVL500-47.4	4
Lock nut M10	ARVL500-20.5	4

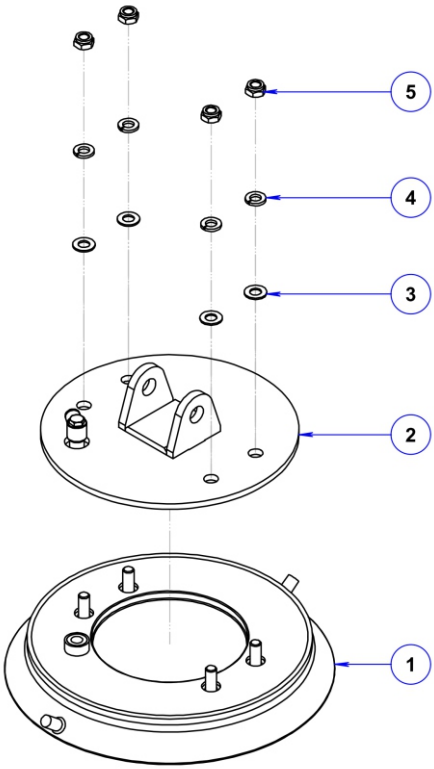
2.5. Spare part list - Lynch pin (ARVL500-48):



SPARE PART LIST

DESCRIPTION	PART NUMBER	QTY.
Lynch pin	ARVL500-48.1	1
Knob	ARVL500-48.2	1
Locking pin Ø4	ARVL500-48.3	1

2.5. Spare part list - Vacuum pad 2 (ARVL500-50):



SPARE PART LIST

DESCRIPTION	PART NUMBER	QTY.
Vacuum pad	ARVL500-50.1	1
Base	ARVL500-50.2	1
Washer Ø10	ARVL500-20.6	4
Spring washer Ø10	ARVL500-47.4	4
Lock nut M10	ARVL500-20.5	4

ELECTRICAL - PNEUMATIC COMPONENTS TABLE

CODE	DESCRIPTION	IMAGE
DT_323	Inline Air filter	
AVL_031	Pressure gauge	
DT_313	Inner tube sleeve	
V_033	One-way valve	
DT_296	Connector (L shaped) (KQ2LF08-02A)	
DT_280	Connector (KQ2H08-02S)	
DT_677	Connector (L shaped) (KQ2LF08-03A)	
DT_345	Connector (L shaped) (KQ2V08-02AS)	
DT_437	Connector (T shaped) (KQ2T08-02AS)	
DT_554	Connector (L shaped) (KQ2Z08-02AS)	
DT_282	Connector (T shaped) (KQ2T08-00A)	

CODE	DESCRIPTION	IMAGE
DT_267_9	Connector (Y shaped) (KQ2U08-00A)	
AVL_057	Air hose (orange)	
DH041	Air hose (blue)	
DH_040_O	Coiled air hose (orange)	
DH_040	Coiled air hose (blue)	
NN013	Air hose reel	
CS007	PTFE tape	
R_023_14	Intermediate relay	
DT_148_12	Timer relay	
DT_629	Power indicator LED light 220VAC	
DT_648	Power indicator LED light 3VDC	
DT_357	Electric wire cable with plug	

CODE	DESCRIPTION	IMAGE
DT_360	3 pin male socket	
DT_668	Double core cable	
PC022_NK	3 pin plug	
DT_709	LED warning button	
DT_750	3-pin power connector jack	
DT_749	LI-ION battery charger	
BAQ007	LiFePO4 battery	
DT_679	Push button (green)	
DT_680	Push button (red)	
DT_619	Remote control, 4 buttons	
DT_673	5 Pin male and female connector	
DT_631	Male and female connectors	

CODE	DESCRIPTION	IMAGE
DT_390	Pressure sensor	
M_123_NK	Vacuum pump	
DT_318	Solenoid valve	
R_023_14	14 Pin Intermediate relay	
R_010_D_TG	Relay base	
R_010_K	Release lever, intermediate relay	
R_030_K	Release lever, timer relay	
DT_244	Rail stopper	
DT_330	Alarm Siren with Strobe Light	
DT_412	Wired mini siren	
XL031	Electric cylinder	
DT_759	Reversing contactor	

CODE	DESCRIPTION	IMAGE
DT_674	Electrical cable	
DT_733	Power switch	
DT_695	Male Amass connector	
DT_760	Female Amass connector	
DT_633_L_D	Single core wire (red)	
DT_633_L_X	Single core wire (blue)	
DT_761	Coiled electrical cable	
DT_446_L_Đ	Red copper-core electrical wire	
DT_446_L_X	Blue copper-core electrical wire	
DT_235	Terminal block dominos	
DT_192	Separator, terminal block	
DT_648	Power indicator LED light	

CODE	DESCRIPTION	IMAGE
AVL_068	Aluminum rail	
DT_127_D	Round cosse (red)	
DT_643	Round cosse (blue)	
DT_148_12	14-pin timer relay	
DD020_0	Numbered Cable Marker – 0	
DD020_1	Numbered Cable Marker – 1	
DD020_2	Numbered Cable Marker – 2	
DD020_3	Numbered Cable Marker – 3	
DD020_4	Numbered Cable Marker – 4	
DD020_5	Numbered Cable Marker – 5	
DD020_6	Numbered Cable Marker – 6	
DD020_7	Numbered Cable Marker – 7	

CODE	DESCRIPTION	IMAGE
DD020_8	Numbered Cable Marker – 8	
DD020_9	Numbered Cable Marker – 9	
DD020_N	Numbered Cable Marker – N	
DD020_L	Numbered Cable Marker – L	
DT_712	Black spiral plastic tubing	
V_016_XM	Truss head screw	
VC011_I	Phillips pan head screw M4x6	
DT099_4	High temperature tube	
DT_748	2-battery management circuit	
DT_746	Round cosse (blue)	
DT_751	Round cosse (red)	
DT_692	Jumper bar	

III. SAFETY INSTRUCTIONS:

1. General Warnings, Caution and Notes:

a. Before Operations:

- Check to ensure the battery is fully charged before using.
- Check vacuum pads to ensure they are free from damage. If it was damaged, ensure to replace it with a new vacuum pad.
- Check to ensure there is no leakage of vacuum pressure.
- Check the glass surface to ensure it is clean and clear of dust, grease, or any other substances.
- Check all the buttons, control lever, pressure gauge and voltage indicator to ensure there is no sign of damage and they are in proper function and operate well.
- Make sure to operate smoothly when not lifting glass sheet and parts are not rubbed against each other.

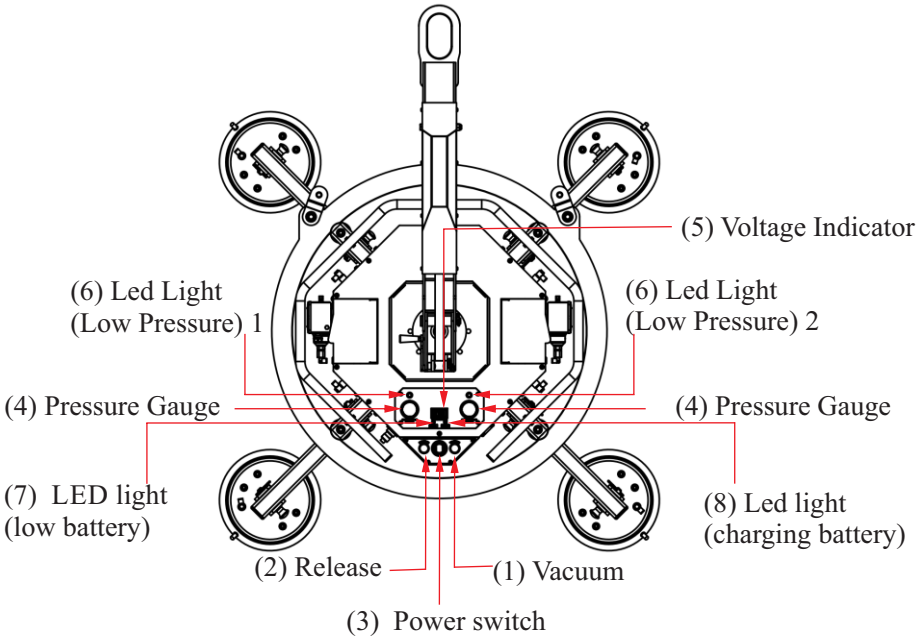
b. During Operations:

- Always monitor warning indicators during operation, such as the pressure gauge and voltmeter (battery voltage: fully charged at 12 VDC).
- The operator must STOP working immediately when alarm activated and/or detected abnormal phenomena such as vacuum leakage, deformation of any parts.
- All workers in the working area must ensure maximum safety to avoid accidents when moving or lifting the glass sheet.
- Do NOT release the lock lever to incline a glass sheet from upright to horizontal position during vacuuming.
- For safety purposes, the operator is responsible for following all applicable laws and regulations in your region.

c. After Operations:

- Turn off the power when not in use.
- When store vacuum pads, avoid distortion and deformation of any part of vacuum pads.
- Check the battery power for the use next time.

2. Instructions for Operation:



- (1) VACUUM: Press (when power switch is ON) the lifter shall start vacuum generation. The vacuum light will bright as well.

+ When the pressure gauge achieves around -77kPa ~ -80kPa, the system turns off automatically and changes into Stand-By mode. Now, it allows to begin the operation.

+ The vacuum pump will start again when the pressure goes down to around -60 kPa, and changes into Stand-By mode when enough pressure.

Warning: *Ensure that the VACUUM button light remains ON during operation. If the light is OFF, the automatic vacuum mode will not function.*

- (2) RELEASE: Press and hold the RELEASE button for 5 seconds with 5 times "beep". The valve will open and the pressure gauge will return to 0, ending the releasing pressure process. Please note that after your hands off, the RELEASE button is still bright around 15s ~ 20s later.

- (3) POWER SWITCH: Power switch has a function of turn on & off the power source of the lifter. When turn on the power, voltage indicator will bright and show pressure of battery at the moment.

- (4) PRESSURE GAUGE: Show the pressure of the vacuum pressure applied. The gauge displays 3 zones as below:

+ Yellow zone is a dangerous pressure.

+ Green zone is a safety caution pressure.

+ Blue zone is a safety pressure.

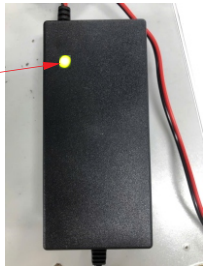
- **(5) VOLTAGE INDICATOR:** Show the voltage of the battery.
- **(6) LED LIGHT (LOW PRESSURE):** When the vacuum pressure is between -60 kPa and 0 kPa, the LED light turns on and an alarm sounds to indicate dangerous pressure. When enough pressure, the LED turns off.
- **(7) LED LIGHT (LOW BATTERY):** Indicates that the battery should be charged when the voltage is less than 12.4VDC and the system will alarm continuously as well as the battery must be charged when the voltage is less than 11.8VDC.
- **(8) LED LIGHT (CHARGING BATTERY):** The light only turns on when the charging cable is connected.

Remote controller:

- Remote controller has four buttons: connected via the jack on the control box.

- Button **90°:** The hanger bar folds to a 90° angle.
- Button **0°:** The hanging bar returns to its original position.
- Button **VACUUM** and button **RELEASE** are the same function as the VACUUM and RELEASE of the control panel.

3. Battery charging process:



Charging Indicator Light:

- When charging starts, the indicator light will be red.
- When fully charged, the indicator light will turn green.

Caution:

- Switch off the power after fully charged.

- Never allow the battery to become fully discharged. Recharge immediately when the battery voltage shows a low level.

Alarm Modes:

- Low Pressure Alarm: During vacuuming, if the pressure drops below -60 kPa due to issues such as motor failure, the system will activate an audible alarm to alert users for timely troubleshooting.

Caution: *Alarm indicator activates when the vacuum mode indicator light (VACUUM button light) is ON.*

- Low Voltage Alarm: After a period of use, if the battery voltage drops to a low level, the system will sound an alarm to remind users to recharge the battery promptly.

4. Device usage:

A. VERTICAL Glass Lifting Usage:

Step 1: Hook the Rotary Vacuum Lifter into a crane hook (Figure 1.1)

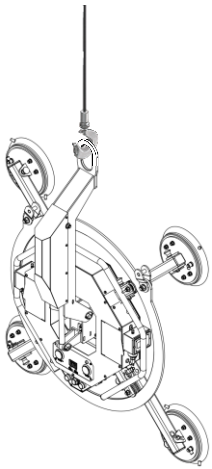


Figure 1.1

Step 2: Move the lifer close to the lifted glass (Figure 1.2).

Note:

- Adjust the position of vacuum pads to be suitable for the sheet's size (Refer to appendix)

- Ensure that the lifter is at the gravity center of the glass sheet (Figure 1.3)

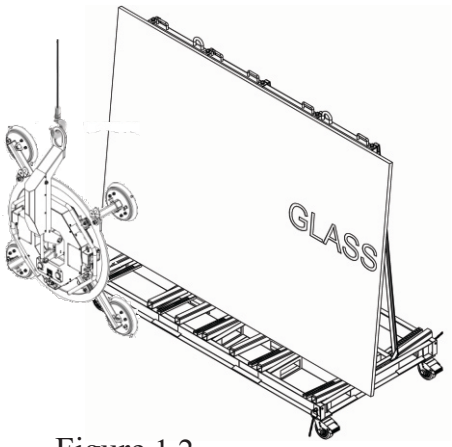


Figure 1.2

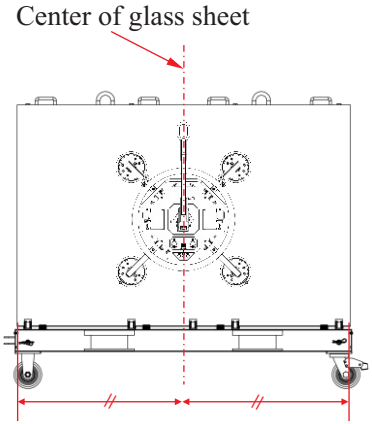


Figure 1.3

Step 3: Move the lifer close to the glass sheet surface (Figure 1.4 and Figure 1.5).

Caution: *Make sure all of vacuum pads touch the glass sheet surface at the same time with even spacing.*

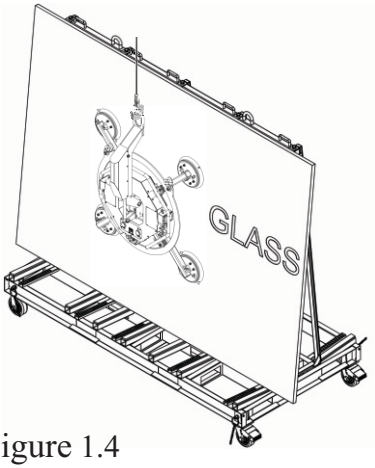


Figure 1.4

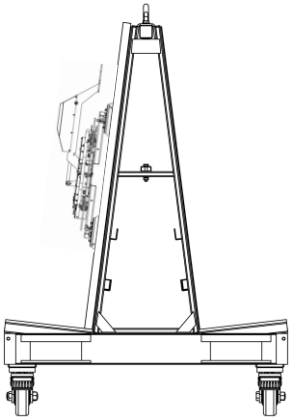


Figure 1.5

Step 4: Rotate the power switch to **"ON"** position to turn on the power (Figure 1.6). Then, press **"VACUUM**" button to vacuum the glass sheet.

Note: *When not in use, rotate the power switch to* ***"OFF"*** *position to turn off the power.*

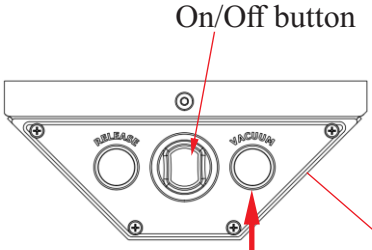
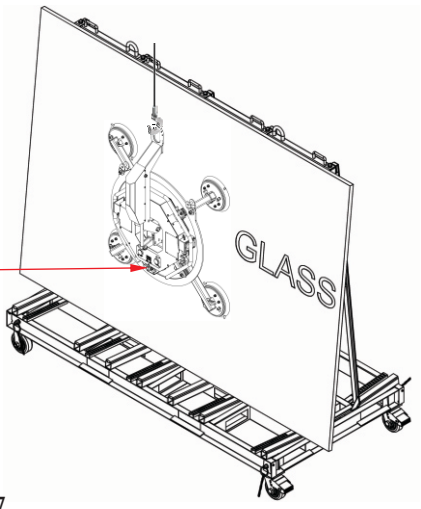


Figure 1.6



Caution:

*- After pressing the **"VACUUM**" button, the gauge indicator shall turn down. Make sure the gauge indicator shows between **- 70 kPa** to **- 80 kPa**.*

- The power switch should always be in the ON position during operation.

Step 5: Lift and move the glass sheet (Figure 1.7 and Figure 1.8).

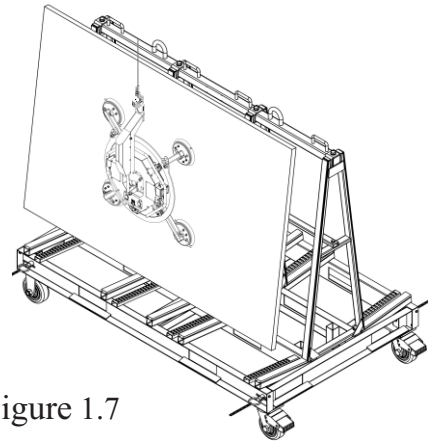


Figure 1.7

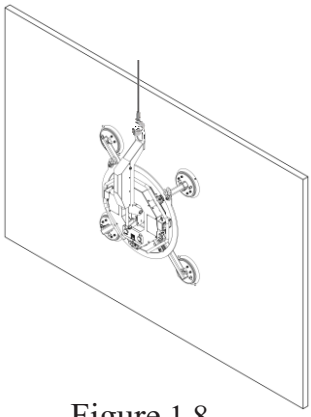


Figure 1.8

Warning: *Stand clear of the lifter and its load during the operation. No one is allowed to stand, pass or work underneath the glass sheet.*

Note:

*- Confirm the pressure gauge indicators are showing between **-70 kPa** to **-80 kPa** during vacuuming glass.*

*- **NEVER** press **"RELEASE**" button during vacuuming glass sheet.*

*- If the pressure reach to **-60 kPa** during vacuuming the glass sheet, the vacuum pressure will automatic start again; then, operator need to stop the lifter and re-check.*

- During proper vacuuming the glass can be rotated 45°, 90°.

Step 6: Place the glass sheet at the desired location (Figure 1.9).

Caution:

- When lowering down the glass sheet, handle it carefully and slowly with best cares.

- Do not unlock the lever arm to adjust the angle from vertical to horizontal when vacuuming the glass sheet.

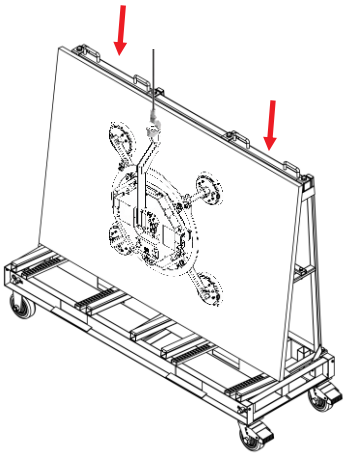
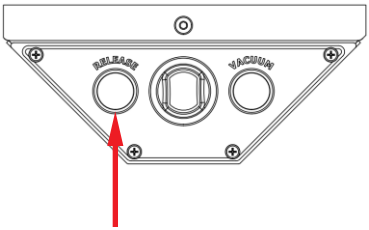


Figure 1.9

Step 7: Press **"RELEASE"** button (hold for about 5 seconds) (Figure 1.10), and move the lifter away from the glass sheet (Figure 1.11).

Caution: *Make sure the gauge indicators take back to 0 before removing the lifter out of the glass sheet.*



Press

Figure 1.10

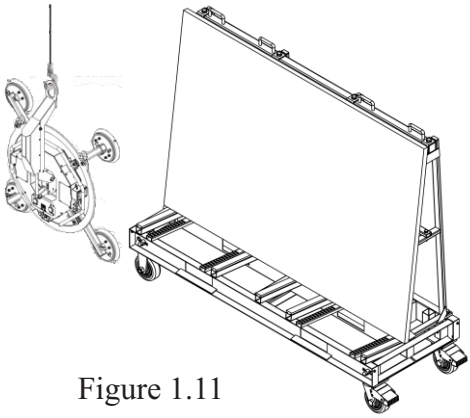
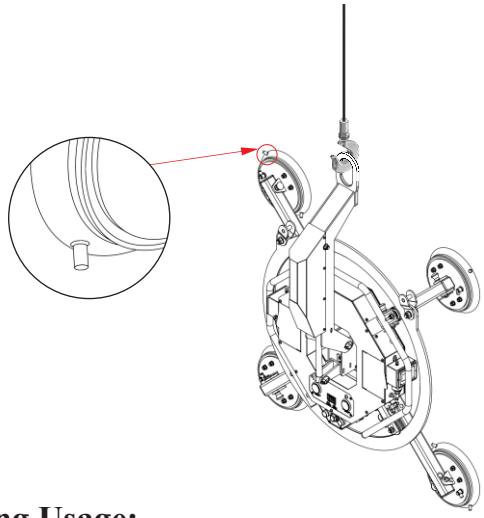


Figure 1.11

Note: *To faster move the lifter out of the glass sheet, use your hands to pull a rubber nipple on the vacuum pad.*



B. HORIZONTAL Glass Lifting Usage:

Step 1: Adjust the vacuum pads horizontally and attach the lever arm to the lifter (Figure 2.1).

Adjust vacuum pads horizontally (Refer to Appendix IV.1)

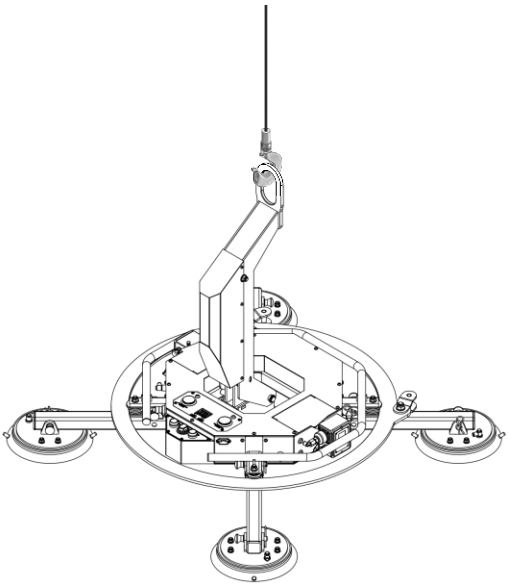


Figure 2.1

Step 2: Move the lifer near to the lifted glass sheet (Figure 2.2)

Caution: *Make sure the lifter is at the gravity center of the glass sheet.*

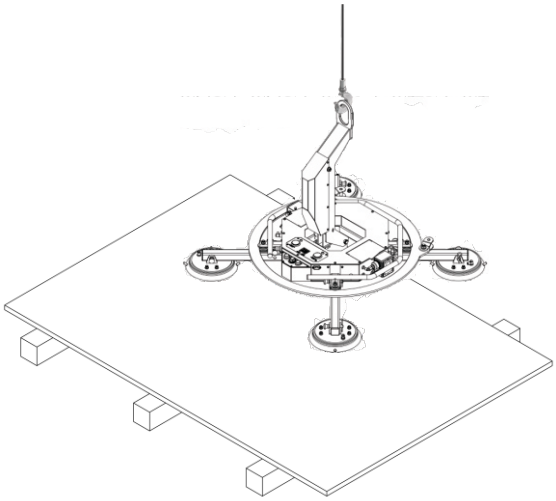


Figure 2.2

Step 3: Move the lifter close to the glass sheet surface (Figure 2.3).

Caution: *Make sure all of the vacuum pads touch the glass sheet surface at the same time with even spacing (Figure 2.4).*

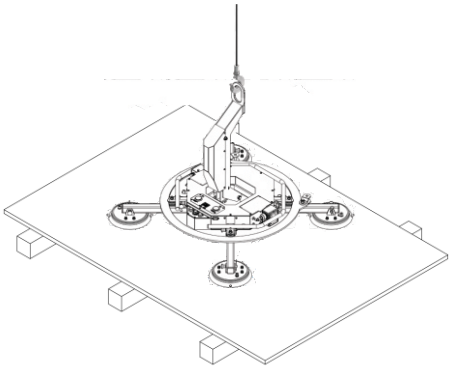


Figure 2.3

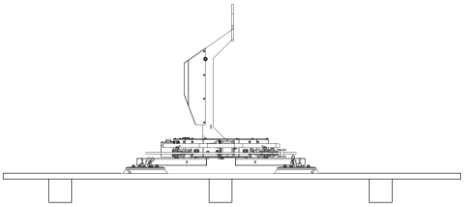


Figure 2.4

Step 4: Rotate the power switch to **"ON"** position to turn the power on (Figure 2.5). Then, press "**VACUUM**" button to vacuum the glass sheet.

Note: *When not in use, rotate the power switch to* ***"OFF"*** *position to turn off the power.*

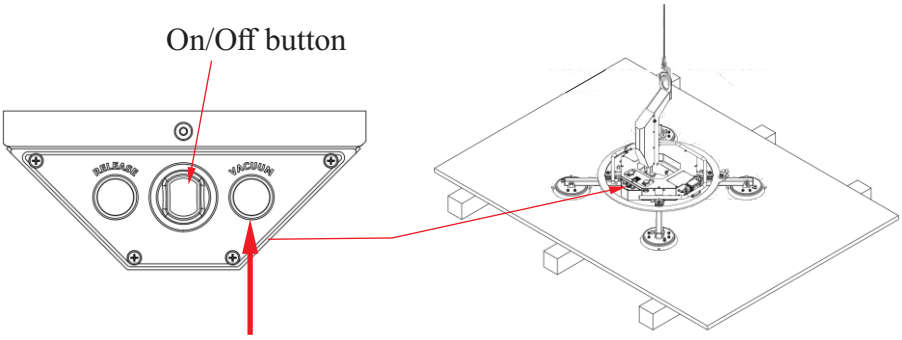


Figure 2.5

Note:

- After pressing the ***"VACUUM"*** *button, the gauge indicator shall turn down. Make sure the gauge indicator shows between* ***-70 kPa*** *to* ***-80 kPa.***

- Power switch is always be turned on during operation.

Step 5: Lift and move the glass sheet (Figure 2.6 and Figure 2.7).

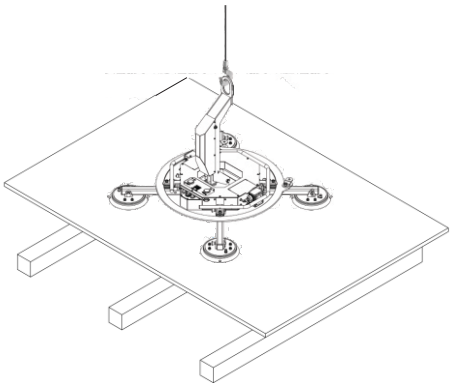


Figure 2.6

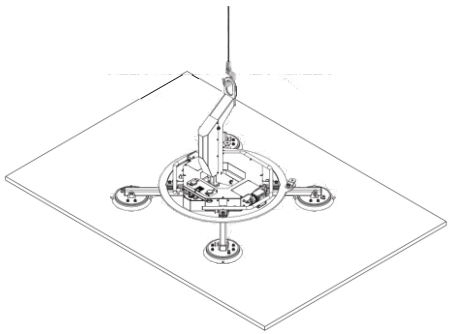


Figure 2.7

Caution: *Stand clear of the lifter and its load during the operation. No one is allowed to stand, pass or work underneath the glass sheet.*

Note:

- Confirm the pressure gauge indicators are showing between ***-70 kPa*** *to* ***-80 kPa*** *during vacuuming the glass sheet.*

- NEVER press ***"RELEASE****" button during vacuuming the glass sheet.*

- If the pressure reach over ***-60 kPa*** *during vacuuming the glass sheet, the vacuum pressure will automatic start again; then, operator need to stop the lifter and re-check.*

- During proper vacuuming the glass sheet can be rotated 45°, 90°.

Step 6: Place the glass sheet at the desired location (Figure 2.8)
Caution: *When lowering down the glass sheet, handle it carefully and slowly with best cares.*

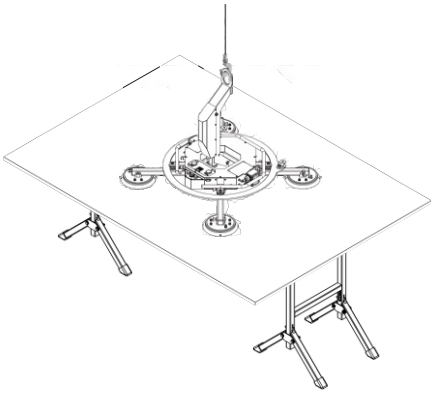
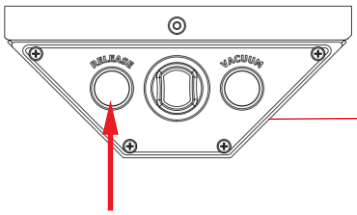


Figure 2.8

Step 7: Press the **"RELEASE"** button and hold for about 5 seconds
(Figure 2.9), then move the lifter away from the glass sheet (Figure 2.10).
Note: *Make sure the gauge indicators take it back to 0 before move the lifter out.*



Press

Figure 2.9

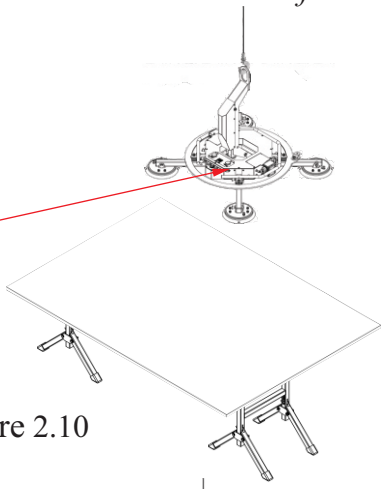
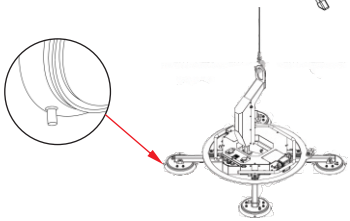


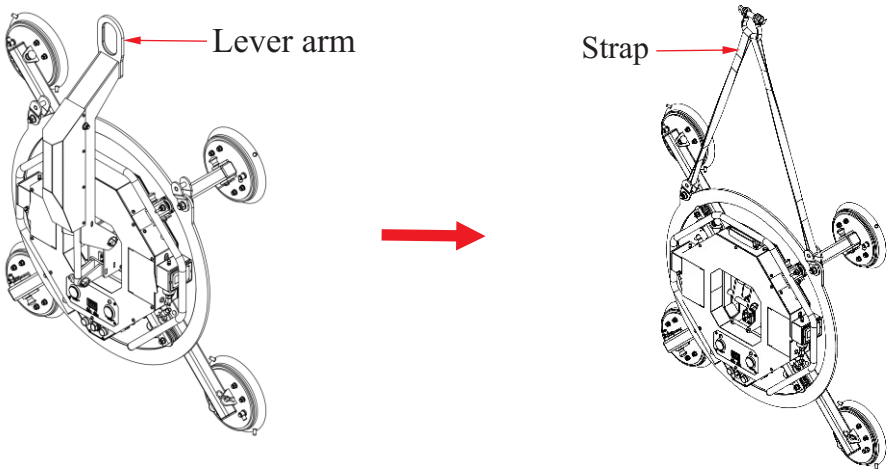
Figure 2.10

Note: *To faster move the lifter out of the glass sheet, use your hands to pull a rubber nipple on the vacuum pad.*



C. Using “STRAP and BOW SHACKLE” to lift the lifter:

Step 1: Remove the “Lever arm”, then attach the “Strap” to the lifter (Refer to Appendix IV.4).



Step 2: Hook the Rotary Vacuum Lifter into a crane hook (Figure 3.1).

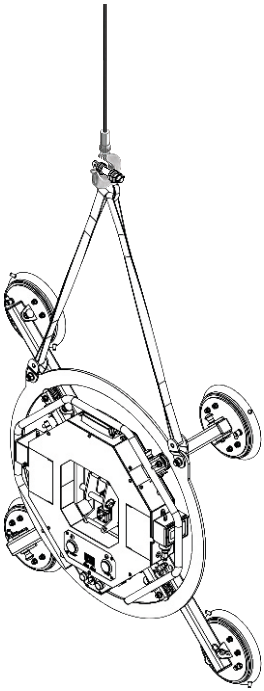


Figure 3.1

Step 3: Move the lifer close to the lifted glass (Figure 3.2)

Note:

- Adjust vacuum pads position to fit to the glass size (Refer to appendix)

- Ensure that the lifter is at the gravity center of the glass (Figure 3.3)

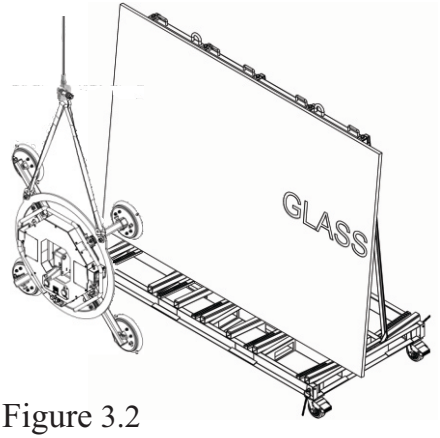


Figure 3.2

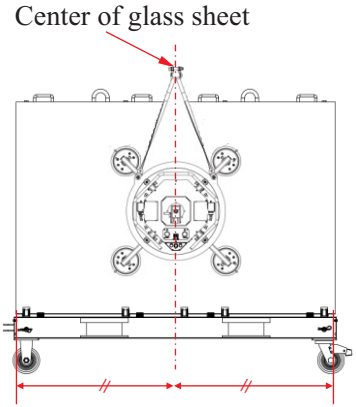


Figure 3.3

Step 4: Move the lifer close to the glass sheet surface (Figure 3.4 and 3.5).

Caution: *Make sure all of the vacuum pads touch the glass sheet surface at the same time with even spacing.*

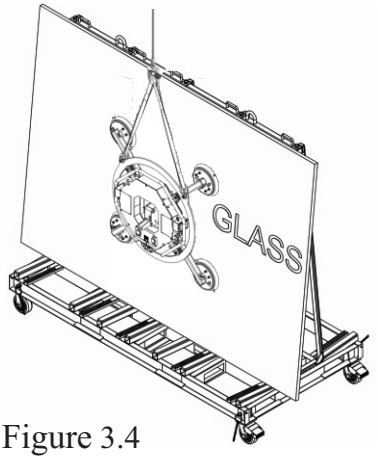


Figure 3.4

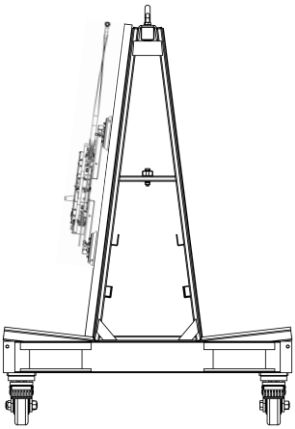


Figure 3.5

Step 5: Rotate the power switch to **"ON"** position to turn the power on (Figure 3.6). Then, press "**VACUUM**" button to vacuum the glass sheet.

Note: *When not in use, rotate the power switch to* ***"OFF"*** *position to turn off the power.*

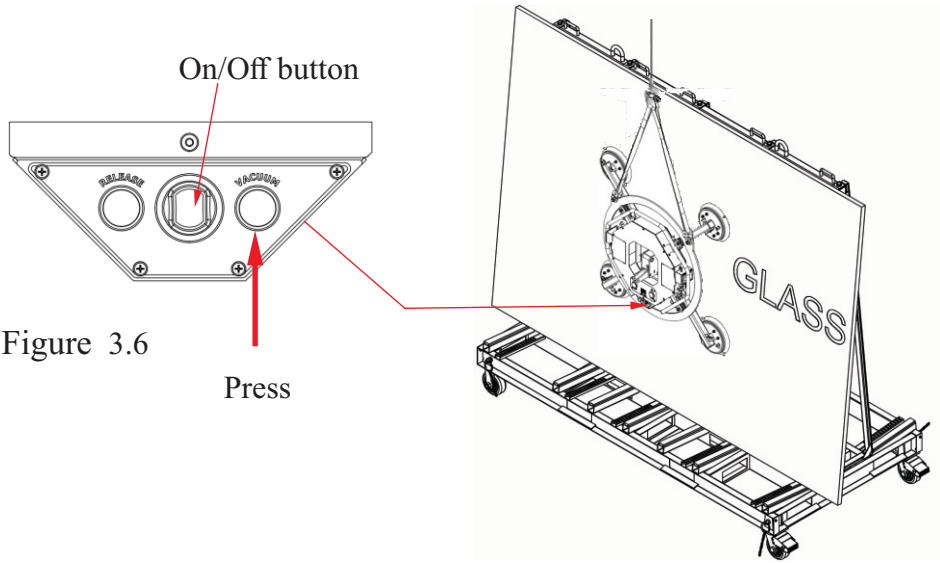


Figure 3.6

Note:

- After pressing the ***"VACUUM****" button, the gauge indicator shall turn down. Make sure the gauge indicator shows between* ***-70 kPa*** *to* ***-80 kPa.***

- Power switch is always be turned on during operation.

Step 6: Lift and move the glass sheet (Figure 3.7 and 3.8).

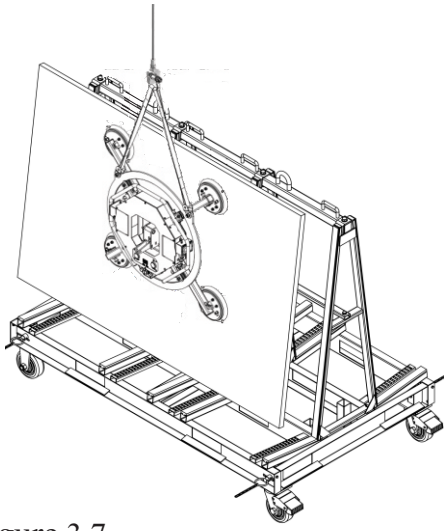


Figure 3.7

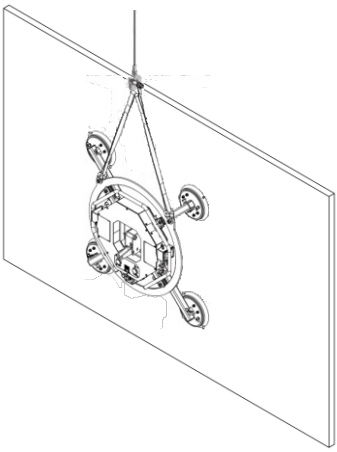


Figure 3.8

Caution: *Stand clear of the lifter and its load during the operation. No one is allowed to stand, pass or work underneath the glass sheet.*

Note:

- Confirm the pressure gauge indicators are showing between ***-70 kPa*** *to* ***-80 kPa*** *during vacuuming the glass sheet.*

- NEVER press ***"RELEASE"*** *button during vacuuming the glass sheet.*

- If the pressure reach over ***-60 kPa*** *during vacuuming the glass sheet, the vacuum pressure will automatic start again; then, operator need to stop the lifter and re-check.*

- During proper vacuuming the glass can be rotated 45°, 90°.

Step 7: Place the glass sheet at the desired location (Figure 3.9).

Caution:

- When lowering down the glass sheet, handle it carefully and slowly with best cares.

- Do not unlock the lever arm to adjust the angle from vertical to horizontal when vacuuming the glass sheet

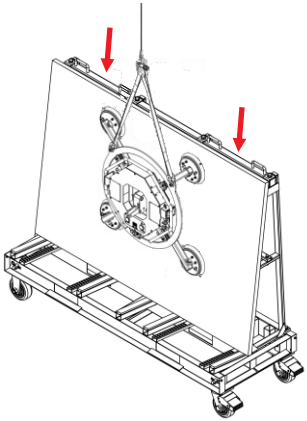
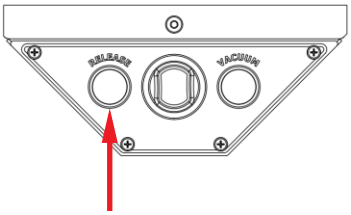


Figure 3.9

Step 8: Press **"RELEASE"** button (hold for about 5 seconds) (Figure 3.10), and move the lifter away from the glass sheet (Figure 3.11).

Caution: *Make sure the gauge indicators take back to 0 before removing the lifter out of the glass sheet.*



Press

Figure 3.10

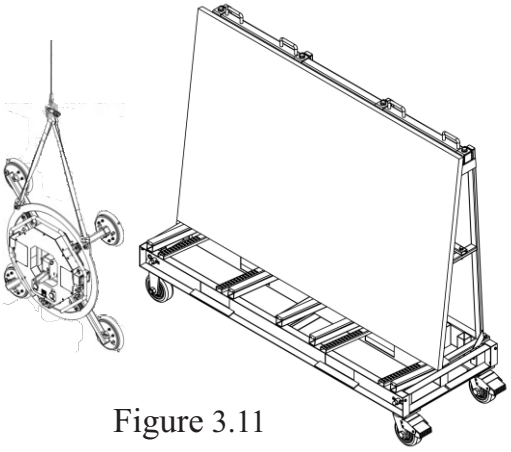
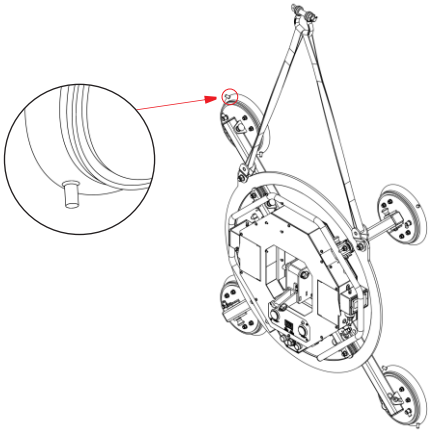


Figure 3.11

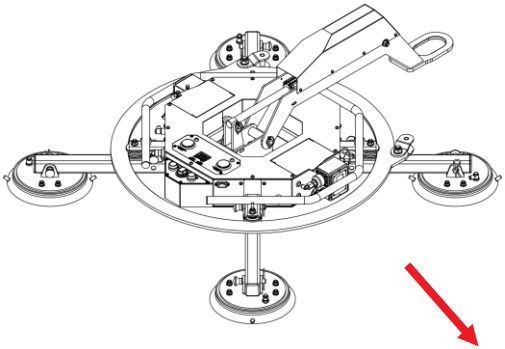
Note: *To faster move the lifter out of the glass sheet, use your hands to pull a rubber nipple on the vacuum pad.*



IV. APPENDIX:

1. Adjust the vacuum pad from Vertical to Horizontal:

Press the 90° button on the remote control (Figure 4.1) to fold the hanger bar vertically (Figure 4.2).



Press button

Figure 4.1

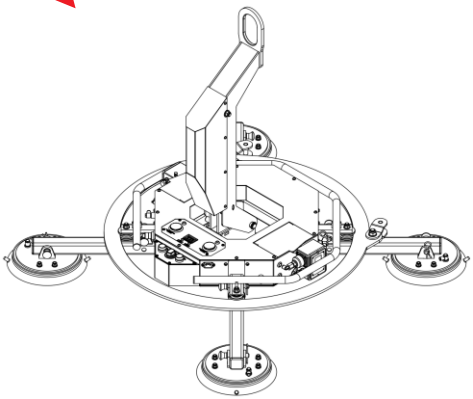


Figure 4.2

2. How to rotate the lever arm:

- Pull the handle (Figure 4.3) and rotate the lifter to desired angle.

Note: *The pin will automatically insert in the hole while adjusting the rotation angle.*

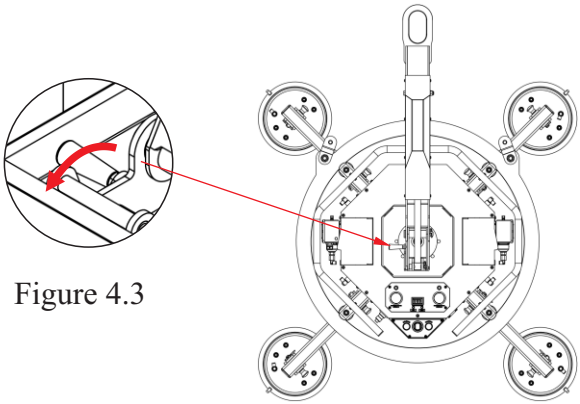
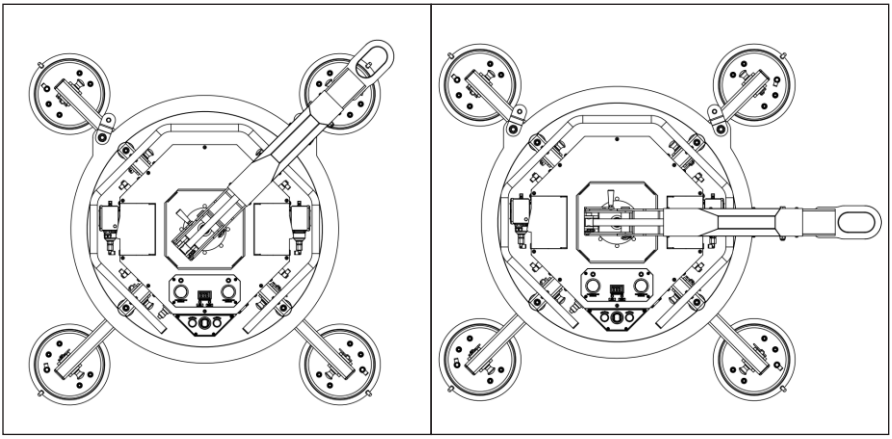


Figure 4.3



3. Adjust the vacuum pad position:

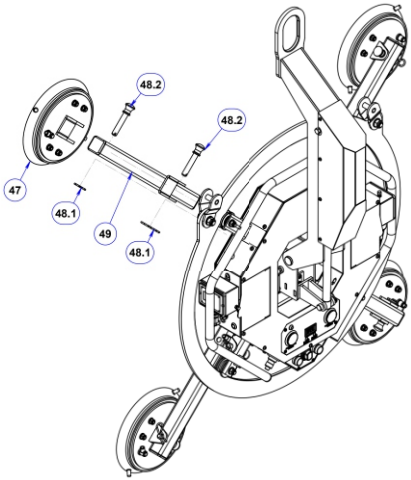
To remove the vacuum pads (47) out of connecting bars (49). And removing the connecting bars (49) out of the device.

By remove the snap pin (48.1) and the pin (48.2).

Adjust the vacuum pads position to suit the work load limit and dimension of the glass sheet.

How to adjust vacuum pads (Figure 4.4)

Note: *Carefully to maintain connecting bars, locking pin, and lynch pin to avoid loss.*



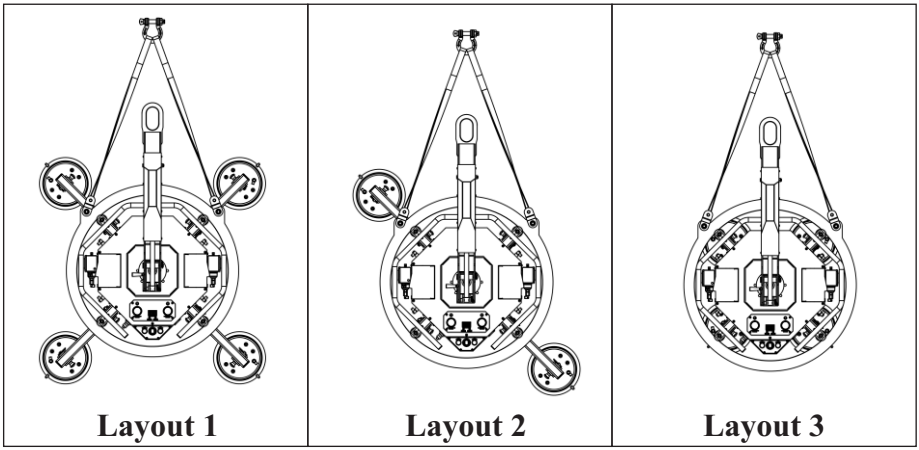
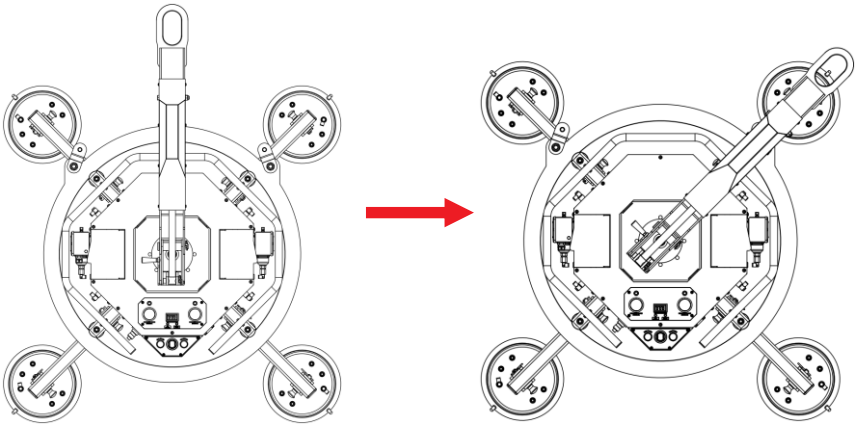


Figure 4.4

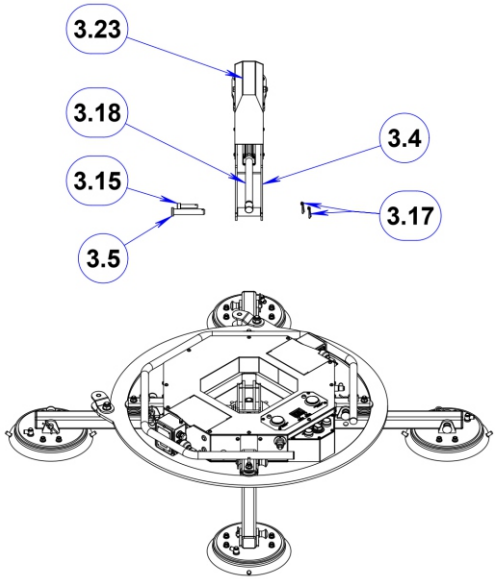
4. Remove the “Lever arm” to install the “Strap”.

Step 1: Rotate the “Lever arm” to 45° angle.

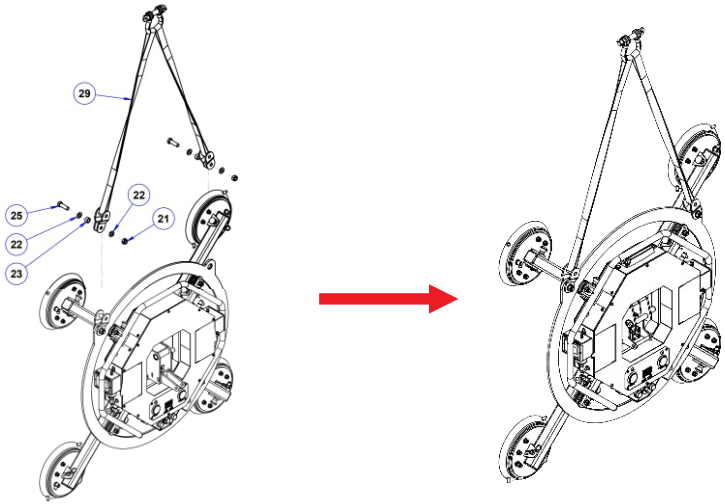


Step 2: Remove the lynch pin (3.17), the shaft (3.5) and one cylinder pin. Then take out the hanger bar (3.4), the cylinder (3.18), and the cover of cylinder (3.23) from the device.

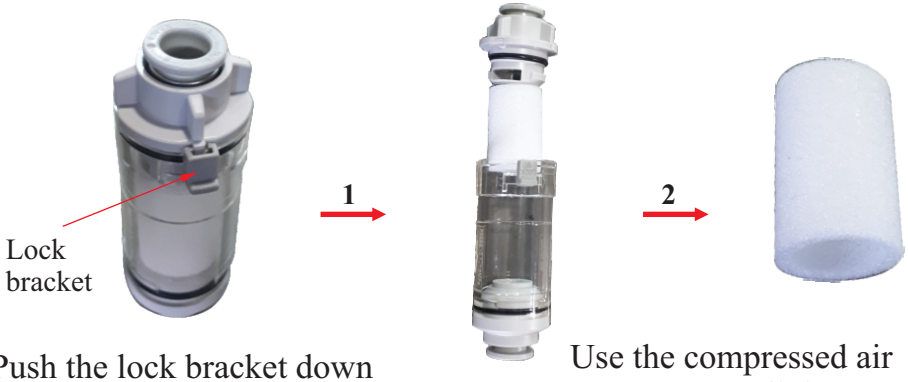
Note: *Carefully store all parts to avoid loss.*



Step 3: Install the “Strap” (29) to the lifter, secure it by using M16x50 bolt (25), Ø16 washer (22), spacer (23) and M16 lock nut.



5. To clean the air filter:



Push the lock bracket down and rotate to open the cover.

Use the compressed air gun to spray all dust on the filter.

Caution: *Do not use water or any solvent to clean the filter.*

- After the air filter has been checked and cleaned, reassemble it as the location of origin.

Caution: *It must be installed according to the correct direction of the valve.*

6. To clean the check (one-way) valve:

1

- Use a small screwdriver and carefully unscrew the check valve.

2

- Separate the check valve

3

- Clean by flushing water or wipe out any foreign object from inside the check valve.

Warning: *Do not use any solvent or petrochemicals to clean.*

Caution: *Make sure the rubber is not to scratch and to damage.*

4 After confirming that no dust or any foreign object inside then carefully reassembly the check valve back together. Tighten the screws little by little diagonally to fit the faces firmly.

Caution: *The check valve is a critical part, handle it with the best care.*

V. TECHNICAL PROBLEMS & SOLUTIONS:

Technical problems	Causes	Solutions
Vacuum pads do not vacuum sheet tightly	Vacuum pads have dust or damaged	Clean the surface of vacuum pad or replace with a new one
The gauge indicator cannot achieve vacuum from -70 kPa to -80 kPa	Damaged pipes, air leakage in tubes and valves	- Inspect the piping by using diluted neutral soapy water to find suspected leaks - Then repair or replace the tube or device
Led sign is not bright	Damage or out of work	Replace with the new led
The battery cannot achieve to 13V	The battery is damaged or not functional	Replace with a new battey
The equipment cannot vacuum the glass sheet	Vacuum pads of two system not close enough to the glass surface	Give a slight press to each vacuum pads

VI. INSPECTIONS AND MAINTENANCE:

- Regularly check the equipment, especially the vacuum pads, to ensure it is in good working condition.
- Air valves and tube must be inspected regularly.
- Always keep necessary spare parts on hand always for immediate maintenance or repair purposes.
- Regularly check the tightening conditions of all bolts and nuts.
- Operator must keep the lifter clean and away from grease or other substances as they may reduce rubber pads' effectiveness and cause them to loss their vacuum.
- Monthly clean and lubricate movable joints.
- Store this equipment in a well-ventilated place (dry and cool); avoid high heat and/or humidity.

VII. WARRANTY POLICY:

At the time of delivery, it is necessary to inspect the **Rotary Vacuum Lifter (ARVL500)** to make sure that it has not been damaged during shipment. The product at the time of dispatch is warranted to be free of defects in material or workmanship.

Claims for errors, shortages, defects, or nonconformities ascertainable upon inspection must be made in writing within eight business days from the date of product delivery. Claims not made as provided above and within the applicable time period will be barred and no other claims will be considered.

We provide a one (1) year warranty on the **Rotary Vacuum Lifter (ARVL500)** from the date of purchase.

During warranty period, we will provide the replacement parts at no charge (Please note: shipping and handling fees may apply).

Warranty coverage is void if:

- The operator failed to comply with the instructions in the manual.
- The specifications in this Manual were not applied properly to the device during operation.
- Damage is due to inadequate maintenance and inspections.
- Damage is due to improper storage and/or usage.
- Modification and repairs made to the equipment were performed by the user/operator without the manufacture's knowledge and agreement.
- Aftermarket or none genuine spare parts were used for repair and installation.
- Modification and repair installations were conducted by uncertified individual.

WARRANTY CERTIFICATE

You are kindly requested to read the following carefully.

PERIOD

The warranty starts from the date of purchase (date on distributors invoice).

Warranty is valid for a period of twelve (12) months.

WARRANTY

This warranty is limited only to provide replacements of the parts recognized by the Company as defective (excluding worn-outs and consumables.)

The Company is not responsible for any misuse or abuse of the product after purchase and/or caused by negligence from the content of this manual.

In an event of equipment failure to operate the machine and/or requiring technical support, operator/user is requested to contact with our Customer Support Department. Our member will inform you (operator/user) of the appropriate procedures accordingly and how to file warranty claim and advise you to your nearest approved service center.

EXCLUSIONS

Warranty does not apply for damages or failures caused by:

Misuses, errors in transportation, incorrect handling or failing to maintain the equipment appropriately.

Use of non-genuine parts/accessories, or of incorrect specifications.