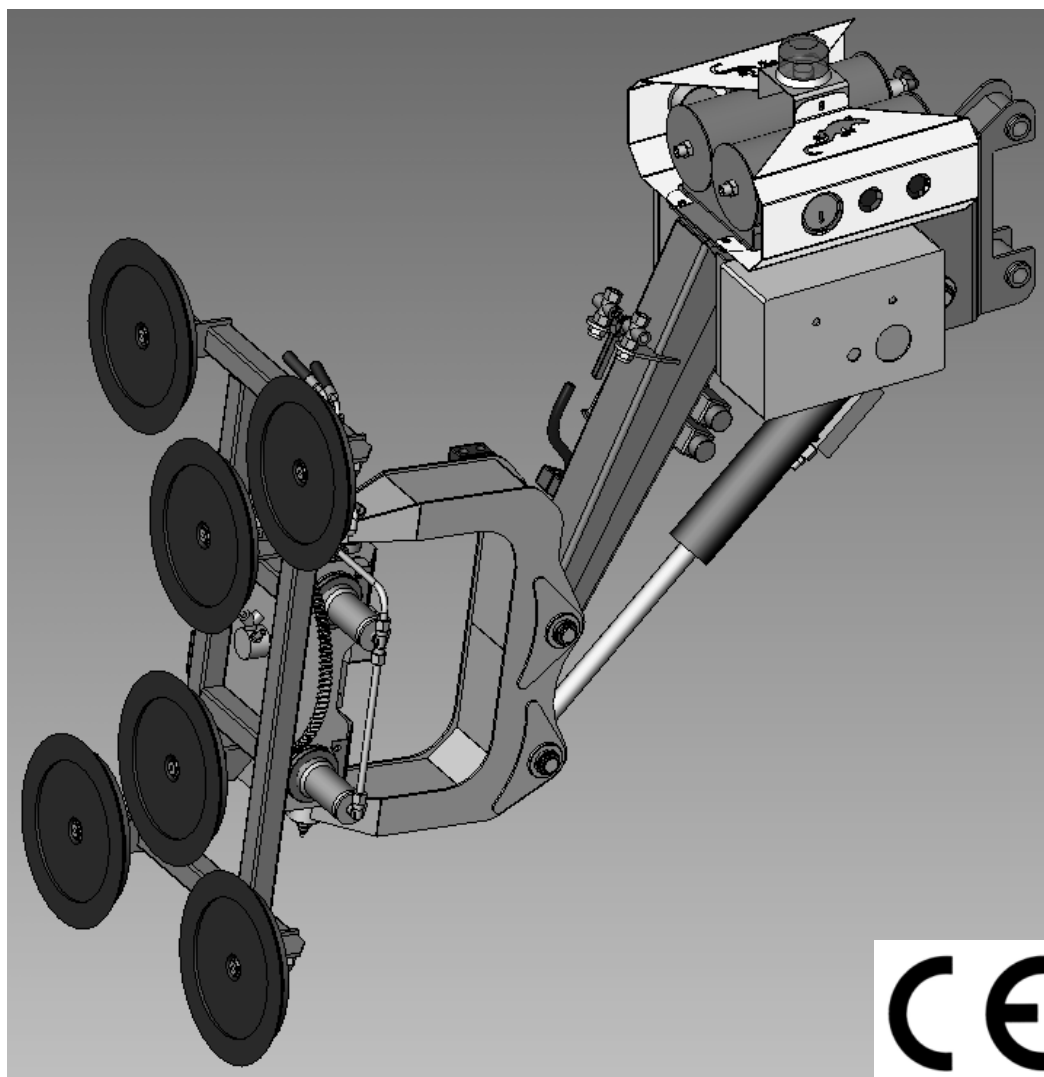




**VACUUM MANIPULATOR
MV 300.3**

SERIAL NUMBER:





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MANUAL REVIEW		
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Conventions:

Qualified technicians: people who have the necessary expertise, skill and knowledge concerning the standards, safety regulations and service conditions, to recognise and avoid any possible danger for people and damage to the processed materials and to the machine itself.

Right side: Right side of the system, as identified by the operator positioned in the back part of the crane, in front of the switchboard and of the valve bank.

Left side: Left side of the system, as identified by the operator positioned in the back part of the crane, in front of the switchboard and of the valve bank.

Marking

 <p>Modello _____</p> <p>Numero di produzione _____</p> <p>Anno di produzione _____</p> <p>Peso _____ kg</p> <p>IMAI s.r.l. Via Campardone, 7 - Zona Industriale Colle Umberto (TV)</p>	<p>On the right side of the crane frame there is an identification plate bearing the machine's model, manufacturing number, year of manufacturing and weight. Model and number are also punched closed to the plate. The machine is supplied CE-marked where required by the market. The CE marking means that the machine meets the EU's requirements.</p>
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1.2 Machine description

The vacuum manipulator **MV 300.3** has been specifically designed to allow the operator to handle glass panes efficiently and safely.

MODEL	MV 300.3	Minimum plate dimension	1100 x 750 mm
Maximum SWL	300 Kg		
Weight	140 Kg	Vacuum capacity	0.75 Bar
Tension	24V DC	Function	Vertical hydraulic rotation 70° Hydraulic tilting Horizontal hydraulic rotation 360°continuous
Power	150 W	Frame	6 plate

2 SAFETY INFORMATION

The designing and manufacturing of this machine is based on specific safety criteria in compliance with the rules and regulations indicated on certificate CE:

A careful risk assessment, carried out by the manufacturer, has allowed to remove the major risks connected both to scheduled and to rationally foreseeable operative conditions. Complete records about safety measures adopted can be found in the technical manual of the machine, which is kept by the manufacturer.

The manufacturer strongly recommends to follow all operative instructions and procedures herein described and to observe all safety rules at work, above all as regards both personal protection equipment and machine safety equipment.

2.1 Rules

Some operative rules should be applied in order to best preserve environment and the operator's safety.

The operator

- He must be a healthy person
- He must be responsible
- He must have sense of direction
- He must act with circumspection when operating with the machine and be able to estimate dangers and working conditions.
- He must have quick reflexes.
- He must have very good powers of concentration.
- He mustn't be used to drink alcohols and to take drugs!

The operator must not wear:

- rings;
- watches;
- jewellery.
- torn clothes;
- scarves;
- unbuttoned shirts or smocks;
- jackets not zipped up;
- other clothes which could cause dangers with parts in motion

General directions

1st regulation

- Preserve your own safety!
- Preserve environment and animals!
- Take care nobody is exposed to dangers!
- Don't get on the machine, slipping danger!



2nd regulation

- Use personal protection equipment! (DPI)
- Be careful about sharp corners!

3rd regulation

- Prohibit unauthorized and untrained staff from using the machine!
- In case of alternation, the manual must pass from one to the following operator.
- Always operate with calm, precision and concentration!

Keep the machine clean in all of its component parts: handling members, switchboard and signalling apparatus.



- Don't smoke.
- Don't use open fires.

2.2 Noise



If workers are exposed to a time-weighted average (TWA) sound level of 85dB or more, hearing protectors are recommended. Hearing protectors must be worn by all operators exposed to a TWA of 90dB or more.

2.3 Conveyance of instructions

This chapter of the manual is intended to facilitate possible operations in case of change of operator and in case of inheritance of the machine due to sale.

THE OPERATIVE RESPONSIBLE OF THE MACHINE IS
THE ONE WHO,
having picked up the machine at the manufacturer's,
ACCEPTS THE ROLE OF OPERATOR.

BUT

the machine can be picked up for the purchaser by someone else, who won't be the final operator or owner.

① In this case, the one who picks up the machines will not be responsible for them, but **WILL TAKE UP THE ROLE OF "TEMPORARY OPERATOR" ONLY UNTIL THE MACHINE IS DELIVERED TO THE PURCHASER.**

① Each "temporary operator" must receive the machine operative instructions from the manufacturer and convey them to the person who, later, will be the effective machine **OPERATOR.**



BE CAREFUL!

When in the firm the same machine is to be used by more than one operator, working instructions as well as the use and maintenance manual must be conveyed to all the operators in charge of the machine.

How to convey the machine instructions

Train the new operator (or the new owner) properly.

- Make sure the operator understands instruction on safe operating and safety devices.
- Make sure the operator understands the information pertaining the machine's dangerous zone and component parts.
- Give the operating manual to the new operator (or to the new owner) and explain its contents to him.
- Tell him about the existence of the Declaration of Conformity and of the CE marking.
- In case of resell, give the Declaration of Conformity to the new owner, and tell him about the hallmarks.
- Be sure the new operator has correctly understood the instructions and has no doubts about the machine's functioning.





How to prove the conveyance of instructions

Considering that a proper knowledge of the machine is absolutely necessary and that the operator, when ends its operative role, is no more responsible for it, we have prepared some forms intended to prove the machine has been correctly picked up at the manufacturer's site (**Declaration of responsibility**) and it has been properly conveyed in case of resell.



Lacking or incorrect conveyance of instructions and of the manual could cause involvement in (also penalty) punishment in case of environmental damage or harm suffered by persons, things or animals.

IN SHORT

-  *Inform and train the new operator*
-  *Give him the manual and highlight safety instructions*
-  *Fill in the form in all details and sign it*
-  It is in the conveyor's interest to take and keep a copy of the page proving the correct conveyance.

2.4 Dangerous zones

There are some very dangerous zones near the machine.
The dangerous zone is determined by the field of action of the crane.



It is absolutely forbidden to stay under hanging loads



There could be further dangers in the working area: please, observe the following rules



Don't work near electric wires, danger of death in case of contact with electric wires. While working, keep the following minimum distance from the power line:

Volt (V)	Min dist. Insulated electric wire	Min. dist. uninsulated electric wire	Place of wires
< 500	0.5 m	2 m	Buildings
500-45.000	1.5	4 m	Tram, trains
>45.000	Not in use	6 m	High tension Power-lines

2.5 Emergency stop

Note: This procedure can be performed in any moment.

In compliance with the safety rules in force, the machine has been provided with emergency devices. They must be operated to reduce the stopping time when the usual stop procedure would not enable actual or impending danger to the operator or to the machine itself to be averted.



CAUTION!!!

Before putting the machine back into service, remove the cause of danger.

Location of emergency devices

The machine has been provided with several types of emergency devices.

- Emergency push-button - located on machine **main switchboard**
- Emergency push-button - located on machine **radio remote control**

About emergency devices

The main features of the installed emergency devices are:

Mushroom-shaped emergency push-button;

PUSH the mushroom-shaped button to stop the machine.

Machine back into service after emergency

In order to avoid unintended start-up, the emergency state remains active until the machine is put back into service.

To put the machine back into service:



Note: Before putting the machine back into service, remove the cause of danger.

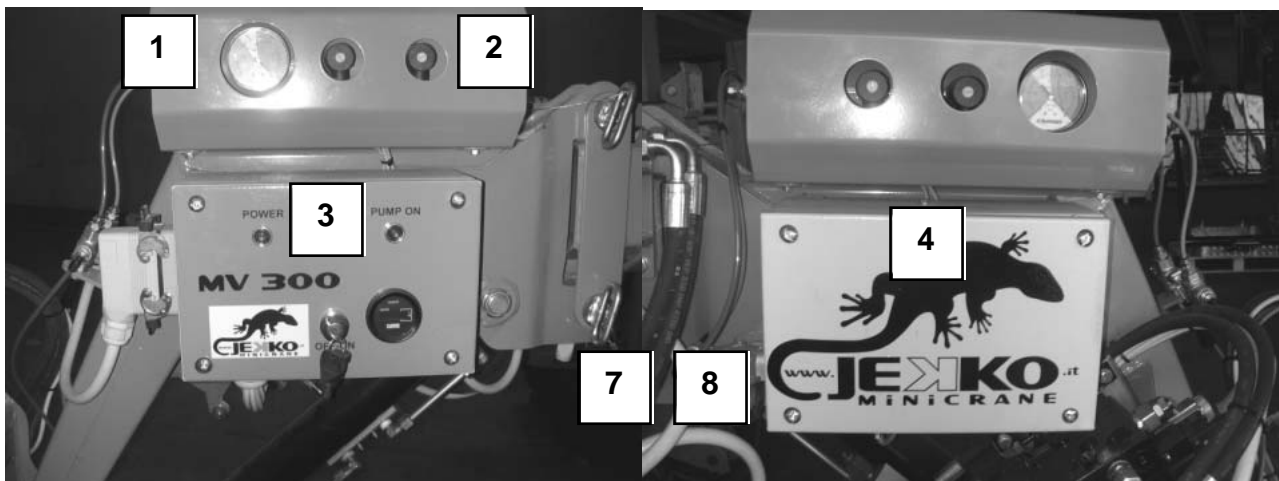
- Find out the push button used to activate the emergency state;
- Rotate the mushroom-shaped button in the direction indicated by the arrows printed on it;
- The push-button is now back in service and the machine is ready to work.

3 DESCRIPTION OF THE MACHINE

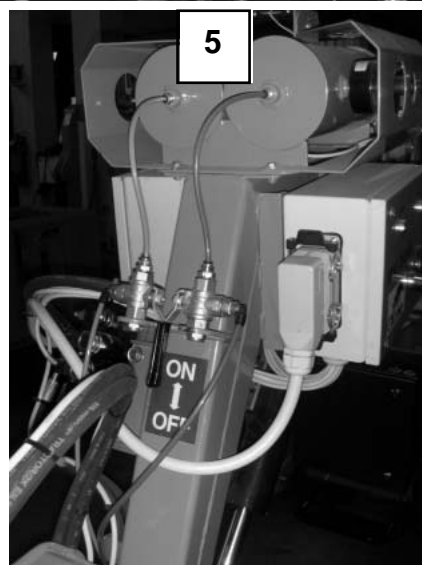
3.1 Structure of the machine

1. Bearing frame made of high-resistance steel tube. It is overdimensioned and equipped with all the machine units.
2. Hydraulic tilting unit with 360° continuous hydraulic rotation
3. Excellent industrial suction cups allowing the glass pane blocking
4. Pneumatic system for the glass pane blocking by means of a manual control
5. Electric installation consisting of a vacuum pump engine and an external switchboard equipped with cutout switch
6. Hydraulic system for slewing and swinging

3.2 Main elements of the machine



Ref.	Description
1	Pressure gauge
2	Vacuum gauges
3	Electrical cabinet
4	Vacuum pump box
5	Air receiver
6	Manual valve



3.3 Installation of the vacuum manipulator

Upon receipt of the equipment, carry out its installation on the workplace after considering the machine dimensions. Connect the vacuum manipulator to the lifting boom of the crane to be used for the glass pane handling.



The accessories supplied are intended to be installed and used exclusively on the jekko line machines for which they are designed and manufactured. The manufacturer declines all liability deriving from non-intended uses.

- 1- Stabilize the machine.
- 2- Remove the rope block and weights, connect the plug to the limit micro-switch cable, wind the cable and fix it to the metal eyelet located under the crane boom (fig. 1)
- 3- Turn the faucet lever to the “manipulator” position (fig. 2)
- 4- Bring the boom near to the manipulator
- 5- On the switchboard, set the presence of manipulator **1M**. For further details, see the manual of the basic machine.
- 6- Connect the quick couplings (line 1 first and then line 2) and the connector which are located on the boom tip (fig. 3)
- 7- Insert the joint unit using both the manipulator and the crane controls
- 8- Insert the two pivots as well as the break pins.

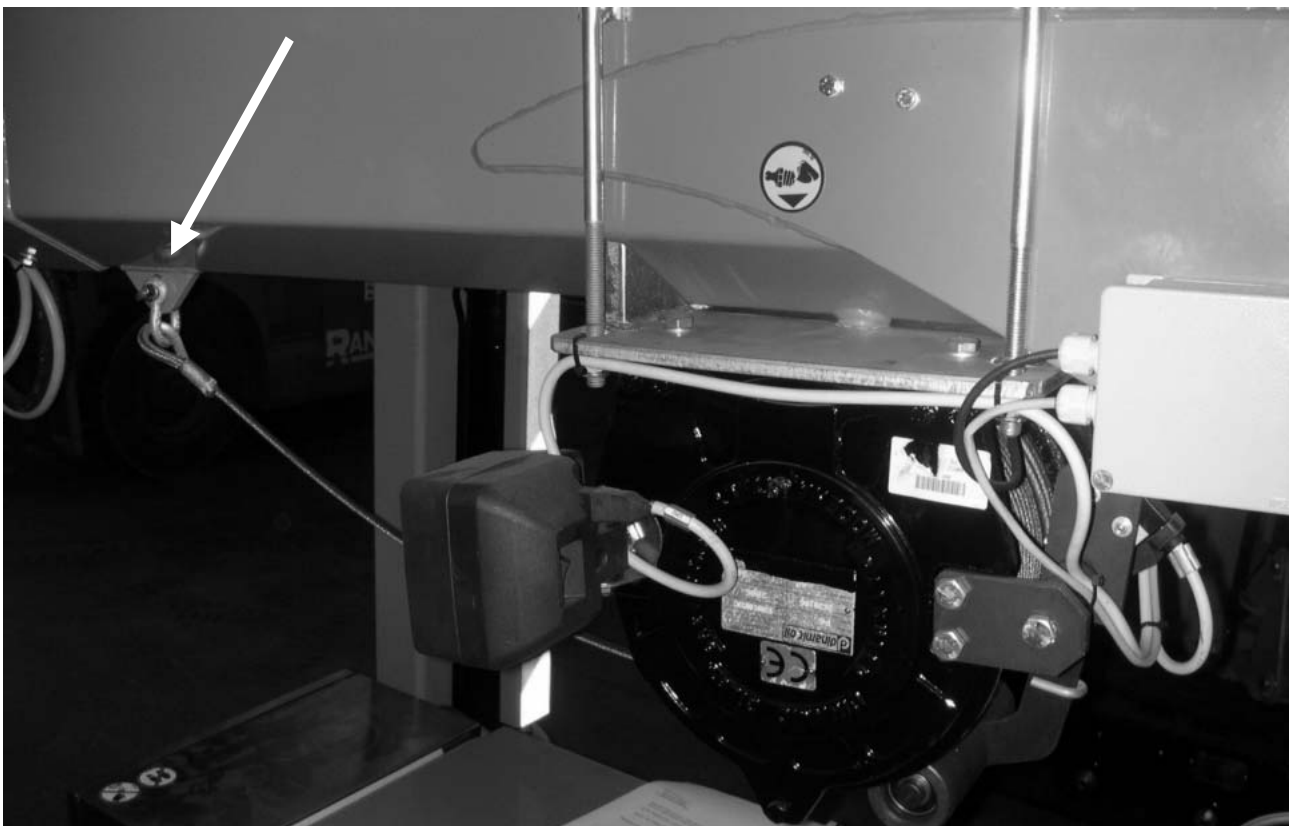


Fig. 1

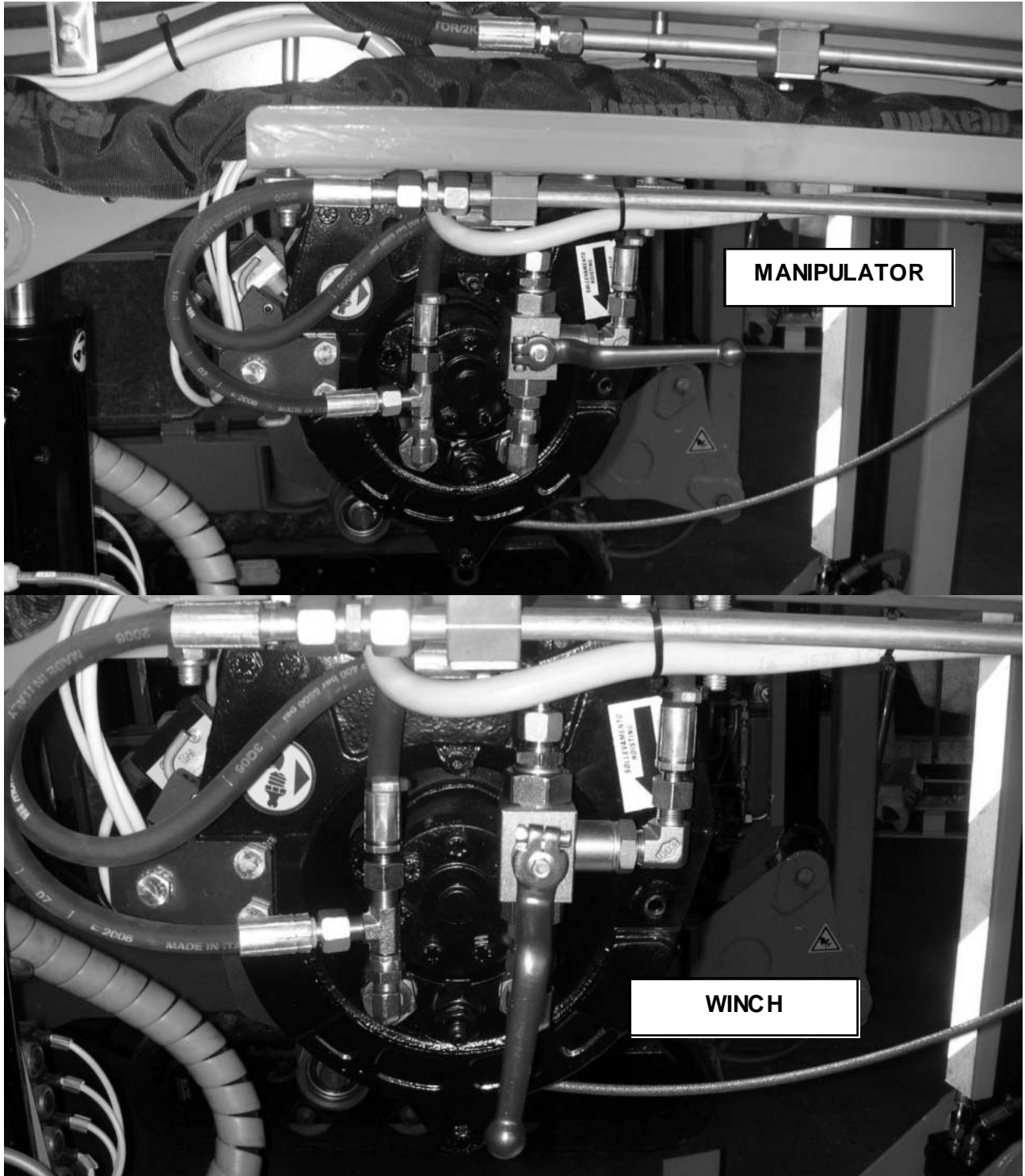


Fig. 2

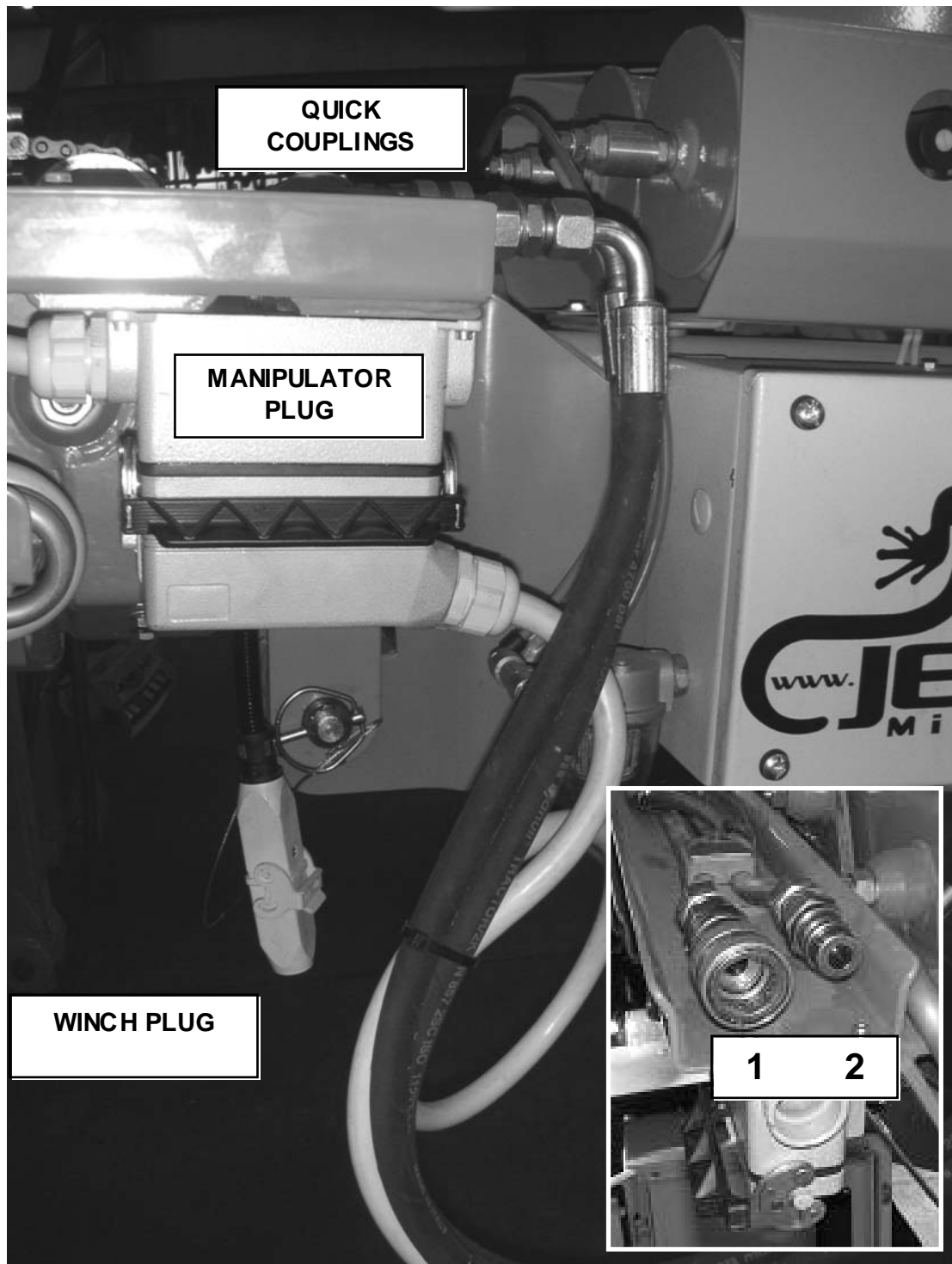


Fig. 3



CAUTION!!!!!!

The plug is exclusively needed to give the handshake to the crane movements when neither the Jib nor the winch are connected.



CAUTION!!!!!!

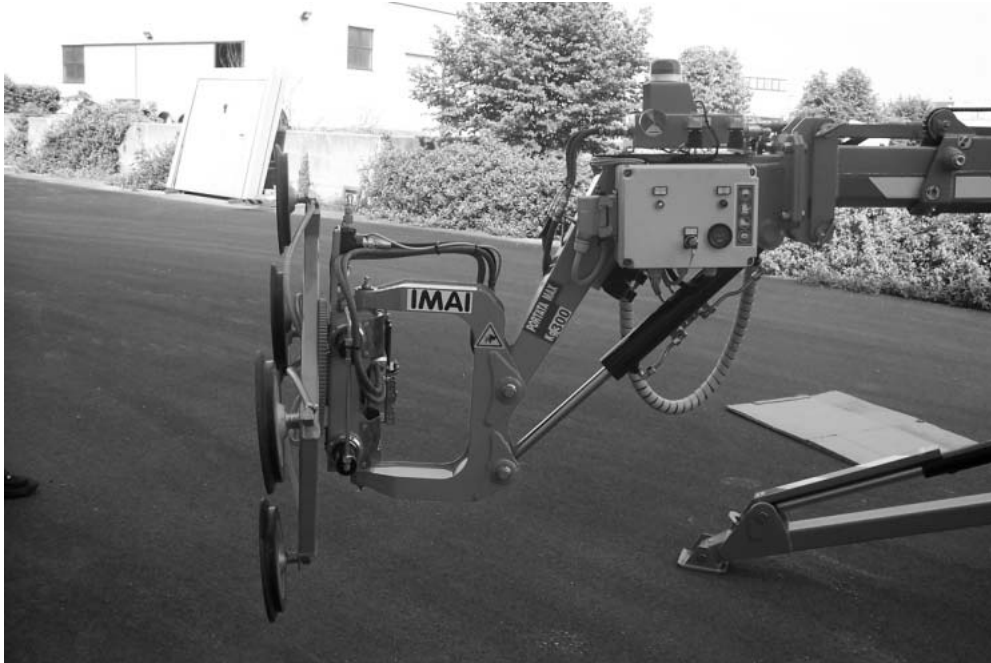
When the manipulator is connected to the crane, the winch is automatically deactivated.



When disconnecting the kit hydraulic feeding in order to remove the kit from the machine, first disconnect line 2 and then line 1. A different procedure might generate dangers deriving from high-pressure fluid jets!!!

Assembly of the manipulator

The manipulator can be assembled according to two configurations (A or B).
The assembly procedure is the same in both cases.



Configuration A



Configuration B

4 USE OF THE MACHINE IN REGULAR WORKING CONDITIONS

4.1 Daily inspection before using the machine

Inspection operations to be carried out daily before starting the machine:

1. Check the absence of material damages on the suction cups
2. Check that the suction cup lips aren't torn or damages; also check the suction cup quality and cleanness
3. Check that the suction cup connections are steady, especially the accessory quick coupling/release
4. Check that the electric connections are safe and the sockets aren't damaged
5. Check the slewing and tilting movements
6. Check that the load to be lifted suits the suction cup
7. Check the steel structural work conditions
8. Check the conditions of the hydraulic and vacuum systems

4.2 Starting and use



It is forbidden to use the machine in weather-beaten places.



CAUTION!!!!

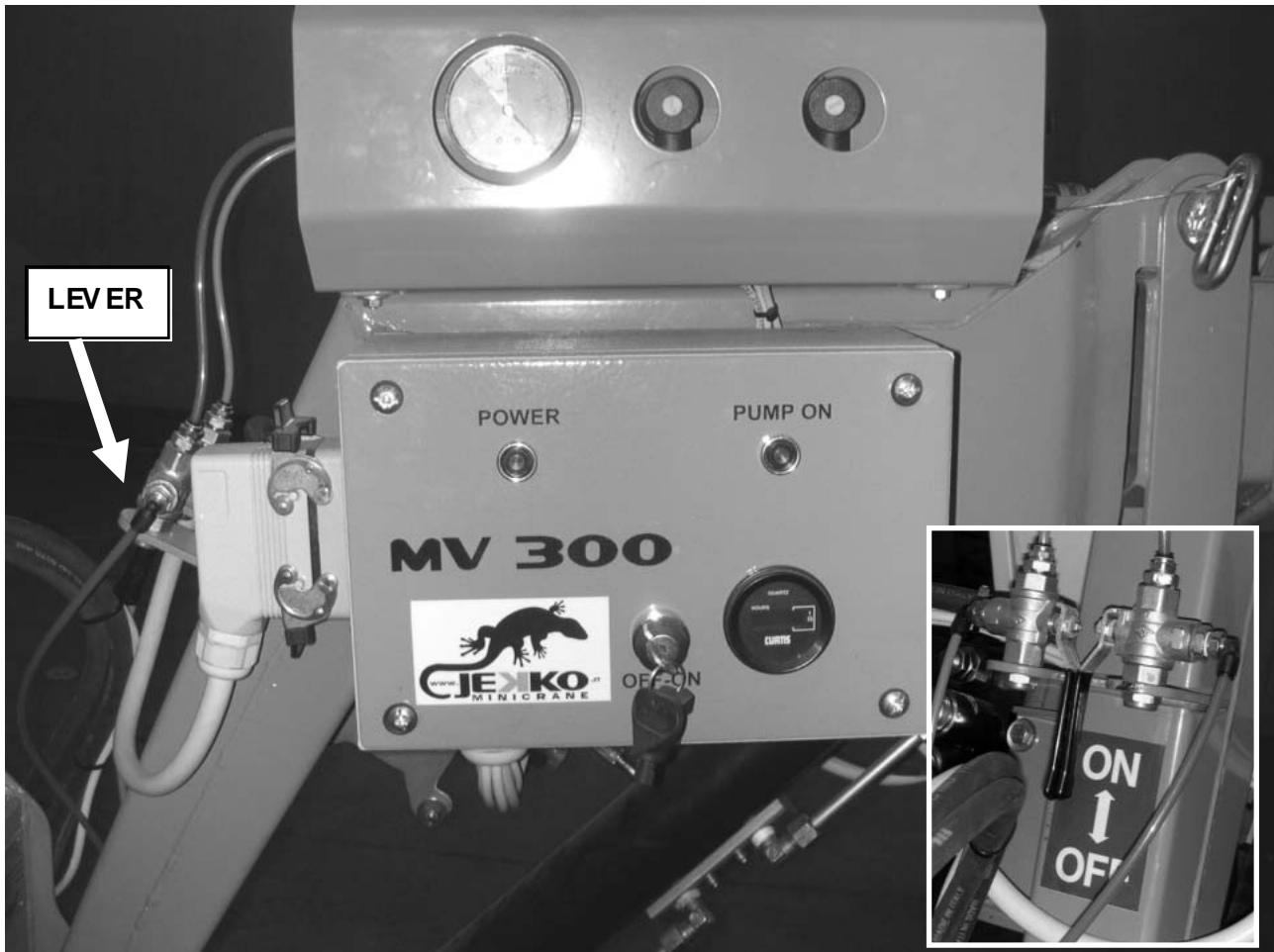
The surface of the glass pane to be lifted, and on which the suction cups will be applied, has to be perfectly clean and dry and free from dust and dirt residues in order to avoid the system damage as well as the sudden release of the lifted load.



CAUTION!!!

Make sure that the crane is perfectly stabilized before using the vacuum manipulator.

Inspection before lifting:



- Operate the pump by turning the cutout switch on the **ON** position - the flashing light and the siren are activated
- Turn the manual lever (**L**) on the **OFF** position and check that the siren switches off when the needle of the pressure gauges reaches the green zone (approx. 0.7 Bar)
- Wait some minute and check that the pressure doesn't decrease and the needle remains within the green zone
- Turn the cutout switch on the **OFF** position and turn the manual lever (**L**) on the **ON** position in order to empty the system

Glass pane anchor

- Bring the vacuum manipulator near to the glass pane to be lifted up by using the crane and manipulator controls
- Arrange the vacuum manipulator on the glass pane in a position suitable to the pane weight and dimensions - **NB: the glass pane barycentre has to be within the area defined by the suction cup, at most 15 cm beyond, otherwise it is very likely that the glass pane and/or the manipulator hydraulic mechanisms should break!!**

- Make sure that the manual lever (**L**) is on the **ON** position
- Start the pump by turning the cutout switch on the **ON** position - the flashing light and the siren are activated
- While the pump is working, press all the suction cups lightly in order that they adhere to the glass pane
- When a 0.6/0.7 Bar pressure is reached (green zone), the engine and the siren switch off and the glass pane is ready to be handled.

Glass pane release

- After positioning the load in the intended place, make sure it is in a safe and steady position in order not to fall when the suction cups will release it
- Turn the manual lever (**L**) on the **OFF** position and release the glass pane
- The vacuum manipulator is now ready for the next operation.



In case of leaks, the pressure decreases and when it reaches the alarm point (yellow zone), the engine and the siren are activated in order to reproduce the vacuum and bring the needle back in the green zone. If the leaks are massive and the pressure falls suddenly to the red zone, the engine goes on working without stopping, but it is necessary to lay down the load as soon as possible (**DANGER OF GLASS PANE RELEASE!!!!**)

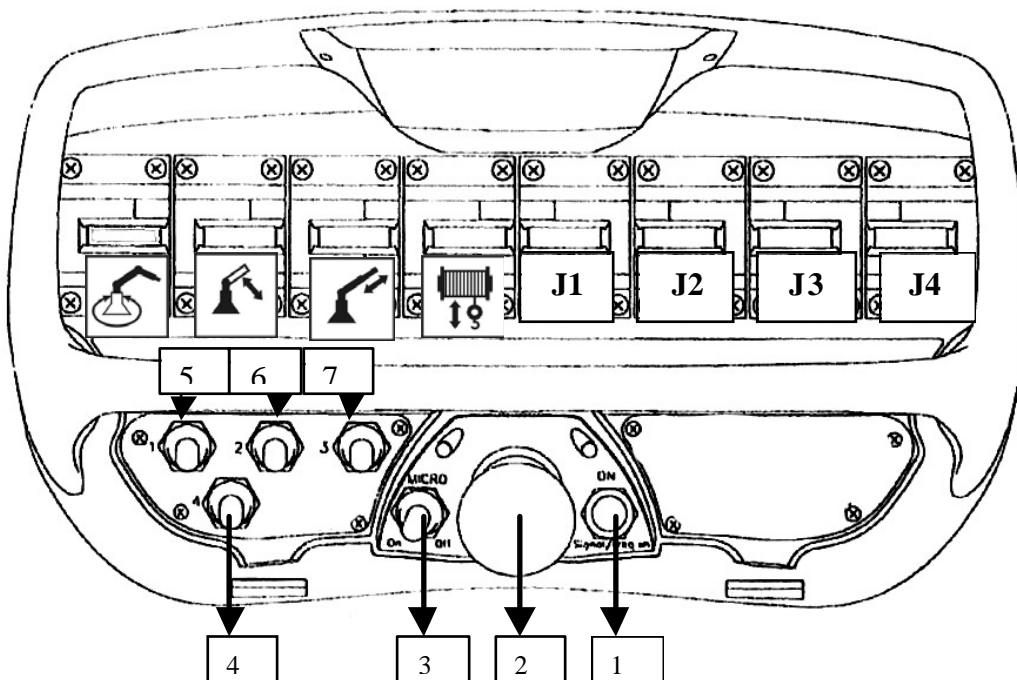
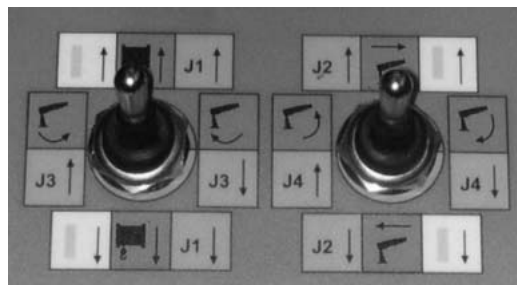
USE OF THE VACUUM MANIPULATOR:

Slewing and swinging



Before rotating the glass pane, check its dimensions and make sure its weight is evenly distributed by centring the suction cup on its surface.

Use the controls on the switchboard or on the crane radio remote control (J1 J2 J3) to handle the glass pane by exploiting the three moves of the vacuum manipulator.

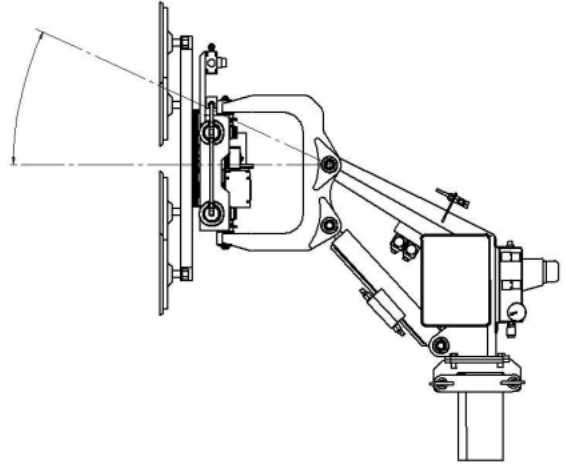


Ref.	Description
1	ON activation of the radio remote control and frequency change during operation
2	Emergency push button
3	Optional
4	Adjustment of the crane working speed SLOW/FAST
5	Adjustment of movement ONLY CRANE-ONLY MANIPULATOR-CRANE+MANIPULATOR
6	Diesel engine start/stop
7	Optional

Controls:

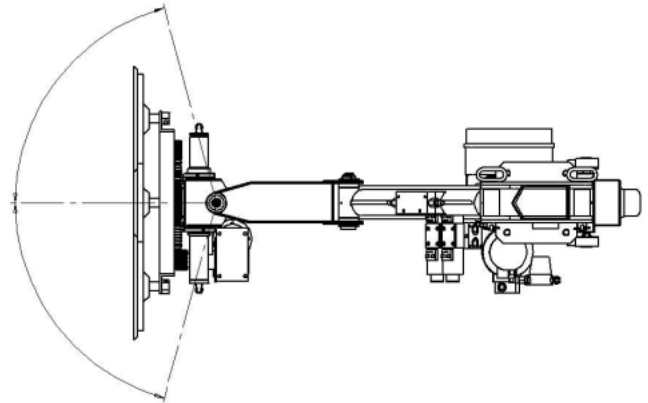
J1

- **UP: swinging upwards**
- **DOWN: swinging downwards**



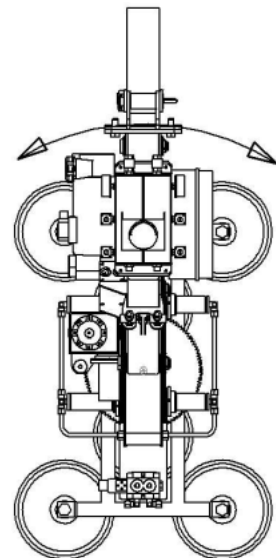
J2

- **UP: clockwise vertical slewing**
- **DOWN: counterclockwise vertical slewing**



J3

- **UP: clockwise horizontal slewing**
- **DOWN: counterclockwise horizontal slewing**



CAUTION!!!!!!

MOVE J2 OR J3 CAN BE CARRIED OUT AT THE SAME TIME AS J1, WHILE J2 AND J3 CANNOT BE OPERATED SIMULTANEOUSLY.

DANGER OF DAMAGING THE MANIPULATOR AND BREAKING THE GLASS PANE!!!!



CAUTION!!!!!!

IT IS STRONGLY RECOMMENDED TO POSITION THE SUCTION CUPS IN ORDER FOR THE GLASS PANE BARYCENTER TO BE WITHIN THE AREA DEFINED BY THE SUCTION CUPS, AT MOST 15 CM BEYOND, OTHERWISE IT IS VERY LIKELY THAT THE GLASS PANE AND/OR THE SLEWING UNIT SHOULD BREAK.

4.3 Vacuum manipulator stop

- Turn the cutout switch on the **OFF** position
- Turn the manual lever (L) on the **ON** position in order to empty the system
- Turn the manual lever (L) on the **OFF**



When the equipment is not in use, put it at rest in a dry and weather-protected place.

7.4 Vacuum scheme

