



Millennium - E



Owner's Manual



Welcome to the OLYMPIA Advantage

The OLYMPIA MILLENNIUM - E has been designed and built to deliver trouble free performance. Like all mechanical equipment however, trouble free operation is based on complete and ongoing maintenance procedures being adhered to in order to validate your Resurface Corp. warranty.

We have included a maintenance log form at the back of this manual to assist you in maintaining a permanent record of your maintenance program. Please copy this form to provide additional pages as needed.

The operational and maintenance procedures outline a step by step process that should be followed precisely. A variety of safety and performance- enhancing options are available and may be ordered on any model.

The illustrations and product information contained in this manual were current at the time of publication. In order to continue Resurface Corp. 's development of its ice resurfacing technology, Resurface Corp. reserves the right to change designs, models and specifications without notice and without liability for such changes.

The components in your OLYMPIA ice resurfacing machine are warranted against defects in material and workmanship by Resurface Corp., for two full years from the date of delivery.

For continued safe, economic operation and to validate the Resurface Corp. warranty, the balance of your OLYMPIA ice resurfacing machine should be strictly maintained under the guidelines outlined in this manual.

ALL WARRANTY REPAIRS MUST FIRST BE AUTHORIZED BY

RESURFACE CORP. OR AN AUTHORIZED DEALER

No warranty on this machine will be honoured by Resurface Corp. other than that stated above.



Millennium-E

Owner's Name:

Address:

.....

.....

Serial Numbers:

Ice Resurfacers:

Battery Charger:

Batteries.:

Water Cart.:

Controllers.:

FL FR

RL RR

Auger Vertical

Auger Horizontal

Hydraulic

Motors:

FL FR

RL RR

Auger Vertical

Auger Horizontal

Hydraulic

Gear Boxes:

FL FR

RL RR

Conditioner Size:

Options:

.....

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Dear User!

Before you put your OLYMPIA Ice Resurfacer into operation, please take the time to carefully read this operating manual.

Pay particular attention to the safety instructions given throughout the manual and to Chapter 1, Safety.

This is a prerequisite for...

- Safe handling and operation of the ice resurfacer,
- Trouble-free operation of the machine.

Always keep the operating manual in the vicinity of the ice resurfacer.

Note:

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1 SAFETY

1.1 Pictograms Used

Throughout the texts in this manual and in part, on the ice resurfacer itself, you will find, among other things, the following pictograms:



Imminent danger that can result in death, serious bodily injury, or major material damage.



Warning about dangerous electrical voltage.



Warning about hazardous movements that can result in hand injuries.



Warning about blades, sharp edges, and similar, that can result in cutting injuries.



Warning about potential explosion.



Application tips and other useful information.

1.2 Generally Applicable Safety Instructions

- Please study the operating manual with due attention before starting the first resurfacing operation. Always remember that you are responsible for an ice resurfacer that weighs several tons.
- The ice resurfacer has been built and designed in compliance with Canadian and international safety standards, so that it can be used without risk.
- To operate the ice resurfacer safely, you must follow the safety instructions.
- The OLYMPIA may only be operated when there are no people on the ice and no objects on the ice surface.
- Sound the horn when you drive through areas in which pedestrians may be present, where your view is restricted, and when you drive onto the ice surface or leave the ice surface again.
- No passengers are allowed on the ice resurfacer at any time.
- Operating conditions vary greatly and Resurface Corp. cannot predict them. Therefore, it is the User's responsibility to select the appropriate settings for operation of the OLYMPIA.
- Wherever necessary, safety circuits and safety devices are installed and are active. Therefore, no modifications and conversions may be undertaken on the ice resurfacer, nor must the safety circuits and devices be modified in any way, or rendered inoperable.



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- The OLYMPIA must be inspected at least once a day for visible signs of damage! Any changes, including changes in the operating behaviour must be reported to the responsible department or person immediately! The ice resurfacer must be switched off and secured immediately if necessary (e.g. push the emergency stop button and turn the key-operated switch to the off position and remove the key)!
- Do not perform any procedures that are not described in this manual!
- No liability will be accepted for any material damage or personal injury caused by failure to comply with the above directives, or failure to follow the instructions given in this operating manual. This also applies for damage caused as a result of improper or unauthorized use of the machine.

1.3 Proper Use

The OLYMPIA ice resurfacer has been manufactured exclusively for the resurfacing of ice surfaces. Do not use the OLYMPIA for any other purpose.

Only duly authorized and trained drivers may operate the OLYMPIA.

All information and instructions given in this documentation must be adhered to without fail.

1.4 Improper Use

The following are deemed to be improper use:

- Operation without the safety devices.
- Failure to comply with the on-site directive posted by the User.
- Driving on surfaces that have more than a 15 % incline (or 13.5°).
- Carrying of passengers.
- Operation without the duly trained driver.
- Operation in inadequate light conditions.
- Failure to comply with the instructions given in this documentation.

1.5 Organizational Measures

- The operating manual must be kept in a place where it is readily accessible to the operators and maintenance personnel!
- The personnel employed to work with and on the ice resurfacer must have read the operating manual before starting any work. This applies in particular for personnel who



only work occasionally on the machinery, e.g. for setup or maintenance purposes.

- Maintenance personnel must tie back long hair, and must not wear loose clothing or jewellery, including rings, when working on the machine. There is a risk of injury, e.g. by getting caught on or pulled into the machinery.
- The prescribed schedules, or those specified in the operating manual for periodic checks/inspections must be adhered to!
- Local safety standards must be adhered to as well as recommendations in this document.

1.6 Personnel Qualifications

- Every OLYMPIA has a variety of built-in safety functions. To prevent accidents from occurring, everyone that deals with the operation and maintenance of the machine must carefully read the instruction manuals provided by Resurface Corp. before they operate or service the OLYMPIA.
- Only the specially trained ice resurfacer operators may have access to the starter key and they must keep it under lock and key. The necessary training and instruction will be given by Resurface Corp. or one of their authorized distributors upon delivery of the machine.
- All operators must be trained by a qualified instructor.
- All safety instructions must be strictly followed when operating, maintaining and shutting down the ice resurfacer. Failure to adhere to the instructions can lead to accidents resulting in personal injury and material damage.
- The personnel are instructed both verbally and in writing, the emergency shut off switch must be switched off before disconnecting the battery connector (to avoid sparking). The emergency shut off switch must be switched on after connecting the battery charger.
- The driver is instructed both verbally and in writing, that he must wear the seatbelt if equipped at all times when operating OLYMPIA.

- Resurface Corp. recommends that the user holds regular training courses, in which special emphasis must be placed on the hazards and safety measures. The service personnel must be instructed about the specific hazards in association with the maintenance and repair of the ice resurfacer. This instruction must be repeated at regular intervals, at least once a year.
- The employees must wear protective gloves when doing maintenance and repair work. The hazards in association with the sharp components are pointed out in regularly held training courses. The hazard avoidance measures must be explained.
- The responsibilities of the personnel for operation, setup and maintenance of the ice resurfacer must be clearly defined. Make sure that only duly authorized personnel are allowed to work on and with the ice resurfacer!
- The maintenance personnel must be duly certified in accordance with the following charts.

Job \ Person	Instructed persons	Qualified technicians	Qualified electricians	Authorized Service personnel
Operation	X			
Troubleshooting			X	X
Mechanical fault rectification		X		
Electrical fault rectification			X	
Maintenance		X	X	
Repair				X



1.7 Obligations of the User

The User must ensure that...

- The ice resurfacer is only used in the proper manner,
- The ice resurfacer is only operated when it is in perfect working order,
- The integrated safety devices are regularly maintained and checked for proper function,
- The operating manual is supplemented with all generally applicable, statutory and other binding accident prevention and environmental protection regulations, and that these are complied with!
- Personal protection gear/clothing is provided and is worn (e.g. protective gloves, warm clothing, safety helmet and, if necessary, ear muffs, steel toed safety boots, and also non-slip footwear (for walking on the ice surface).
- The operating manual is supplemented with facility-internal instructions, e.g. supervision and reporting duties to take account of facility-specific particulars, such as work organization, operational procedures, employed personnel, etc.
- It is checked, regularly, that the personnel are working in a safe and hazard-conscious manner and are adhering the instructions given in the operating manual!

1.8 Operator's Workplace

Operation of the ice resurfacers is done solely from the driver's seat on the driver's platform.



Before doing any jobs of „longer duration“ on moving parts, switch off the power and depressurise the systems at the vehicle and take suitable measures to prevent it from being switched back on again (after switching off the emergency shut off switch, pull the battery plug, turn the key-switch to the Off position and remove the key).

1.9 Safety Devices and Guards

Limit switch at the driver's seat



There is a limit switch at the driver's seat on the OLYMPIA that must not be bypassed. When the driver leaves the seat, the ice resurfacers are stopped after a delay of 8 seconds, so that the OLYMPIA cannot be driven without the driver.



EMERGENCY STOP

The EMERGENCY shut off button can be used to shut down the whole ice resurfacer in an emergency. The EMERGENCY shut off button is located at the front left, in front of the steering wheel.

Switch-Off: Depress the knob on the switch to shut off the power (disconnect the circuit).

Switch-On: To switch the ice resurfacer back on again, pull out the knob until it locks into place. The normal switch-on procedure must then be executed from the beginning. (section 7.1.1)



Fig. 1.1: Emergency Shut off switch on the OLYMPIA



The Emergency Shut off switch turns off the whole ice resurfacer, except for the BiCAT. The BiCAT is mounted on the battery to save the stored data. When the battery connector is disconnected, the whole ice resurfacer is switched off too, with the exception of the BiCAT.

Limitation: The (+) contact of the EMERGENCY STOP switch still carries the potential of the (+)Ub port of the battery!



Charging of the battery is also interrupted when the Emergency shut off switch is pressed. If the charger is not working, please first check whether the Emergency shut off switch has been pressed.



Caution!

Do not attempt to operate the ice resurfacer until the reason for the shut down has been discovered and corrected.

If the EMERGENCY STOP circuit is activated, all power to the OLYMPIA is switched off. The brake accumulator remains under pressure, but can be depressurised by simply pressing the brake pedal several times.



The removal of guards or safety devices or rendering them inoperable while the ice resurfacer is in operation is prohibited.

Guards and safety devices may only be removed or put out of operation for repair or maintenance purposes after the main switch has been turned off and measures taken to prevent it from being switched back on again, and after the ice resurfacer has been depressurised.

Tools are needed to open all covers and panels.



Horn Button

The horn button is located on the upper dash panel. The horn sounds as soon as you press this button.



Fig. 1.2: Horn button on the OLYMPIA

Warning Signals

- Warning lamp indicating that there is not enough water in the water tank
- Warning signal indicating that the battery is low (accumeter flashes)

1.10 Maintenance and Repair Regulations

In terms of this manual, maintenance work means all ...

- maintenance jobs that have to be done periodically on the OLYMPIA,
- lubrication,
- cleaning,
- setup and retooling, changing of components / sub-assemblies, and
- Adjustments/setting of the electrical equipment, mechanical parts and hydraulic systems.
- Never open the control cabinet and/or any electrical components while power is being supplied to the machinery.
- The battery connector must be disconnected before doing any work on the ice resurfacers (including changing the blades). The proper way to do this is to check to make sure the snow dump tank is empty, then raise the tank to the fully open position, Remove the starter key and properly dismount the resurfacers, and install the snow dump safety supports. Disconnect the battery by separating the main power plug located directly in front of the operators platform under the snow dump tank. Carry the key on your person. Put up a notice on the ice resurfacers that says, DO NOT START.
- Before starting the work, cordon off the area in which the maintenance work is to be done with a red/white safety chain and put up notices that read MAINTENANCE WORK IN PROGRESS! UNAUTHORIZED ACCESS PROHIBITED. RISK OF INJURY.



After completing the maintenance jobs and before switching on the ice resurfacer, make sure that:

- There is nobody in the danger zone
- There are no more tools or other parts in the vehicle, and
- All safety devices/guards have been duly re-installed and are in proper working order.

Also adhere to the safety regulations that are specified in the descriptions of the individual maintenance jobs.

1.11 Waste Disposal

Hazardous waste must not be disposed of with general household waste. Each local community generally has drop-off locations for the proper disposal of hazardous waste.

The battery must be disposed of in the proper manner. Contact your battery supplier for proper disposal of your batteries. (refer to the regulations in your O.S.H.A. manual or Directive 91/157/EEC or to your local battery disposal regulations).



For more information, please contact your local waste disposal authorities.

1.12 Remaining Hazards



Risk of Injury!

The ice resurfacers operator must be in possession of all his mental and physical faculties to ensure that nobody gets run over (i.e. he must not have consumed alcohol, taken pills or other medication, or taken drugs).



Risk of Falling and Risk of Injury!

The carrying of passengers on the ice resurfacers is strictly prohibited, as they could fall off the machine and sustain injury.



Risk of Injury!

Before starting any maintenance job, make sure that you secure the snow dump tank with the safety supports to prevent it from dropping down, because there is a considerable hazard potential here.



Risk of Sustaining Cutting Injuries!

Always wear protective gloves when handling the blade. Because the blade is extremely sharp, for your own safety and to protect the sharp edge of the blade, always use the magnetic guard.



NEVER leave the OLYMPIA unattended when filling it with water, because hot water could leak out and injure someone.



Risk of Injury!

Make sure that there are no people or objects in the work and driving area.



Danger!

Do not spray the machine with a water hose to clean it, because this can lead to electrical faults.



Risk of Explosion!

Ensure proper ventilation during the charging process. Escaping hydrogen gas could lead to an explosion.



Risk of Short Circuiting!

The batteries must not come into contact with water. Never place anything on top of the batteries, otherwise short-circuiting could occur.



Risk of Injury!

If your ice resurfacer is parked on an incline, before releasing the handbrake turn the start key to the ON position. Make sure the gear selector is in neutral. Depress and release the accelerator pedal. Now you can depress the brake pedal, release the handbrake and the ice resurfacer will not move.

Failure to follow this procedure will result in the ice resurfacer rolling down the incline when the handbrake is released.



Risk of Injury!

Before switching on the OLYMPIA , it is necessary to make a complete circle check of the ice resurfacer.

Always use extreme caution when driving the OLYMPIA from the service area onto the ice surface (and vice-versa), as there could be people on the connecting routes.

The OLYMPIA may only be operated on the ice surface when it is completely clear of persons and debris.

The ice resurfacer operator must stop the ice resurfacer and secure it to prevent it from rolling away before leaving the seat on the ice resurfacer`s platform. This is done by setting the key-operated switch (starter switch) to the STOP position and applying the parking brake.

The driver`s safety seat has a timed proximity switch that stops all movements eight seconds after the driver leaves the seat.

Caution:

In a hazardous situation, depress the palm-type emergency shut off switch immediately, if any other controls fail for any reason.



Risk of Getting Crushed!

There must not be any people in the vicinity of the OLYMPIA when the ice shavings are being unloaded.



Risk of Getting Crushed!

If other people enter the area during the unloading process, the ice resurfacer movements must be stopped and may only be resumed after these people have left the area again.



Risk of Falling!

Proceed with extreme caution when moving the ice resurfacer around or near the stationary snow dump area. Risk of falling!



Risk of Getting Crushed!

When doing maintenance or repair work in the area under the snow dump tank, the safety supports must be secured, if the work is to be done with the tank open.



Risk of Injury!

When driving the OLYMPIA always proceed with caution.

Drive with a greatly reduced speed. Especially when driving in areas with a restricted view or in narrow spaces.

When driving off-ice, the vehicle lighting must be switched on.

The OLYMPIA must not be driven on public roads, as it is not licensed for use on public roads and highways.



Risk of Getting Crushed!

There is an increased risk of accident when doing maintenance and repair work, because electrical safety devices may have to be put out of action.

2 TECHNICAL DATA

2.1 Dimensions

With snow bin closed:

Width with 84 inch Conditioner	88" / 224cm
Width with 96 inch Conditioner	100" / 254cm
Length	162" / 411cm
Height	77" / 195cm

With snow bin open:

Length	228" / 579cm
Height	142" / 360cm

Blade width:

On 84 inch Conditioner	84" / 213cm
On 96 inch Conditioner	96" / 243cm
Turning radius	180" / 457cm

2.2 Weights

Net weight total (incl. 770 Ah batteries)	10,648 lbs / 4,830 kg
Front axle	3,792 lbs / 1,720 kg
Rear axle	6,944 lbs / 3,150 kg



Gross weight (incl. 770 Ah batteries and full water tanks) 12,853 lbs / 5,830 kg
 Front axle..... 4,828 lbs / 2,190 kg
 Rear axle 8,025 lbs / 3,640 kg

2.3 Noise Emission



Note: Ambient noise level 56 dB (A)

Readings taken on ice with dasher gates closed

Standing noise (hydraulic pump running only) 63 dB (A)
 Driving noise (with elevator turned off) 73 dB (A)
 Driving noise (with elevator turned on)..... 74 dB (A)
 At a distance of 25m away (with elevator turned off)..... 63 dB (A)
 At a distance of 50m away (with elevator turned on) 62 dB (A)

2.4 Filling Capacities

Capacity of snow bin 103 ft³ / 2.9 m³
 Capacity of wash water tank 45 Imp gal / 204 l
 Capacity of flood water tank 184.5 Imp gal / 838.8 l
 Hydraulic oil quantity 5 Imp gal / 22.75 l

2.5 Electrical System

Battery voltage 80 V
 Battery capacity up to 770 Ah
 Total power 17.4 kW

2.6 Brake Systems

Operating principle: Full disk brake at each wheel

Brake pads: asbestos-free

Application:

Main brake: Hydraulic

Parking brake: Mechanical

2.7 Hydraulic System

Hydraulic fluid: ATF 55 F-30589

Oil change interval: Approx. every 3 years

Oil filter: Exchangeable filter, 20 Micron

Oil cooling: Convection cooling at the oil tank

Oil temperature: Max: 80°C, normal: approx. 30°C

Hyd. Pump, Motor-driven: Tandem, gear pump

1 gpm / 4.55 lpm steering

6 gpm / 27.2 lpm auxillary

Emergency hand pump: Piston pump

0.15 in³ / 2.5 cm³/stroke

Steering: Load sensing hydraulic

2.8 Water System

Water Pumps:

Speed Related Water: Impeller pump

26.9 Imp gal/min (123 L/min) at 2,450 rpm

Tire wash pump: Impeller pump

8.7 Imp gal/min (40 L/min)



Wash water: Impeller pump
51.3 Imp gal/min (234 L/min) at 1,750 rpm

2.9 Tires

Tire size:

Tubeless: HANKOOK DYNAPRO M/T
LT225/75R16 10 ply
Tungsten tip studs
Aluminium alloy wheels

Tire pressure: Front: 85 psi / 5.8 bar
Back: 85 psi / 5.8 bar

2.10 Conditioner

2.10.1 Blades

Ice shaver blade: inlaid steel
Length: 84-96" / 213-244 cm
Width: 5" / 12.8cm
Cutting angle: 8,5 degrees
Blade grind angle: 27 degrees

2.10.2 Conveyor System

Auger:

Vertical: 8" / 20.3 cm
Horizontal: 12" / 30.5 cm

2.11 Materials Used

Stainless Steel:..... AISI 304L-316

Aluminium: 5052H32

Steel: Hot-dip galvanized
Electro zinc plating
Hard-chrome plating
painted

Plastics: Glass fibre-reinforced plastic
Polyamide
Polyurethane



3 ON-SITE CONDITIONS

3.1 Ground Conditions



Level, solid floor covering, preferably with spike-friendly overlay.

Maximum permitted incline: 15 %

3.2 Room Ventilation

In accordance with OSHA (North America), VDE (Europe) and local codes, the battery rooms should be designed such that natural ventilation is adequate (see OSHA 1926.441 or VDE 510).

3.3 Water Connections

- Ice making water on the left hand side of the ice resurfacer.
- Wash water on the right hand side of the ice resurfacer.
- The intake can be controlled with a solenoid valve. The solenoid valve is controlled by the ice resurfacer. Valve size is 1”.

3.4 Water Quality

- Clean water with low total grains of hardness
- Ice making water temperature as hot as local codes will allow
- Wash water: cold only

3.5 Charger

Mains connection:

North America: 208, 480, 550, 600 volt, 3 phase fused disconnect.

Europe: Wall socket : 400 V/3~+N+PE 32 A 5-pol. CEE-Norm.

Charger cable:

15' (4.5m) long, battery connection plug is located under snow dump tank, directly in front of drivers platform.



It is possible to install longer cables from the charger.

3.6 Garage Temperature

Preferably above 15°C (59°F), never below 0°C (32°F)



Charging can take considerably longer at temperatures below 15° (59° F). Freezing of a partially discharged battery can damage the battery. The same applies for freezing of the water system.

3.7 Snow Dump Pit Threshold

A threshold at the snow dump pit must not be more than 23" (58.5cm)



4 DESIGN AND FUNCTION

4.1 Ice Resurfacer Design and Chassis



Fig. 4.1: Front view with open hood

- Item 1 EMERGENCY SHUT OFF switch
- Item 2 Steering wheel
- Item 3 Driver's seat
- Item 4 Ice making water fill station
- Item 5 Conditioner
- Item 6 Step for climbing up to the driver's seat
- Item 7 Board brush
- Item 8 Front bumper wheel
- Item 9 Snow bin
- Item 10 Front headlights
- Item 11 Snow bin hood



Fig. 4.2: Rear view of the OLYMPIA ICEBEAR

- Item 1 Handle for climbing up to the driver's seat
- Item 2 EMERGENCY SHUT OFF switch
- Item 3 Steering wheel
- Item 4 Top control panel
- Item 5 Manual Ice Making Water tap handle
- Item 6 Electrical control cabinet door
- Item 7 Tail lights
- Item 8 Drive motor for the horizontal auger
- Item 9 Automatic towel lift
- Item 10 Ice making water fill station
- Item 11 Spreader cloth
- Item 12 Conditioner bumper wheel
- Item 13 Reverse Light



The OLYMPIA is available in either mainly structural stainless steel, or structural black steel chassis design. This applies to the chassis, the conditioner, the snow dump tank, the frame of the snow tank cover, the steel structure of the driver's platform and all metal parts that, for technical reasons, should not be manufactured from any other material.

The electrical control cabinet is made of aluminium.

Self-supporting chassis

The chassis consists of 5/16" thick structural tube, either of stainless or black steel. It is supported on the front and rear axles. The front axle is designed as a floating axle. The rear axle is designed as part of the main chassis welded directly to the main frame rails. As well the battery holders, the driver's platform and the mountings for the conditioner, the brush and other parts are part of the chassis.

The control cabinet, the snow bin cover, all parts of the hydraulic system, power supply, water supply and panelling are bolted to the chassis.

The front axle

The front axle is of structural tube steel construction. It holds the front drive units (gear with motor), and the hydraulic steering components.

The drive units are supported in spindles attached via upper and lower king pins. They absorb all radial forces. The vertical forces are absorbed by a bearing ring. This extends the serviceable life of the bearing assembly.

Coupling of the front drives consists of two solid, adjustable steering links, which are connected to the gears via link fittings.

Steering is controlled by a hydraulic cylinder that is mounted between the steering links of the front wheels at the axle. In conjunction with a hydraulic orbit control and the hydraulic pump, this arrangement ensures smooth and low-maintenance steering.

Body Panels

All panels are made of glass fibre-reinforced plastic (GRP).

4.2 Snow Conveyor (Auger)

The horizontal auger in the conditioner transports the snow that has been scraped off the ice by the blade to the centre of the conditioner, where it is picked up by a vertical auger and is transported into the OLYMPIA'S snow dump tank. To switch on the horizontal and vertical augers, press the switch ELEVATOR ON on the dashboard.

Directional Control Switch for the elevator:

- This switch has three possible positions
- Turning the switch to the left turns the elevator FORWARD (self- locking)
- The middle position is OFF
- Turning the switch to the right turns the elevator REVERSE (turn and hold switch)

4.3 Hydraulic Components

A tandem hydraulic pump supplies the hydraulic system with oil. Control valves supply the ice resurfacers with oil for the operation of a series of control valves for movement control, and control of the flow of hydraulic fluid to the various components as needed. The hydraulic system must only be serviced by qualified personnel.



5 CONTROLS



Fig. 5.1: EMERGENCY Shut Off Switch

The ice resurfer is equipped with an EMERGENCY SHUT OFF SWITCH that is installed above the steering wheel, at the left.

To get power from the batteries to the ice resurfer, pull the red knob up.

To disconnect the batteries from the ice resurfer, depress the red knob.

5.2 Top Control Panel

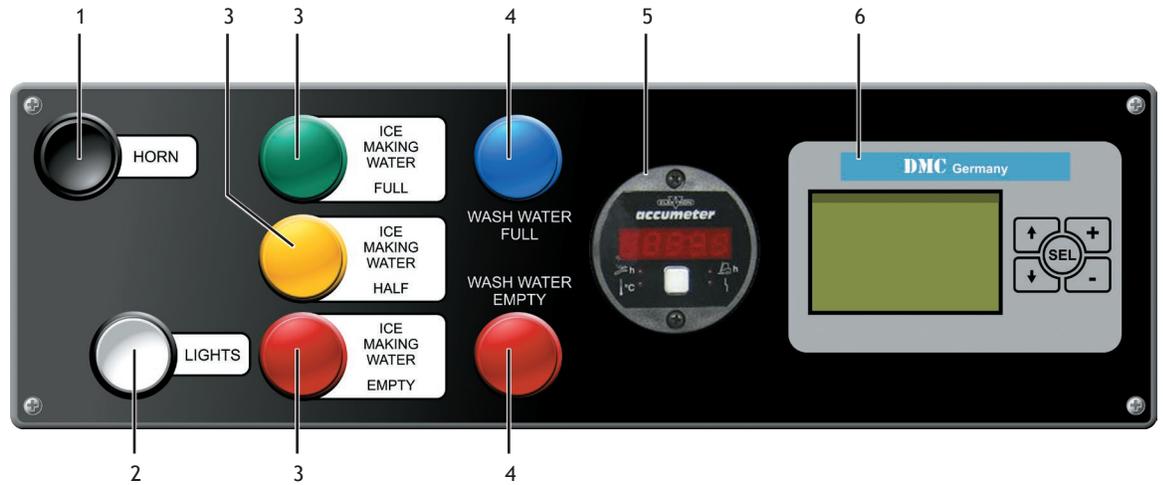


Fig. 5.2: Top control panel

Item 1

Horn Button

Press this button to sound the horn.



Item 2

Lights

This button turns the headlights and tail lights on and off.

Push and release to turn on, repeat to turn off.





Item 3

Ice Making Water Indicator



When the tank is full the green light will come on. If equipped, simultaneously the auto water fill valve will shut off the flow of water filling the tank. The yellow light will stay on until $\frac{1}{2}$ of the tank capacity is used. Again if equipped simultaneously the auto water fill valve will shut off the flow of water filling the resurfacer, if the $\frac{1}{2}$ full selection was used during the filling procedure. The red light will come on when the ice making water tank is empty. Simultaneously it will turn off the speed related water pump. When the red light first comes on there is approximately 100 litres of water in the tank.

Item 4

Wash Water Indicator



When the tank is full the blue light will come on. If equipped, simultaneously the auto water fill valve will shut off the flow of water filling the tank. The red light will come on when the wash water tank is empty. Simultaneously turning off the wash water pump and valve.

Item 5

Accumeter

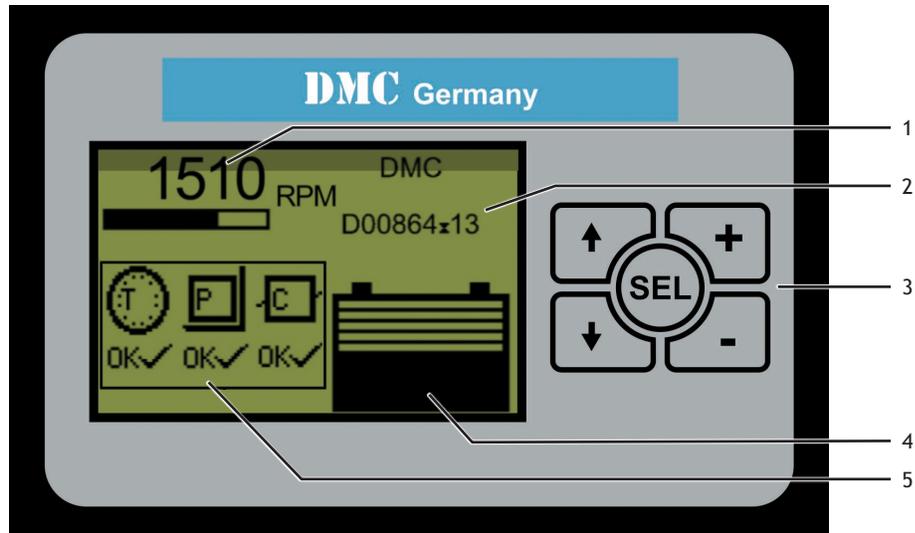


The accumeter is equipped with a digital LCD display. This will display the remaining capacity of the batteries. By pushing the white button it will change to operating hours. By pushing the white button a second time it will display hours until the next service is needed. A third push of the button will display operating temperature. A slashing red light in the right corner will indicate low electrolyte level.



For more information, please refer to the documentation provided by the manufacturer, Elektron.

Item 6 Dashboard Display



- Item 1 Display field for display of the speed.
- Item 2 Operating hours counter: can be activated using the display buttons.
- Item 3 Soft keys to set functions such as service intervals, operating hours counter and the customer information field.
- Item 4 Battery discharge status indicator
Indicates the discharge status of the battery.
- Item 5 Fault indicator
Indicates the status of the drive and pump controllers. If there is a fault, the relevant fault message appears instead of OK.



For more information, please refer to the documentation provided by the manufacturer, DMC.



5.3 Bottom Control Panel

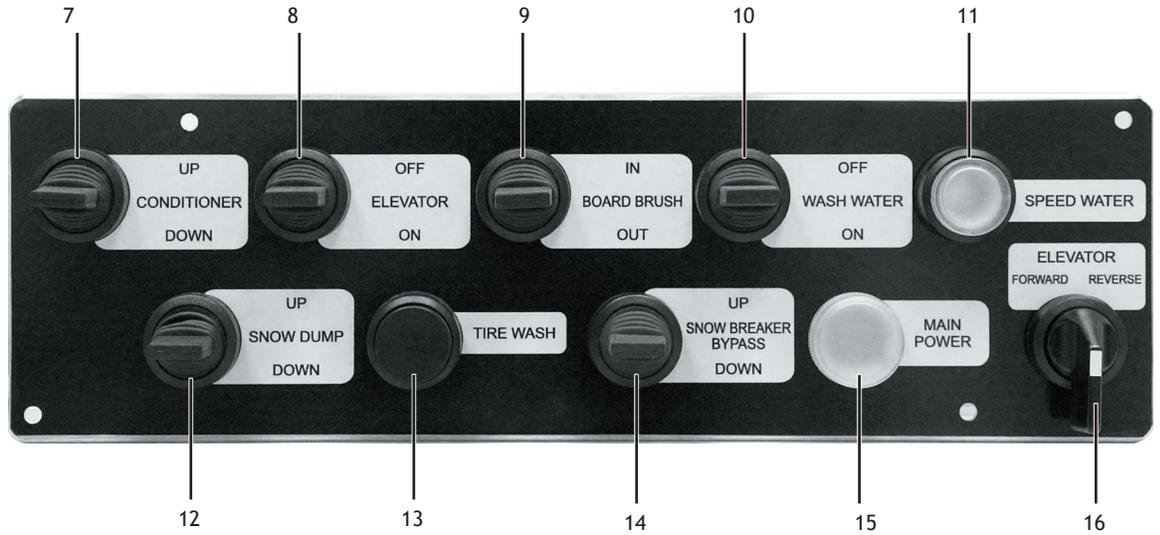


Fig. 5.3: Bottom control panel



The bottom control panel has been configured that the top row of switches is on ice and in a specific order to maintain the proper sequence of engagement. From Left to right.

Item 7

Conditioner Up/Down



Raises and lowers the conditioner

To raise the conditioner, push and hold the switch UP until the conditioner is in the full up position.

To lower the conditioner, push and hold the switch DOWN until the conditioner is in the full down position.

Item 8

Elevator Off/On



Turn both augers ON (horizontal and vertical auger), by pushing the switch down. Turn both augers OFF by lifting the switch to the off position.



If the ice resurfacers are switched off, with the ignition key or with the EMERGENCY SHUT OFF switch, the augers must be restarted again.



Item 9

Board Brush



Raises and lowers the board brush.

To lower the board brush push the switch down.

When the brush is lowered, it will automatically start to rotate.

To raise the board brush lift and hold the switch in the up position until the board brush is fully raised.

When the board brush is raised, it will automatically stop rotating.

Item 10

Wash Water On/Off



To turn the wash water system on push the switch down.

To turn the wash water off lift the switch up to the off position.

When switched on the water from the tank will flow for approximately 8 seconds before the wash water pump turns on. When switched off both the pump and the water flow stop at the same time.

Item 11

Speed Water



To turn on the speed related water system push the button in, the button will light up green indicating the pump and valve have been energized.

To turn off push the button again and the green light as well as the pump and valve will turn off.

Item 12

Snow Bin Up/Down



Opens and closes the snow dump tank.

To open the snow dump, lift and hold the switch up until the snow dump tank is fully open.

Before opening the snow dump tank make sure there is sufficient clearance as the snow dump tank will move forward and up.

To close the snow dump tank hold down the down switch until the snow dump tank is completely closed.

Before closing the snow dump tank make absolutely sure that there are no obstructions of any type that could get crushed between the tank and the chassis of the ice resurfacer.

It is recommended that if possible the snow dump tank should be left fully open after each ice cleaning operation, with the safety bars down and locked, so that any residual snow or water can drain from the tank.



Item 13

Tire Wash



Push the button in and hold to activate the tire washing system.

Let the button out to deactivate the tire washing system.



Item 14 Snowbreaker Override



Is a backup system which allows for the manual operation of the snowbreaker.

Pushing the switch down will move the snow breaker down.

Lifting the switch up will raise the snow breaker.

Item 15 Power On Light



When you turn the ignition key to the ON position the power on light will illuminate, indicating the ice resurfacer is turned on.

Turn the ignition key to the OFF position to switch off the ice resurfacer, the power light will turn off

Item 16 Elevator Forward/Reverse



Left switch position: Snow is transported from the conditioner into the snow bin by the horizontal and vertical augers

Centre position: Neither auger turns

Hold in right switch position: Both augers reverse

Item 17

Gear Shift Lever



Unless moving the ice resurfacer, always make sure the gear shift selector is in the neutral position. To move the ice resurfacer forward move the gear shift selector to the forward position. To reverse the ice resurfacer, move the gear shift selector to the reverse position.

F = Forwards

N = Neutral

R = Reverse



Always move the gearshift selector to the centre position (neutral position) before you leave the driver's platform.



If the lever is not in the neutral position when the ignition key is turned on, the drive control will be disabled until the gear shift selector is switched back to the centre position.



Make sure the ice resurfacer comes to a complete stop before changing gears.

Item 18

Ignition Key



Turn the ignition key to the right or ON position to switch on the ice resurfacer and put it into operation.

Turn the ignition key to the left or OFF position to switch it off again.

The ice resurfacer can be switched off with the EMERGENCY SHUT OFF (Fig. 5.1) at any time.

When the ice resurfacer is switched off, all functions are shut down, except for the automatic water fill stations.



5.4 Ice Making Water Control Panel Optional



Fig. 5.4: Ice Making Water control panel

- Item 19 Indicator lamp for water tank level HALF FULL
- Item 20 Selector switch
- Item 21 Indicator lamp for water tank level FULL

This panel controls how much hot water can be put into the ice resurfacer.

The ice resurfacer is supplied with an electric water valve, to be mounted onto the water supply line in the building. Power for this valve is supplied from the ice resurfacer. Once mounted and wired.



The water hose down stream from the solenoid valve should not be too big in relation to the water pressure and pipe size, because a pressure difference of 0,5 bar (7 psi) is needed to close the solenoid valve.

The solenoid valve plug of the water supply pipe is connected at the Ice Making Water Control Panel and the water level for the water tank is set there. At the left of the selector switch there is a yellow indicator lamp (Fig. 5.4, Item 19) for half filling the water tank. At the right there is a green indicator lamp (Fig. 5.4, Item 21) for completely filling the water tank. To select the desired fill level, turn the selector switch (Fig. 5.4, Item 20) in the appropriate direction.

The filling process can be interrupted or stopped at any time by turning the selector switch to the centre position.



The control panel function can be used even when the ignition key is turned off, provided the battery connector is plugged in.

Connection of the Ice Making Water Line

First connect the water line to the water fill pipe on the side of the dash and then connect the solenoid valve to the supply socket on the panel. Turn the fill level selector switch to the desired setting (full or half-full). When the preselected water level is reached, the solenoid valve automatically turns off.



Always be sure to insert the fill hose into the ice resurfacer first.

Disconnection of the Ice Making Water Line

Proceed in the following order to disconnect the water hose from the ice resurfacer:

1. Turn the selector switch to the neutral position.
2. Pull the plug out of the socket.
3. Disconnect the hose from the ice resurfacer.



This procedure prevents the solenoid valve from opening before the water hose is connected to the ice resurfacer when the next fill takes place, thus preventing water from pouring out in an uncontrolled manner.



When the ½ or full mark is reached, the solenoid valve shuts off the supply of water.



When the solenoid valve is open, a pressure difference of at least 0.5 bar (7 psi) must prevail at the valve to ensure safe and speedy switching of the pilot-controlled solenoid. A smaller valve on a low-pressure supply pipe with a larger water hose therefore works better than a large valve in a small pipe at low pressure!

5.5 Wash Water Control Panel



Fig. 5.5: Wash Water control panel

Item 22 Selector switch (illuminated)

This panel controls how much cold water can be put into the ice resurfacer's wash water tank.

The ice resurfacer is supplied with an electric water valve, to be mounted onto the water supply line in the building. Power for this valve is supplied from the ice resurfacer. Once mounted and wired.



The water hose behind the solenoid valve should not be too big in relation to the water pressure and pipe size, because a pressure difference of 0,5 bar (7 psi) is needed to close the solenoid valve.

The solenoid valve of the cold water supply line is connected at the Wash Water panel. To switch the wash water supply ON or OFF, turn the switch (Fig. 5.5, Item 22) in the appropriate direction.



The filling procedure can be interrupted or stopped at any time by turning the selector switch to the OFF position.

The control panel function can be used even when the ignition key is turned off, provided the battery connector is plugged in.

Connection of the Wash Water Line

First connect the water line to the water-filling inlet and then connect the solenoid valve to the supply socket on the panel. When the water tank is full, the solenoid valve automatically turns off the water.



Always be sure to insert the fill hose into the ice resurfacers first.



Disconnection of the Wash Water Line

Proceed in the following order to disconnect the water hose from the ice resurfacer:

1. Turn the selector switch to the OFF position.
2. Pull the plug out of the socket.
3. Disconnect the hose from the ice resurface.



This procedure prevents the solenoid valve from opening before the water hose is connected to the machine when the next fill takes place, thus preventing water from pouring out in an uncontrolled manner.



When the solenoid valve is open, a pressure difference of at least 0.5 bar must prevail at the valve to ensure safe and speedy switching of the pilot-controlled solenoid. A smaller valve on a low-pressure supply pipe with a bigger cross-section therefore works better than a large valve in a small pipe at low pressure!

5.6 Foot Pedals and Parking Brake

Another three controls that you will work with a lot are located in the foot well area of the ice resurfacer:

Accelerator Pedal

The right foot pedal is the accelerator pedal and is used to control the driving speed of the machine.

Initially press the foot pedal just a little to switch on the hydraulic motor for the power steering. The more you press down on the pedal, the faster the OLYMPIA travels.



The accelerator pedal must not be pressed when you turn on the ice resurfacers, otherwise the controller will assume there is a fault and will not turn on.



Before pressing the accelerator pedal, it is essential that you first turn on the ignition with the key. And when ready select the direction in which you want to travel.

Brake Pedal

The left foot pedal is the main brake pedal. The foot brake acts simultaneously on all four drive wheels. ABS is not installed. The OLYMPIA braking system has a pressure accumulator, so that the brakes can be applied at least another two times after the hydraulic system has been switched off.

Parking Brake Lever

The parking brake lever (hand brake) is located at the right of the driver's seat. It acts on the two rear wheels. If movement of the ice resurfacers is started while the parking brake is applied, the controller switches to CREEP MODE (very low speed) to keep from damaging the wheel drive motors.



5.7 Controls for the Water

There must always be enough wash water available to be vacuumed up. The pump must not be allowed to run dry, because the impeller and shaft seal assembly is water-lubricated.

The wash water is sprayed directly out of the water tank onto the ice by a spray pipe on the back inside wall of the conditioner. When the wash water system is started, cold water is distributed in the conditioner over the whole width of the conditioner, creating slush.

The squeegee then forces the slush into the cuts on the ice. Any excess water and debris is vacuumed back into the wash water tank.

5.7.1 Ice Making Water

The flow of flood water is controlled either by the speed-related pump, or by the ball valve at the base of the conditioner (Manual Water Valve). For the best resurfacing results, the ice making water should have a temperature NO HIGHER than local codes will allow. The hot water melts some of the surface of the ice, thus achieving the best possible bond with the existing ice. Hot water also holds less oxygen than cold water and therefore produces a denser, harder ice.

Harder ice does not get damaged as easily and therefore needs less depth of cut to achieve a smooth surface. Which in turn, results in minimal ice build-up.

This means less time spent on ice maintenance and less wear and tear on the resurfacing equipment.

Speed Related Water

The automatic flow of water depends primarily on the speed at which the ice resurfacer is being driven, and secondarily on the internal water valve setting. The lowest quantity of water flows when the ice resurfacer is at a standstill, the highest quantity when the ice resurfacer is driving at full speed. This automatic function reduces the flow of water in the curves to an adjustable minimum.

Manual Ice Making Water Flow

The manual water function allows water to be applied to the ice at a constant rate, regardless of the speed at which the ice resurfacer is travelling. It can also be used to supplement the speed related water.

5.8 Controls for the Hydraulic System

Switching the Hydraulic Pump Motor On and Off

There are two ways of switching on the hydraulic pump motor:

1. By pressing the accelerator pedal.
2. By pressing the appropriate function switch.

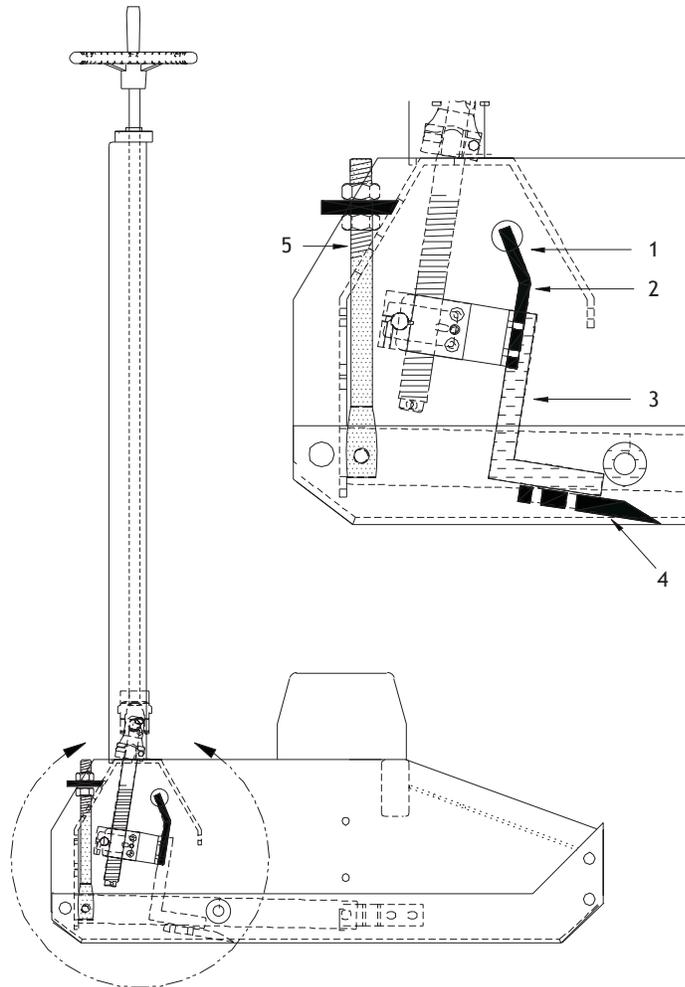
However, the ice resurfacer must be turned on at the ignition switch before the motor can be started up.

The hydraulic pump motor is switched off either by turning off the ignition switch, or automatically approx. 20 seconds after the accelerator pedal was last pressed, or as soon as you let go of a function switch.



5.9 Blade Level Adjustment

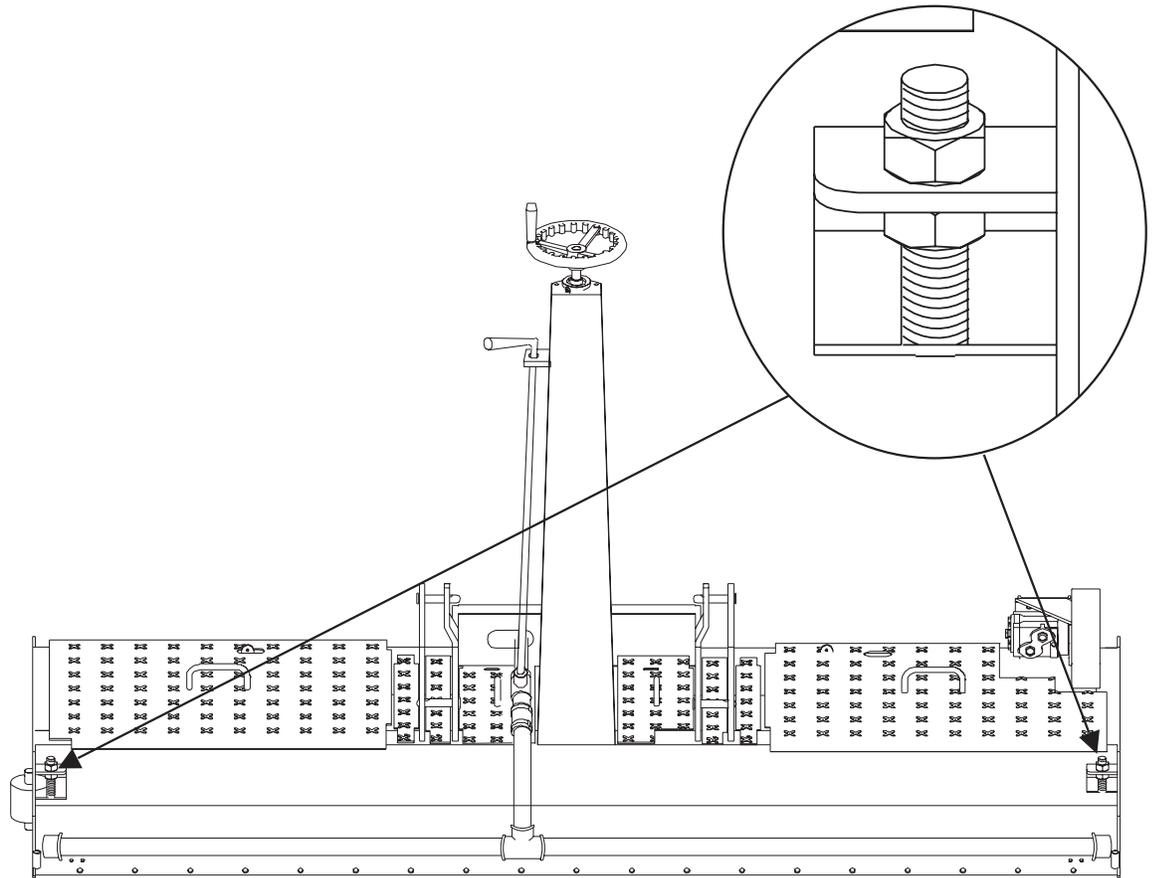
The blade adjustment crank, located on the tower to the right of the operator, raises and lowers the blade. The adjustment crank is turned until the indicator arm completely fills the sight hole at the side of the conditioner as shown below.



- Item 1 Sight hole
- Item 2 Indicator arm
- Item 3 Blade holder
- Item 4 Blade
- Item 5 Blade level adjuster

Fig. 5.6: Blade height adjustment

If the sight hole is filled, but the blade is too low or high, go to the rear of the conditioner and using a 1 1/8" wrench (metric version 27mm), first loosen the top nut of the blade level adjusters located on each side of the rear of the conditioner shown below.



Then turn the nuts to raise or lower the blade into the proper position, which is exactly level with the bottom of the runner. Once the blade is at the proper level tighten the nuts on the blade level adjuster.

To check the level of the blade, slide a large coin along the runners of the conditioner, from back to front, until you feel it pass over the edge of the blade.



Safety Note: Be careful when doing the coin check. Make sure you are wearing gloves and that you move the coin from back to front as the blades are extremely sharp.

The sharp tip of the blade should be flush with the runners on both sides. If the blade is flush the coin will slide smoothly over the blade edge.



5.9.1 Blade/ Coin check

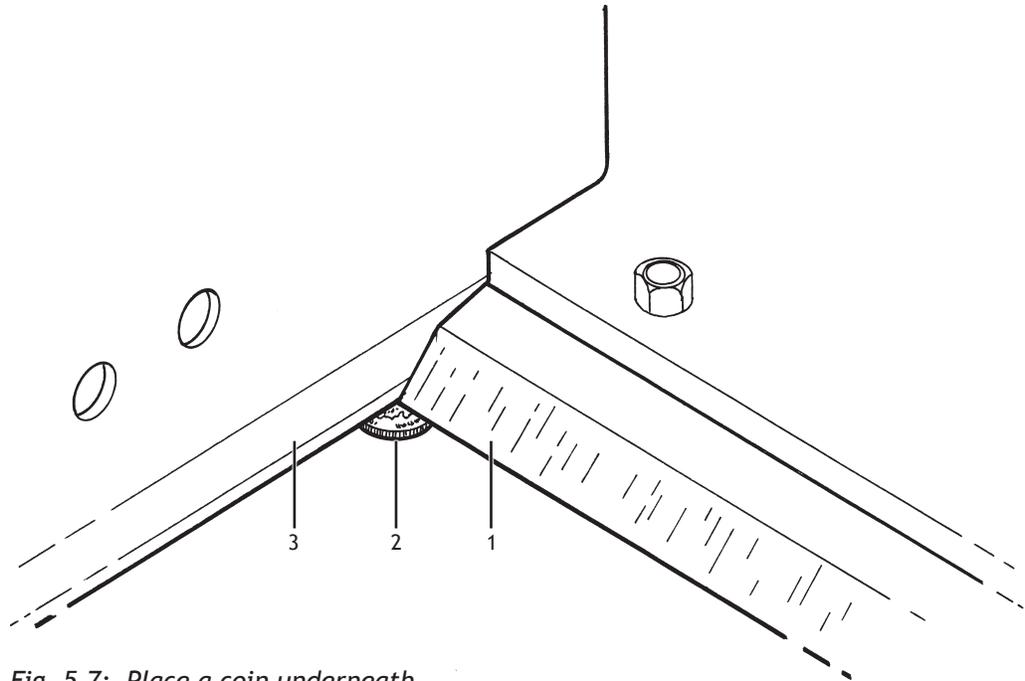


Fig. 5.7: Place a coin underneath

- | | |
|--------|--------|
| Item 1 | Blade |
| Item 2 | Coin |
| Item 3 | Runner |

Next raise the blade by turning the adjustment hand wheel one turn counter clockwise.



Please Note: It is important that the blade holder and the blade surface be free of foreign material and lightly coated with oil to prevent rust.

Test drive the OLYMPIA doing a dry cut. If the blade is properly set up you will see a feathered edge on the ice surface on both sides of the conditioner. If the cut is deeper on one side or the other then the blade needs to be raised or lowered, on the driver's side until the feathered edge is equal on both sides.

After the blade angle and level are set, any change in the cutting depth will alter the indicator arm position in the sight hole, but blade angle tolerances will accommodate such adjustment and further adjustment of the blade angle will not be necessary.

6 START UP OF THE OLYMPIA MILLENNIUM - E

6.1 Charge the Batteries

Before you can start work with the OLYMPIA, you must charge the battery. A battery charger is supplied with the ice resurfer for this purpose. This charger is designed to fully recharge a battery that has been drained as close to 0% on the accumulator as possible.

1. Raise the snow dump tank fully and install the safety support bars.
2. The battery charger will indicate connect battery
3. Push down the EMERGENCY SHUT OFF switch.
4. Carefully disconnect the power supply coupling located directly in front of the operators platform above the rear wheel. Now plug the cable from charger into the power supply coupling.



Battery gassing does occur in the final stages of charging. Gassing emits dangerous hydrogen gas.

5. Pull up the EMERGENCY SHUT OFF switch.



The EMERGENCY SHUT OFF switch must be pulled up, otherwise charging will not take place.



6. In North America the charger will automatically start. For other countries it may be necessary to manually start the charger.



The battery charger switches off automatically when the battery is fully charged.

7. When recharging is complete, depress the EMERGENCY SHUT OFF switch, disconnect and store the charger cable from the ice resurfacer's power supply connection.



If the charging operation has to be interrupted for any reason, turn off the charger before disconnecting the charger plug.

8. Reconnect the OLYMPIA's internal power supply cables.

9. Pull the EMERGENCY SHUT OFF switch



The batteries must not come into contact with water, as this could cause them to short out.



When working with acid batteries, avoid all contact of the acid with the skin or clothing.



Always wear a rubber safety apron, a facemask, suitable protective gloves and safety footwear when working on or near batteries



Always use only distilled water to fill batteries.



Check the electrolyte level in the batteries once a week immediately after recharging. Top it up, if necessary.



The battery water level is correct when all of the cell floats are visible. Periodically check the specific gravity with a hydrometer. In the log supplied, record water filling and specific gravity reading.

Watering The Batteries:

A battery watering cart is supplied with each ice resurfacers.

1. Connect the hose coupling to the respective battery trays .
2. Turn on the pump in the cart.
3. The batteries are automatically filled with distilled water until the float valve at the individual battery cells stop the filling process. The water flow indicator in the hose will stop spinning when the tray is full. This process must be repeated on both battery trays.



The optimal charging cycle for a maximum life expectancy of the battery is as follows:

1. Discharge until the battery is as close to 0% on the accumulator charge indicator as possible.
2. Recharge uninterrupted for 7-8 hours.
3. If at all possible do not attempt to charge the battery between resurfacings (opportunity charge).



Opportunity charging, although sometimes may be necessary should be avoided as it decreases the overall life of the battery.



6.2 Installation of the Squeegee

Mount the squeegee on the inside of the conditioner with the bolts and nuts provided. .

If not already trimmed, carefully trim the ends of the squeegee so that it fits tightly against the runners of the conditioner, as in the picture:



Squeegee Trimming

Snow that is pushed by the squeegee must stay within the area between the squeegee and the runners, and must not be pushed out from there, as this would cause ridges to be produced on the ice.

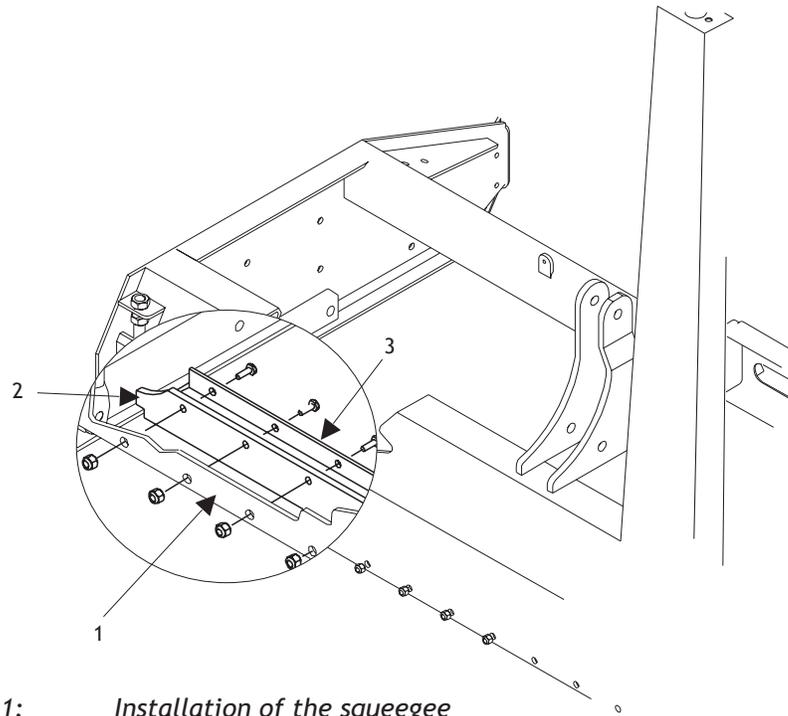


Fig. 6.1: Installation of the squeegee

- Item 1 Conditioner
- Item 2 Squeegee
- Item 3 Squeegee clamp bar

6.3 Installation and Removal of the Blade



Always wear approved safety gloves when handling the blade. For operator safety and to protect the edge of the blade, always use the magnetic blade protector when handling the blade, as it is extremely sharp.



For shipping and storage, blades should be bolted into wooden sheaths.



Before installing a blade, make sure that the surface of the blade holder is clean and has been lightly coated with oil to prevent rust. The blade should also be clean where it attaches to the blade holder and coated with oil.



6.3.1 Blade Installation

1. Insert safety blocks under the conditioner before attempting to work under it.
2. Place the blade on small wood blocks(4) at the rear of the conditioner, remove it from the wood sheath and install the magnetic protector supplied with the tool kit.
3. Using the blade hook, lift and slide the blade underneath the conditioner and lift against the bladeholder until the attachment holes line up.
4. Tighten the blade hook thumb screws(2) so that the slide bracket(1) sits on top of the conditioner.

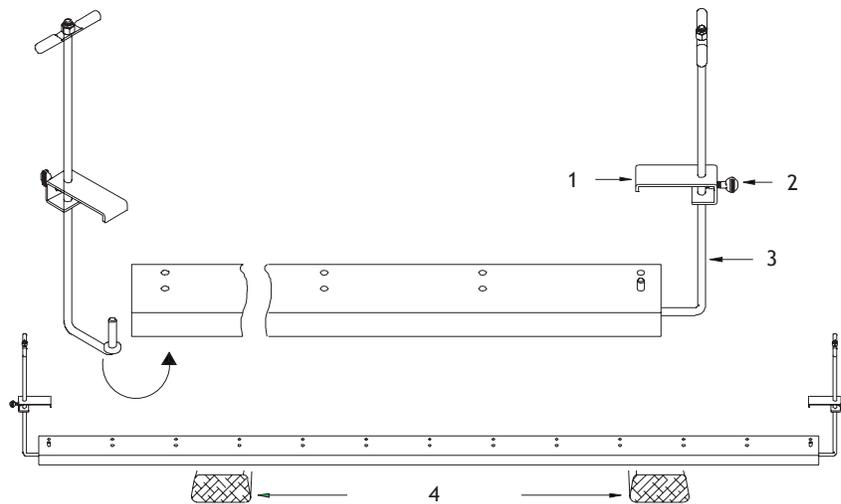
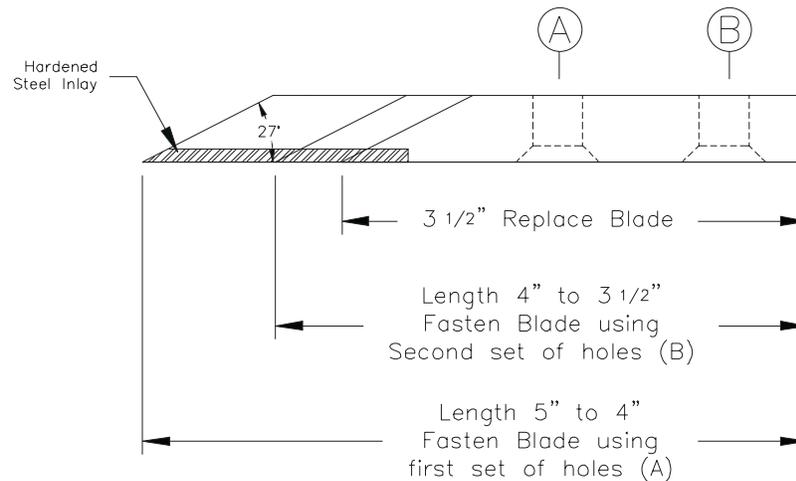


Fig. 6.2: Installing the blade

Item 1	Bracket
Item 2	Thumb screw
Item 3	Blade hook
Item 4	Wooden blocks



Install the blade bolts and finger tighten remembering to utilize the row of holes closest to the cutting edge. The second row of holes should be used when the blade has been ground down to 4 inch (approx. 10.16 cm) overall width.



The Order is Important



Following the diagrams below, begin to install the blade bolts. Finger tighten the bolts. **DO NOT** use lock washers as they will damage the blade holder.

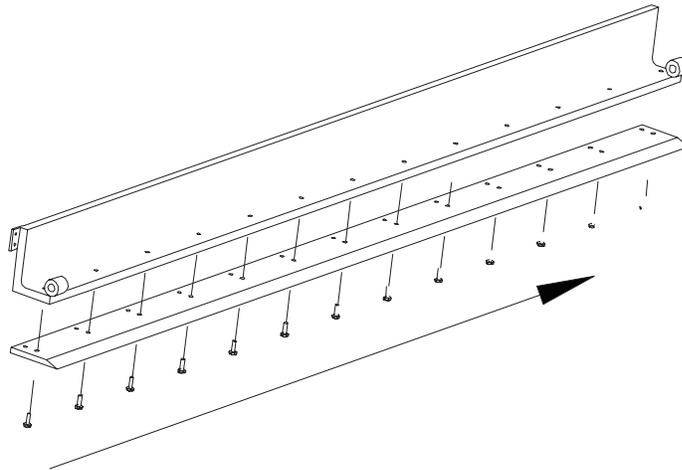


There are two ways of properly tightening the blade bolts:

Blade Bolt Sequence “A”

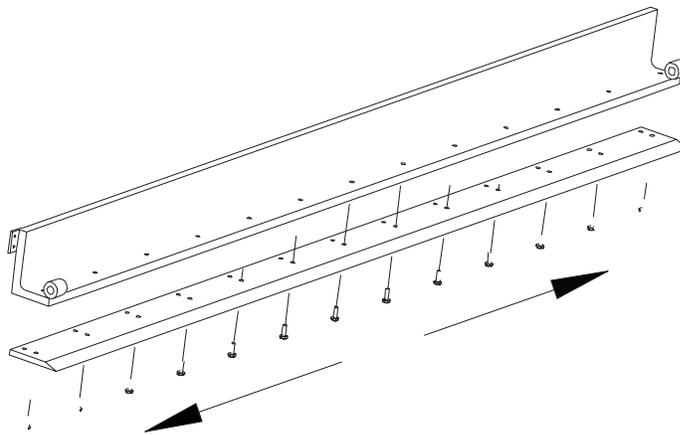
Sequence A - starting at one end of the blade, tighten the bolts consecutively across the blade to the opposite end.

Remove the blade hooks and insert the remaining two blade bolts and tighten.



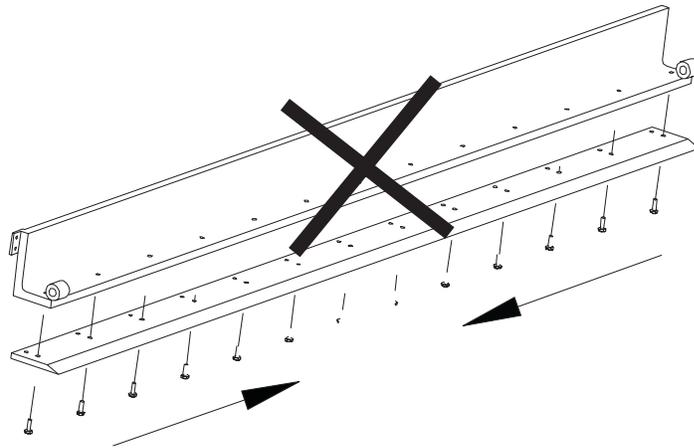
Blade Bolt Sequence “B”

Sequence B - starting in the middle tighten the bolts from the centre to one end then return to the centre and tighten the bolts to the other end in order. Remove the blade hooks and insert the remaining two blade bolts and tighten.

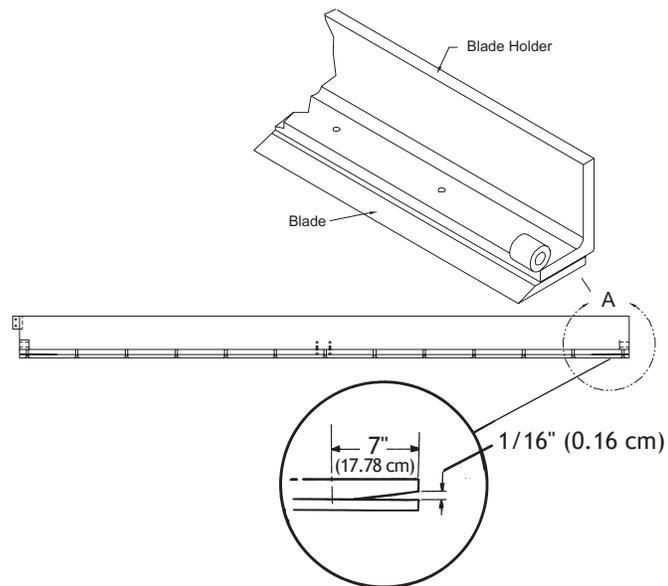


Wrong Sequence

Please note: Tightening the bolts in any other order, such as from the end to the middle or at random will result in a warped blade and uneven ice.



The blade holder is feathered by $1/16"$ (approx 1,6 mm) over the last 6" to 7" (15.2 to 17.78 cm) at each end. This prevents ridges from forming on the ice.

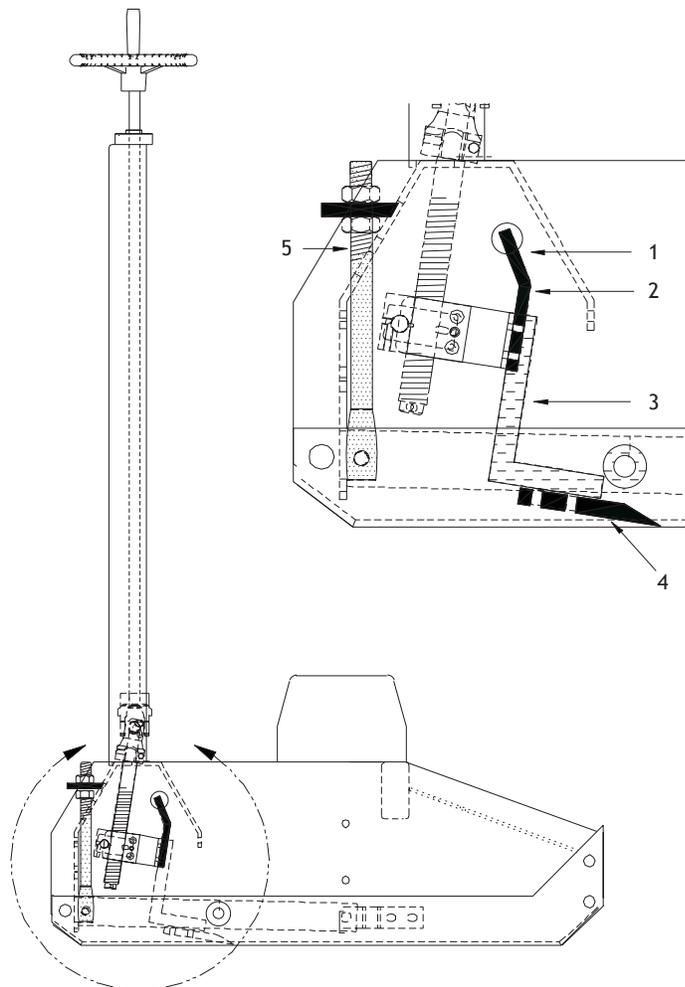


Removal of the blade is done in reverse order to that in which it was installed!



6.3.2 Blade Level Adjustment

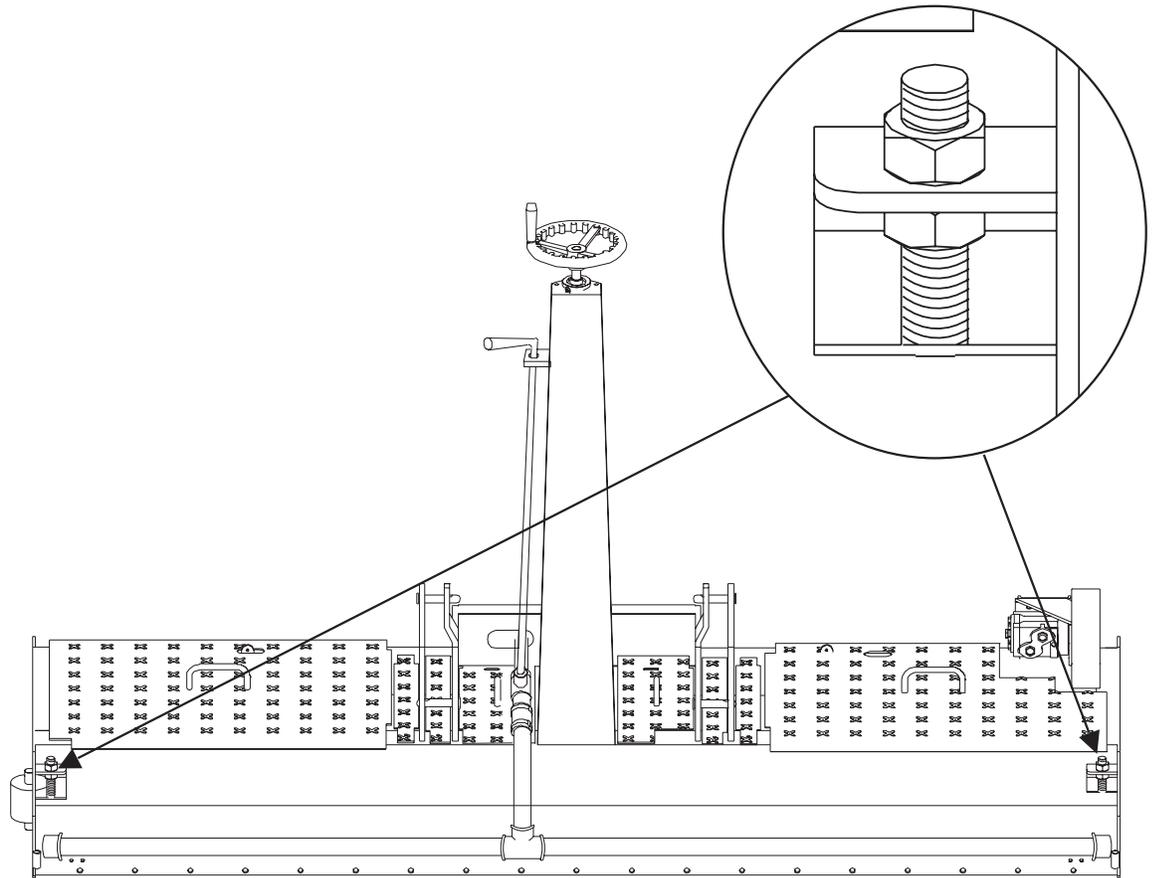
The next step is to adjust the angle of the blade. The blade adjustment crank, located on the tower to the right of the operator, raises and lowers the blade. The adjustment crank is turned until the indicator arm completely fills the sight hole at the side of the conditioner as shown below.



- | | |
|--------|----------------------|
| Item 1 | Sight hole |
| Item 2 | Indicator arm |
| Item 3 | Blade holder |
| Item 4 | Blade |
| Item 5 | Blade level adjuster |

Fig. 6.3: Blade height adjustment

If the sight hole is filled, but the blade is too low or high, go to the rear of the conditioner and using a 1 1/8" wrench, first loosen the top nut of the blade level adjusters located on each side of the rear of the conditioner shown below.



Then turn the nuts to raise or lower the blade into the proper position, which is exactly level with the bottom of the runner. Once the blade is at the proper level tighten the nuts on the blade level adjuster nuts.

When the ends of the blade are flush with the runners, the majority of the blade will extend 1/16" (1,6mm) below the runners, which is an excessive cut.

To check the level of the blade, slide a large coin along the runners of the conditioner, from back to front, until you feel it pass over the edge of the blade.



Safety Note: Be careful when doing the coin check. Make sure you are wearing gloves and that you move the coin from back to front as the blades are extremely sharp.



The sharp tip of the blade should be flush with the runners on both sides. If the blade is flush the coin will slide smoothly over the blade edge.

Blade/ Coin check

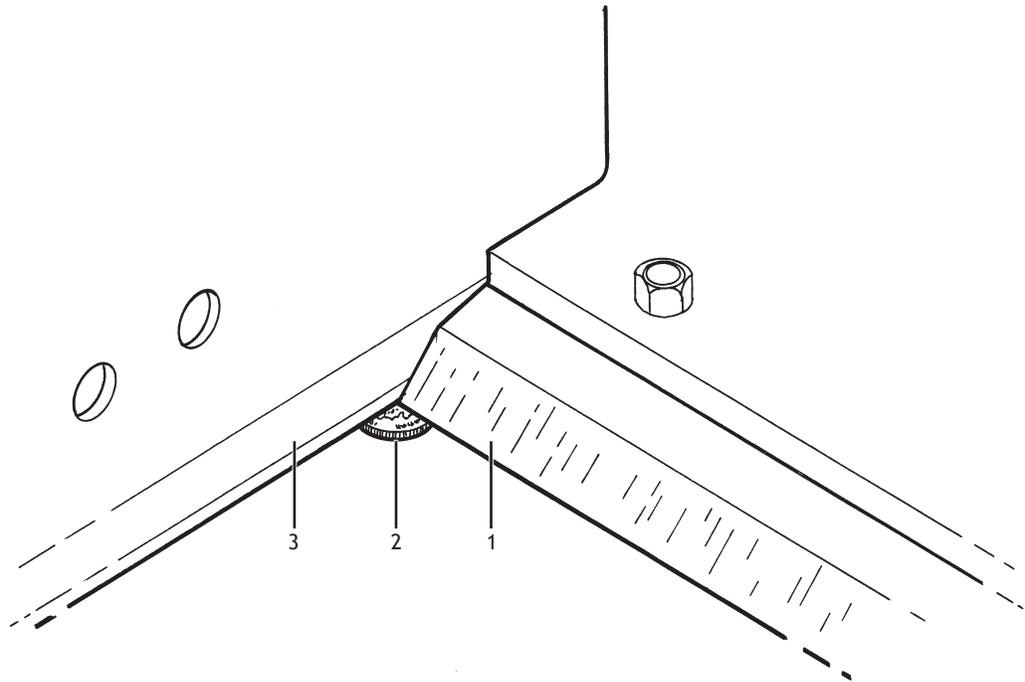


Fig. 6.4: Place a coin underneath

- | | |
|--------|--------|
| Item 1 | Blade |
| Item 2 | Coin |
| Item 3 | Runner |

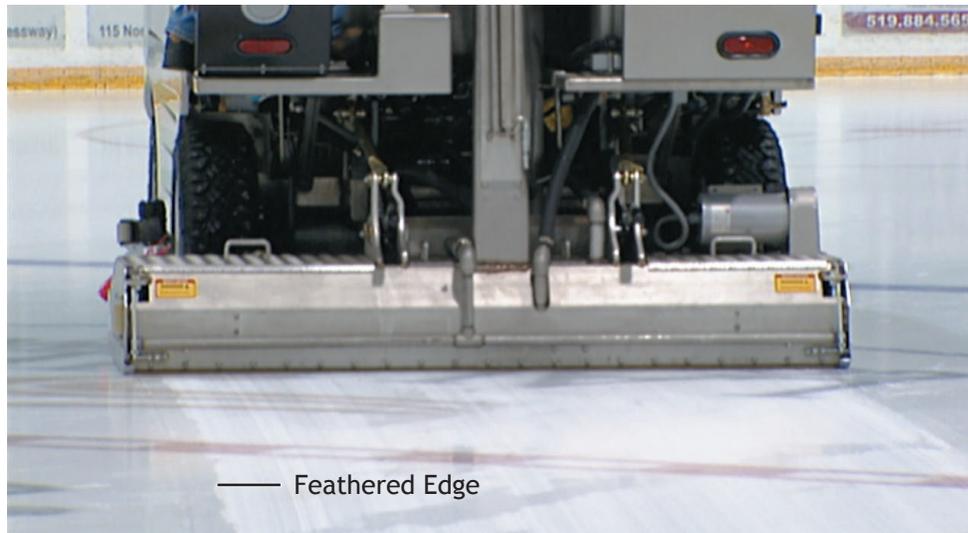
At this point go back to the blade adjustment crank and turn it counter clockwise 2 turns to raise the blade.



Please Note: It is important that the blade holder and the blade surface be free of foreign material and lightly coated with oil to prevent rust.

Test drive the OLYMPIA doing a dry cut. If the blade is properly set up you will see a feathered edge on the ice surface on both sides of the conditioner. If the feathered edge on both sides of the conditioner is not an equal distance from the runners on both sides of the conditioner, stop, dismount, and adjust the driver's side , up or down, until the feathered edge is equal distance from the runners on both sides of the conditioner.

After the blade angle and level are set, any change in the cutting depth will alter the indicator arm position in the sight hole, but blade angle tolerances will accommodate such adjustment and further adjustment of the blade angle will not be necessary.



6.4 Horizontal and Vertical Augers

The horizontal auger in the conditioner carries the snow scraped off the ice by the blade into the centre of the conditioner where a vertical auger picks it up and transports it to the snow bin in the front of the OLYMPIA.

6.4.1 Horizontal Auger Adjustment

The horizontal auger should be approximately 1/8th" (3mm) above the bottom of the runners to maximize snow pick up while at the same time preventing any marking of the ice surface.



Auger Height Adjustment

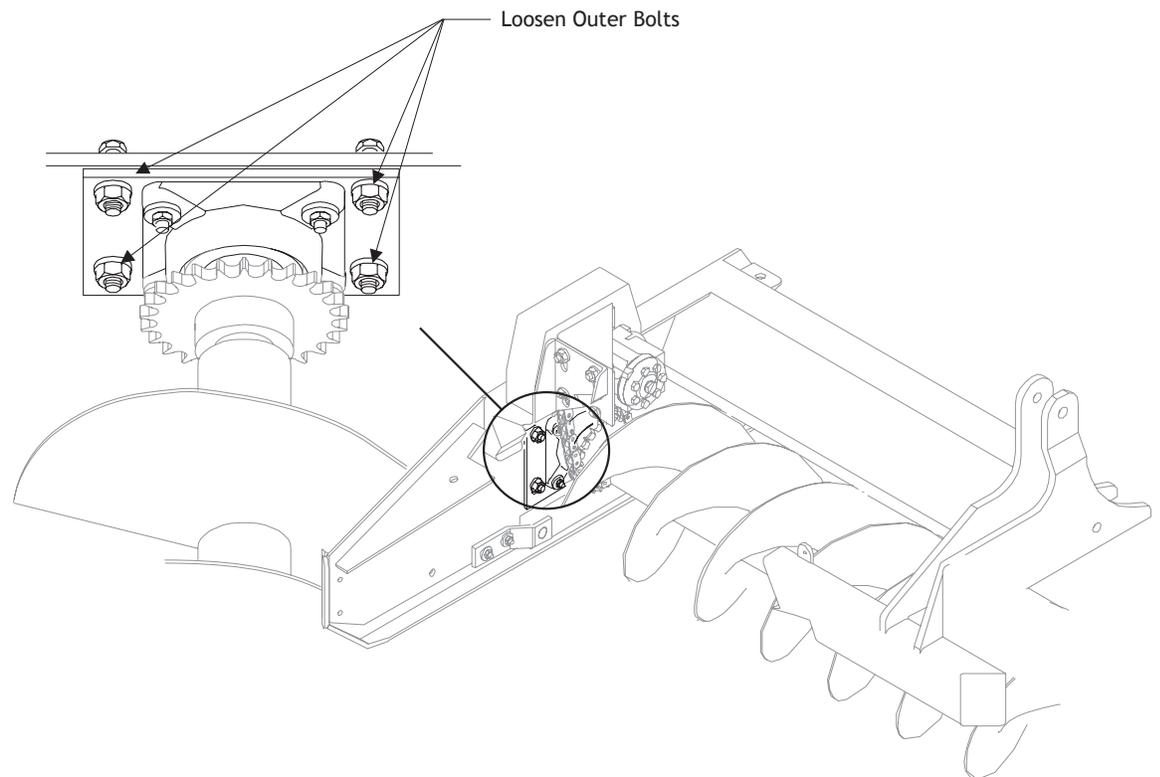
The horizontal auger is adjusted by loosening the four outer bolts on the bearing adjustment plate on each end of the auger and the four bolts for the auger motor mount. This can be checked by running a piece of string between the runners and observing the distance between the string and the auger.

Pry the auger to the proper position.

After the adjustment has been completed, re-tighten the four outer bolts on the bearing adjustment plate.

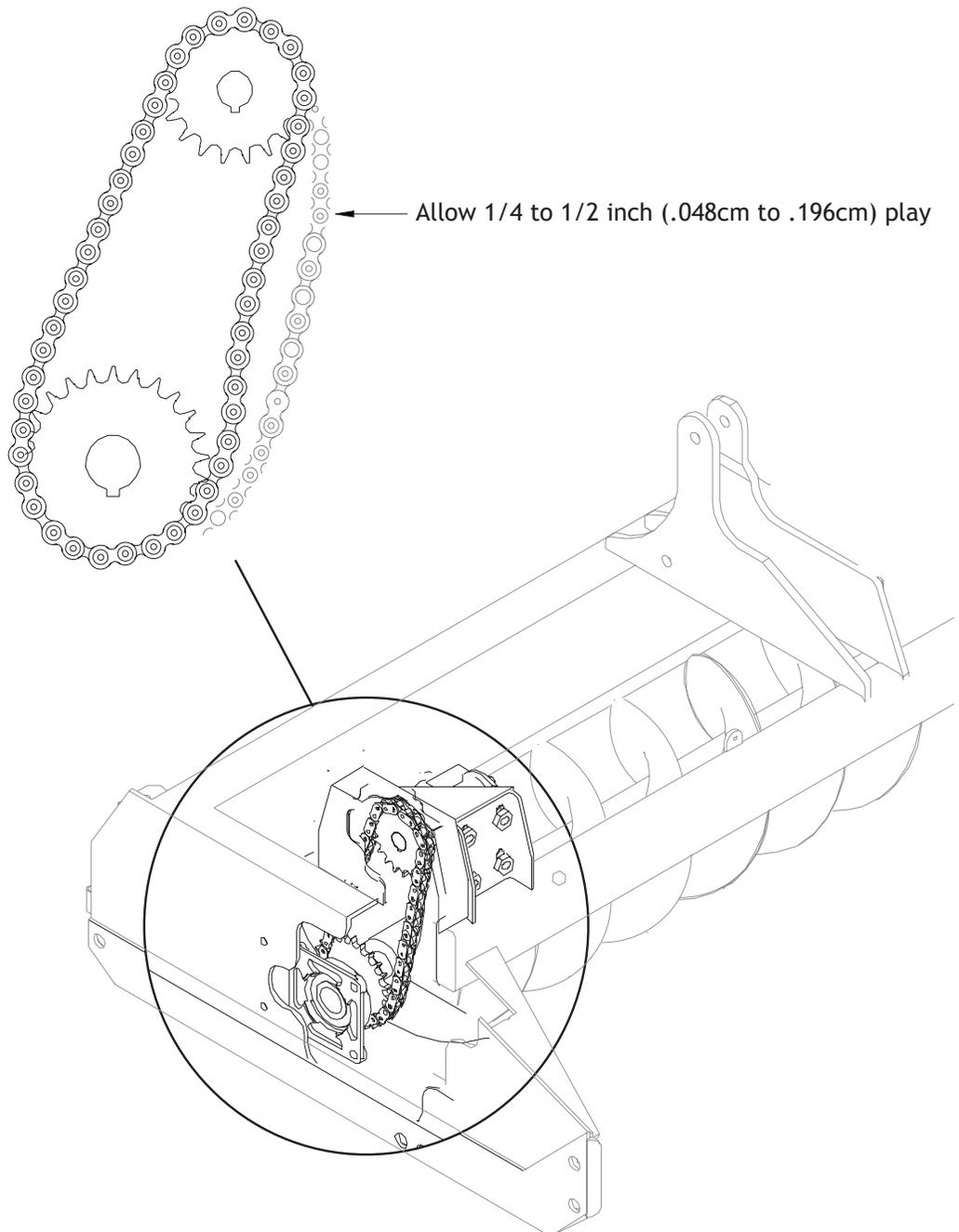
If the auger is set too low, diagonal lines may be found where the auger touches the ice.

If the auger is set too high, excessive amounts of snow will be left on the ice surface at the end of the resurfacing.



6.4.2 Auger Drive Chain Adjustment

The horizontal auger drive chain should be kept at a reasonable tension at all times. If too loose, the sprockets and chain will wear out prematurely. If too tight, the sprockets, chain and auger bearings will also wear out prematurely. To adjust the chain tension, loosen the motor mount plate bolts and adjust the motor mount until you get the proper tension.





Vertical Auger

There is only one adjustment to be made on the vertical auger, look into the inspection plate where the auger connects to the motor, the space between the coupling halves should be no more than 1/6th" (1.5mm).

Generally if the space is more than that it might be necessary to replace the bushing in the bottom of the vertical auger.

6.4.3 Down Pressure Check

Raise the blade to above the runners by turning the adjustment crank counter clockwise.

With the conditioner in the UP position, drive the OLYMPIA onto the ice surface.

Lower the conditioner to the ice surface by pushing and holding the CONDITIONER UP DOWN switch down until the lift arms are against the down pressure stops. Before operating the OLYMPIA, you should check to see if the runners are sitting level on the ice surface.

We recommend that you drive around the ice surface with the conditioner down for 2 or 3 laps to cool the runners.

To do this, the conditioner should be lowered so the runners are sitting on the ice surface and the conditioner lift arms are against the down pressure stops.

For proper traction and control the rear tires of the OLYMPIA should be in full contact with the ice surface, the entire width and 5" (12.7cm) of the circumference of the tire should be flat on the ice.

It is important to have the correct tire pressure 85 psi (5.8bar) in the tires prior to checking and adjusting the conditioner down pressure.

6.4.4 Down Pressure Adjustment

To adjust the down pressure, stop the OLYMPIA, place it in park and lower the conditioner until it is almost touching the ice surface.

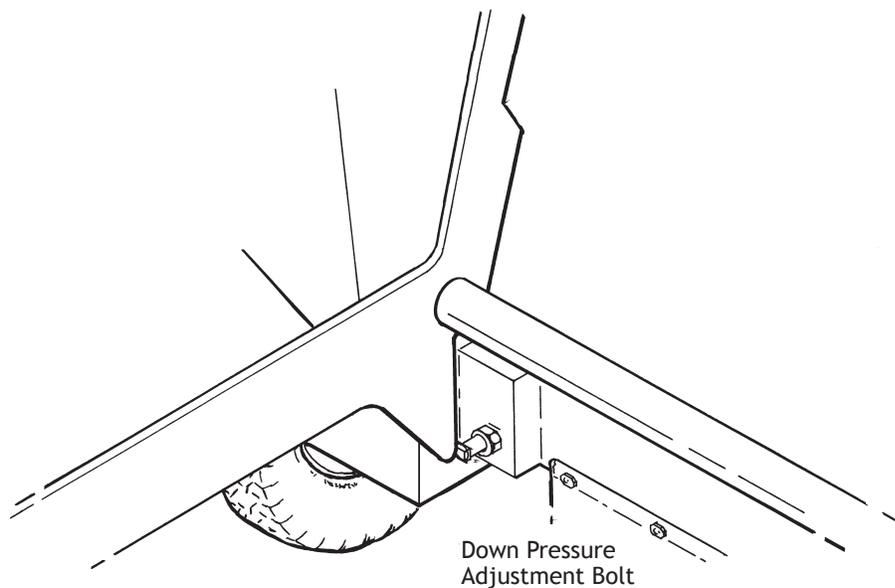
Properly dismount and turn the down pressure stop bolts in (clockwise) 5 full turns.

Remount the OLYMPIA, lower the conditioner until you have three tire lugs or 5" (12.7mm) of the tire touching the ice. Shut off the OLYMPIA, and dismount. Turn the down pressure stop bolts until they are tight against the down stops under the conditioner arms.

Now tighten the jam nuts.

Too much down pressure will lift the rear wheels off the ice resulting in a loss of control.

Too little down pressure will result in rippled ice and gouging in the corners.



Please Note: Every time you reset the down pressure you have to reset the top link adjustment.



6.4.5 Top Link Adjustment

Check to make sure the entire length of the runners are still on the ice surface.

Drive the OLYMPIA once around the rink.

When the top link is adjusted properly the rear tires should leave a full tread pattern on the ice.

Please Note: It is essential for proper operation that rear tire pressure be maintained at 85 psi (5.8 bar).

To test the top linkage, first loosen the lock nuts on both top links.

Now loosen both top links by turning them counter clockwise until there is no tension.

Remount the OLYMPIA and drive forward six feet (2 meters), stop, turn off the OLYMPIA and dismount.

Now simultaneously re-tighten the top links by turning them clockwise making sure to extend the top link to hand tight only.

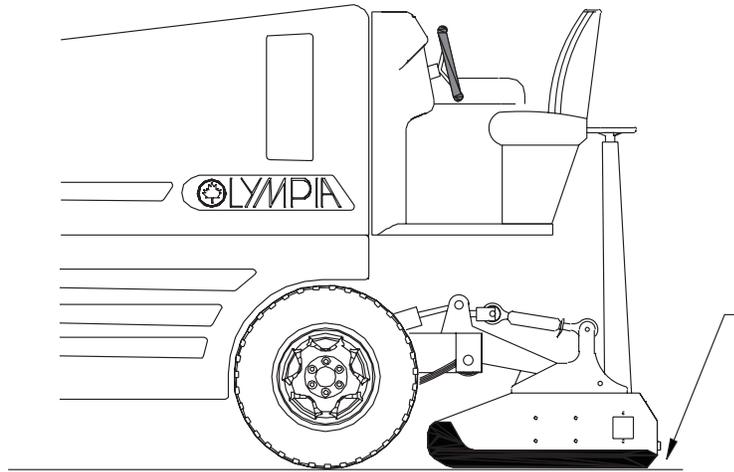
Secure the top links by tightening the lock nuts.

Check to make sure the front of the runners are still on the ice surface. When properly adjusted the runners will not leave any marks on the ice surface.

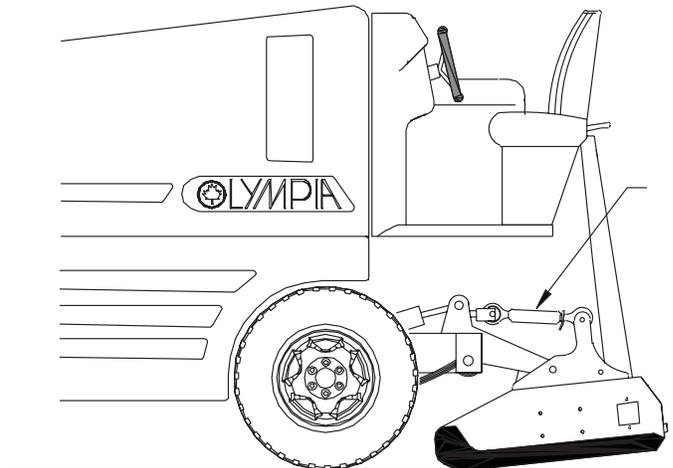


Please Note: It is essential that you adjust both top links at the same time, and in the same direction.

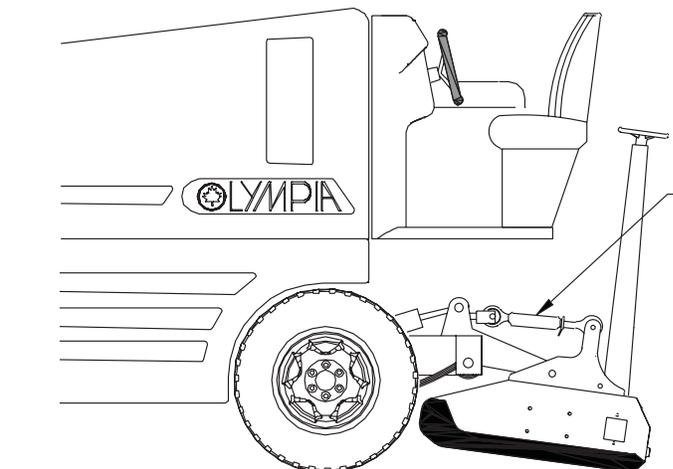
Proper Top Link Adjustment



Top Link too short



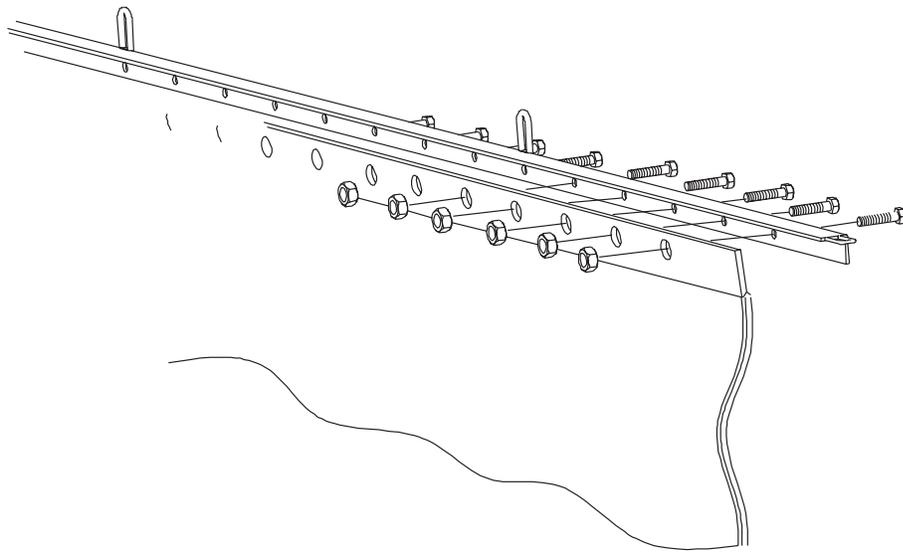
Top Link too long





6.5 Spreader Cloth Installation

1. Install the towel on the backside of the towel bar with the 3/8" hex head bolts and locknuts, making sure the nuts are on the towel side of the towel bar.
2. Place the towel bar assembly onto the towel lift guides.
3. Attach towel lift chains between the towel bar and towel lift arm.



6.6 Water Filling Procedure



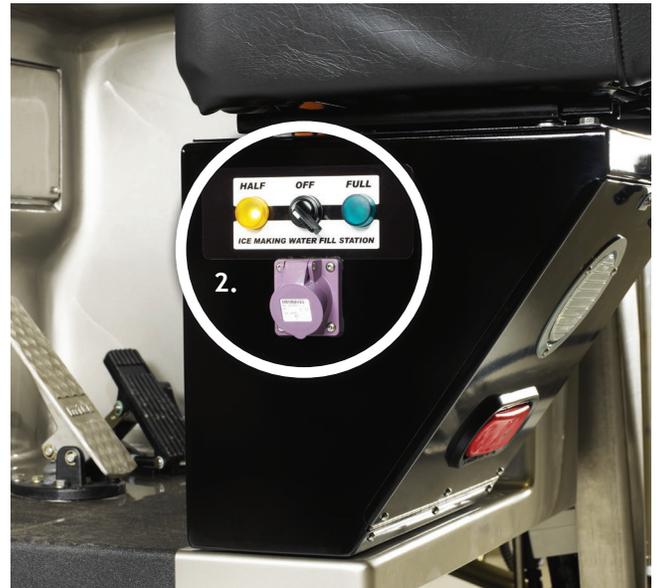
Always fill the ice making water tank with hot water, always fill the wash water tank with cold water.



Never leave the OLYMPIA unattended during the water filling procedure.

6.6.1 Ice Making Water Filling Procedure

1. To fill the ice making water tank, insert the hot water hose into the filling inlet (Item 1) on the left hand side of the OLYMPIA.
2. Plug the solenoid valve plug into the socket on the Ice making water fill station (Item 2).
3. Select whether you want to half-fill or completely fill the tank.
4. When the switch is turned, the water begins to flow until the previously selected water level is reached and the system shuts itself off automatically.
5. Return the switch to the OFF position, pull out the solenoid valve plug and remove the hose from the filling inlet.





6.6.2 Wash Water Filling Procedure

Always fill the wash water tank with cold water only.

1. Insert the cold water hose into the filling inlet (Item 1) on the right side of the ice resurfacer. Plug the solenoid valve plug into the socket on the Wash water fill station (Item 2) on the exterior right hand side of the OLYMPIA's control cabinet.
2. Turn the switch to the ON position, the water then begins to flow.
3. The filling procedure ends automatically when the tank is full.
4. Turn the switch to the OFF position, pull out the solenoid valve plug and remove the hose from the filling inlet.



6.7 Safety Circle Check

1. Do a smell check
2. Turn on the lights
3. Be sure battery charge is complete. Check to make sure battery charger is turned off.
4. Remove the ignition key.
5. Depress Emergency Shut Off switch.
6. Disconnect the battery cables and store.
7. Reconnect the internal power supply cables.
8. Make sure the front bumper wheel spins freely.
9. Check lug nuts and tire pressure and general condition of tire and studs on left front wheel.
10. At front of ice resurfacers check the body for damage
11. Look under ice resurfacers for any leaking fluids, debris and make sure no one is working under the ice resurfacers.
12. Check lug nuts and tire pressure and general condition of tire and studs on right front wheel.
13. Make sure both tank drains are closed.
14. Check lug nuts and tire pressure and general condition of tire and studs on right rear wheel.
15. Check the condition of the blade, in relationship to the runners. To avoid being cut by the blade, always start at the rear of the conditioner and slide your hand towards the front of the conditioner.
16. Check the runners for burrs that would leave scratches on the ice surface. Make sure you go the full length of the runner. The runner should have no nicks or scratches on it and the blade should be flush or slightly above the bottom of the runner.
17. Remove the conditioner cover on the right hand side and check that the horizontal auger turns freely in both directions.
18. Make sure there is no up, down or side to side movement.



19. Check the tension on the conditioner chain. There should be between a quarter and half- inch play (6,5-12,7mm).
20. Check the auger for up and down and side to side movement.
21. Check electrical connection for conditioner (horizontal auger) motor.
22. Check the blade holder pivot bolts to make sure they are tight. Replace the conditioner cover plate and install the locking pin. Go to the back of the ice resurfer and flip up the towel.
23. Check the squeegee making sure it fits tightly from end to end and there are no nicks or cuts.
24. Examine the bottom side of the towel. Make sure it is clean, debris free and that the loops of the towel are in good condition.
25. Check the bottom of the runners again for burrs or nicks.
26. If your OLYMPIA is equipped with the optional edger on the conditioner, check the cutting tips for damage and make sure the plate is securely attached.
27. Check all the hydraulic hose connections on the edger and make sure there are no fluid leaks.
28. Check the electrical connections.
29. Check lug nuts and tire pressure and general condition of tire and studs on left rear wheel.
30. Check the board brush. Make sure that no debris is caught in the brush and that there is no free play.
31. Move the snow dump tank safety support bars to the stored position and lock in place.
32. Using a three point mount, step onto the ice resurfer and sit down.
33. Turn the start key to the ON position.
34. Check the horn and the lights.
35. Make sure the conditioner is all the way up by pushing and holding the conditioner UP switch on the dash.

36. Test the elevator system. First, make sure the toggle switch is in the FORWARD position, then push the ON OFF switch for the elevator. While it is still running turn the toggle switch to the REVERSE position. The augers should come to a stop and then reverse direction. Then switch back to the forward position and shut off by lifting the ON OFF switch.
37. While the elevator is running check the snow breaker's manual override by pushing the manual override switch down and then up to make sure the snow breaker cycles.
38. If the wash water tank is full turn on the wash water only long enough to make sure the wash water valve opens and you have an unobstructed water flow on both sides of the conditioner. Note (The augers must be turned on and the gear selector in the drive position to perform this check).
39. Check the board brush by pushing the board brush switch down, to lower the board brush and then up to raise the board brush.
40. Depress the brake pedal to check the brake lights.
41. Check the blade adjustment hand crank wheel. Make sure it turns freely.
42. Visually inspect snow breaker and cylinder to make sure all fasteners are tight.
43. Turn on the tire wash to make sure the pump works.
44. At least once a month lower the conditioner almost to the floor, insert the hand pump handle into the emergency hand pump located under the seat, push the switch under the seat to the HAND PUMP position and proceed to pump the conditioner up. After this is complete be sure to return the switch to the DRIVE position. Remove the hand pump handle and restow it.
45. Remove all hoses and cables from the ice resurfacer.
46. Complete the log book entry that you have performed the circle check.
47. You have now completed the safety check and are ready to proceed onto the ice surface and begin the resurfacing process. Make sure you use the horn when crossing any pedestrian areas.



7 WORKING WITH THE OLYMPIA MILLENNIUM-E

7.1 Driving

7.1.1 Starting

To start the OLYMPIA you must be seated in the driver`s seat. The red EMERGENCY SHUT OFF switch must be in the UP position. Turn the ignition key to the right and you will hear the switches turn on inside the electrical panel.

7.1.2 To move the ice resurfacer

Depress the accelerator pedal to start the hydraulic pump. Release the parking brake and select forward or reverse gear. Press down the accelerator pedal and carefully start driving. When you are on the ice surface, carefully check the distance to the boards.



In the event of electrical drive faults depress the EMERGENCY SHUT OFF switch on the dashboard. Wait for approximately 10 seconds and lift up the EMERGENCY SHUT OFF switch. This will reset all the electrical motor controllers. Restart the ice resurfacer. If a fault code persists a pictogram will appear showing the fault code on the lower left hand corner of the DMC gauge on the dashboard.

7.1.3 Brakes

To stop the OLYMPIA, take your foot off the accelerator pedal and carefully press the brake pedal.



Always apply the hand brake (parking brake), set the gear lever to neutral and turn the ignition switch to the off position before dismounting the OLYMPIA.

7.1.4 Shifting from Forward to Reverse

Always come to a complete stop before changing the direction of travel.

Never drive in reverse when the board brush is out.



When lowering the conditioner, make sure that the OLYMPIA continuously moves forwards!

7.2 Ice Resurfacing



Only lower the conditioner while the OLYMPIA is moving forward, otherwise it could sustain damage.



When working with the OLYMPIA, there must not be any other person on the ice.



Operation and start-up must only take place from the driver's seat!



Before driving onto the ice surface make sure pedestrian doors in the dasher boards are closed.



Before leaving the driver's seat, always turn off all functions!

7.2.1 Driving with the Board Brush

Normally the brush is used for the first lap around the boards at the beginning of each ice cleaning process.

This produces a clean, snow-free board area, right up to the edges. In connection with the edger and the automatic water function, the use of the brush reliably prevents a build-up of ice at the boards.



Drive with the brush in the same way as you would without the brush, but always travel in a clockwise direction around the boards.



Never drive backwards while the brush is extended. The brush can yield to the boards in the forward direction of travel, however, when driving in reverse, the brush could swing into an opening and catch the boards, causing severe damage.

7.2.2 Water Application

Ice Making Water Procedure

1. Fill the tank with hot water through the fill pipe located on the driver`s side.

Note: A ½ full tank is more than sufficient for a single resurfacing.

2. Water flow can be turned on and off two ways.

A: Gravity flow regulates the flow of water by opening or closing the water tap mounted just in front of the blade adjustment hand wheel on the conditioner.

B: Turn on the speed related water on the bottom control panel. Ice making water will then be pumped out according to how fast or slow you are driving.



After each resurfacing it is recommended to drain any excess water left in the tank. This will reduce scale build up inside the ice making water tank.

Wash Water Procedure

The wash water system sprays water from both sides of the conditioner into the centre, in front of the squeegee, thus creating slush. Excess water and slush are then vacuumed up, taking with it any dirt and debris from the ice surface. In addition, any snow left behind by the blade is turned into slush by the wash water and is pushed into any cracks in the ice by the squeegee. The water is filtered and then returned to the wash water tank.



Always use cold water in the wash water system.

To turn on the wash water system during the resurfacing operation, depress the Wash Water switch. The water begins to flow. After 10 seconds, the wash water pump begins to vacuum up the water.

$\frac{3}{4}$ of the lap prior to completion of resurfacing, turn off the wash water, lift the Wash Water switch to the Off position. Both the water flow and the pump turn off at the same time.



By turning the wash water off $\frac{3}{4}$ of the lap before completion, any water trapped between the blade, squeegee and runners will be used up and this will prevent pooling of any water at the gate once the conditioner is raised.

The filter basket for the wash water is located in the top of the wash water tank, to the right of the driver and can be easily accessed.

Fill the water tanks with enough water to do a complete resurfacing job. Any water still remaining in the tanks at the end of the day should be drained completely, to prevent a build-up of scale.

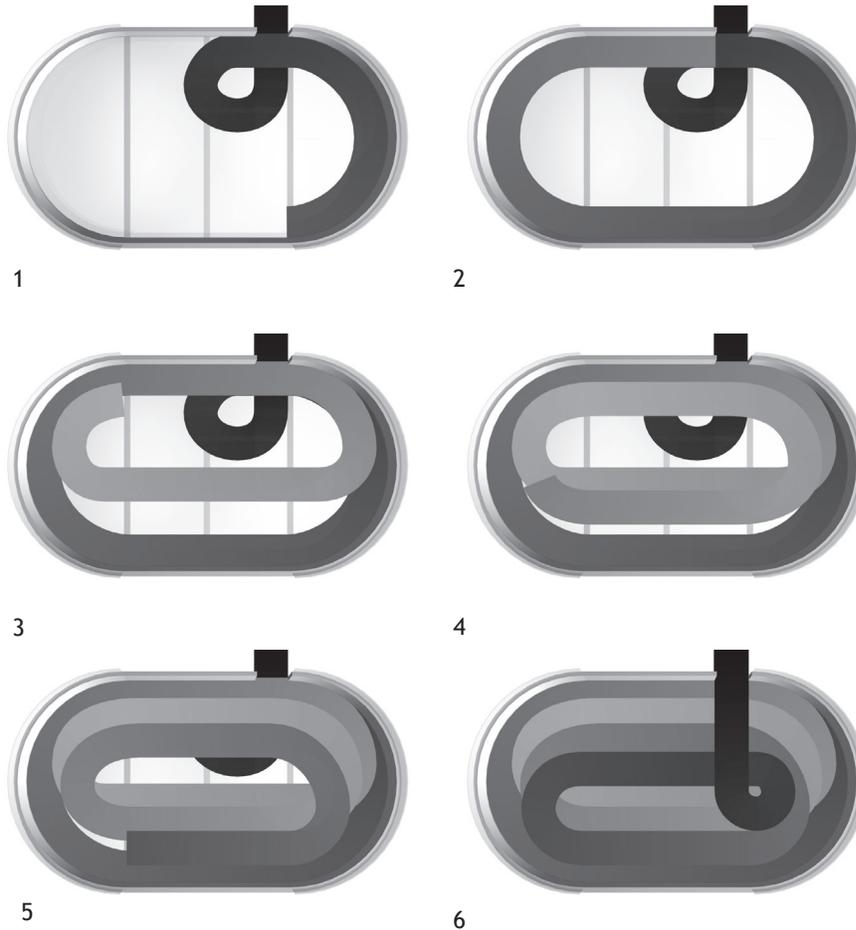
7.3 Resurfacing Procedure

Once you have taken on sufficient water, before driving onto the ice surface, turn on the tire wash to rinse the tires of any debris. Now carefully drive onto the ice surface and carry out the normal ice making procedure as follows:

- Lower the conditioner to the ice surface until the conditioner lift arms are against the down pressure stops.
- Engage both the vertical and the horizontal augers by pushing the top of the elevator on button.
- Turn on the ice making water with either the Speed Related Water button or the manually operated water valve.
- Turn on the Wash Water button.
- Now engage the board brush.
- Drive slowly ahead keeping the board brush close to the boards. (This will clean the snow on the kick plate and edges of the ice surface into the conditioner)
- Upon completion of a full circuit of the rink, retract the board brush and follow the pattern shown below.



Use extreme caution with the board brush when passing open gates as the board brush could swing into the opening, causing damage to both the boards and/ or the ice resurfacer.



- $\frac{3}{4}$ of a lap prior to completion of the resurfacing, turn off the wash water. Just prior to finishing the resurfacing, turn off the ice making water. Bring the OLYMPIA to a complete stop while the rear wheels are still on the ice surface.
- Turn off the horizontal and vertical augers.
- Lift the conditioner. Do not move the ice resurfacer until the conditioner is in the fully raised position.
- Proceed carefully to the snow dumping area. Prior to dumping check to ensure there is sufficient overhead clearance. Raise the snow dump tank button until it is completely opened
- After dumping the snow lower the snow dump tank of after dismounting install the snow dump safety supports.

- Engage the parking brake and turn off the ice resurfacer.
- After stepping down from the ice resurfacer, be sure to remove cover plates and wash out the conditioner.



In order to maintain the recommended ice thickness of 1-1/4" (36mm), it is important that you cut the ice at a rate equal to the water you put down. Usually between 1/2 and 3/4 a bin of snow will equal the amount of water put down on an 8 to 10 minute resurfacing.



Proceed with extreme caution when driving up to the snow dumping area!



The snow dumping area should meet the following safety requirements:

- Red/white cordons at the left and right of the unloading area, with pictograms.
- Yellow/black threshold on the floor that is high enough to prevent the OLYMPIA from falling into the dump.
- Guard at the front of the snow dump to prevent people from falling in.

7.3.1 Cleaning the Ice Resurfacer after an Ice Resurfacing Operation

The conditioner should be rinsed out after each use. Do not hose down the whole ice resurfacer unnecessarily. The control cabinet, the hydraulic station, the battery panels and the driver's platform may only be cleaned with a damp cloth, never with a direct jet of water.



Keep the humidity in the storage area as low as possible!



8 CLEANING AND MAINTENANCE

8.1 Cleaning and Maintenance Safety Instructions



To perform the maintenance program, park the OLYMPIA with the conditioner in the fully UP position and shift the gear lever to the neutral position (N).

Fully raise the snow dump tank and install the safety support bars.

Turn off the ice resurfacer.



Before starting any maintenance jobs, remove the ignition key from the lock and keep it on your person. Put up a notice at the dashboard that says: **DO NOT SWITCH ON! WORK IN PROGRESS IN THE DANGER ZONE!**

Dismount using the three-point procedure.



When working on any of the other hydraulically operated components of the OLYMPIA, also secure them with safety bolts or props, so that a hazardous situation does not arise in the event that a component failure. Whenever working on the conditioner it is recommended that blocks be placed under it to prevent any possible injuries.



Maintenance and repair work must only be done by duly trained personnel. Specialists are needed for some jobs (e.g. electricians, hydraulics technicians, etc.).



Before doing such jobs, the whole ice resurfacer must be switched off. To do this, push down the Emergency shut off switch and disconnect the batteries from the resurfacer as shown in section 6.1. Put up a warning notice there that says: **DO NOT PLUG IN BATTERY CONNECTOR! WORK IN PROGRESS IN THE DANGER ZONE!**



Before starting the work, the OLYMPIA must also be secured with chocks to prevent it from rolling away. The red/white plastic chains must be clearly visible at the sides of the machine. It is imperative that the chocks are removed again before putting the OLYMPIA back into operation (the red/white plastic chains serve as a reminder).



Only after the OLYMPIA has been secured in the described manner may the isolating guards be removed (if necessary).



Only duly authorized personnel are permitted to be in the vicinity of the machine when maintenance and repair work is being performed.



If mechanically driven movements are necessary on the OLYMPIA in the course of maintenance and repair work, these may only be executed on the instruction of the facility supervisor, and at a safe, reduced speed.



Before starting the work, the employee responsible for doing the work must first ensure that this can be done without endangering people or facility equipment. Only after he has done so may he switch the power back on.



Mechanically driven ice resurfacer movements can only be started in jog mode during maintenance and repair work by holding the respective controls accordingly.



After completing the maintenance and repair jobs, the responsible employee must ensure that the isolating guards are remounted and that there are no people in the danger zone. After it has been ascertained that the ice resurfacer can be put back into operation without endangering people or facility equipment, the responsible employee can restore the power to the ice resurfacer by plugging the battery connector back in again. The people working on the ice resurfacer must be informed in advance.



In an emergency, press the EMERGENCY SHUT OFF switch. Before reengaging the ice resurfacer, make sure that this can be done without endangering people or facility equipment.



Employees must wear protective gloves when doing maintenance and repair work. The hazards associated with the sharp components should be pointed out in regular training courses.



Any failure of, or damage to the safety devices or guards must be reported to the facility supervisor without delay. He will then decide how to proceed.



8.2 Maintenance Checks

Failure to carry out the basic maintenance checks can lead to damage and downtime as well as possible personal injury.

8.2.1 Daily

- Carry out circle check as described in section 5.8
- Recharge the battery (if necessary)
- Inspect all safety switches
- If your ice resurfacer is equipped with an edger, inspect all the components

8.2.2 Every Time the Blade is changed or Weekly



The procedure for changing the blade is described in Chapter 6.3.

- Re- grease the blade bolts
- Lubricate the horizontal auger drive chain
- Lightly oil bottom side of blade holder system
- Grease blade holder pivots
- Grease horizontal auger bearings
- Grease conditioner lift arms
- Grease conditioner mounting pins



- Clean the entire ice resurfacer thoroughly with a damp cloth
- Water the batteries using only distilled or RO. treated water

Never spray an open jet of water into the ice resurfacer, as electrical components will be damaged.

8.2.3 After 5 Hours

- Tighten the lug nuts

8.2.4 After 50 Hours

- Check all drive belts (vee-belts) and re- tension them, if necessary (Refer to Chapter 9.1)
- First oil change on the wheel drive gear boxes (using Dexron III)



8.2.5 Monthly

- Have the battery voltage measured and battery acid density checked by a battery specialist. Add distilled water, if necessary.
- Check whether the battery box is dry
- Inspect the hydraulic system for any sign of leaks
- Check the belt tension at all drive belts
- Check the tire pressure (85 psi or 5.8 bar)
- Check that all lug nuts are tight (140 Nm)
- Check all traction drives for leaks
- Check that the parking brake cable runs smoothly, re-lubricate it with penetrating oil, if necessary
- Check the hydraulic oil level in the hydraulic tank
- Check that the board guide roller runs smoothly
- Check the surface of the blade holder in the conditioner and lightly oil it
- Briefly test all functions
- Check the tension of the conditioner drive chain, it should not have more than ½ inch (1,27 cm) of play
- Spray lubricant onto the conditioner drive chain

8.2.6 Annually or Before Storage

- Spray all metal surfaces of the conditioner with a thin coating of penetrating oil
- Lubricate all lube points on the OLYMPIA to eliminate moisture
- The horizontal and the vertical auger and all moving parts of the conditioner must be coated with a thin coating of penetrating oil
- Open the drains
- Remove the filter basket from the wash water tank. Using a wet vac, vacuum out any debris left in the tank
- Remove the blade and properly store it
- Oil the blade holder on the conditioner
- Clean the ice resurfacers: Wash the OLYMPIA with luke- warm water and a mild soap. Make sure that you rinse off the soap with cold water before it dries and causes streaking on the surface of the OLYMPIA



Never spray an open jet of water into the ice resurfacers, as electrical components will be damaged.

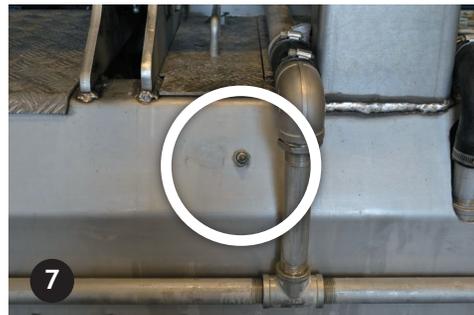
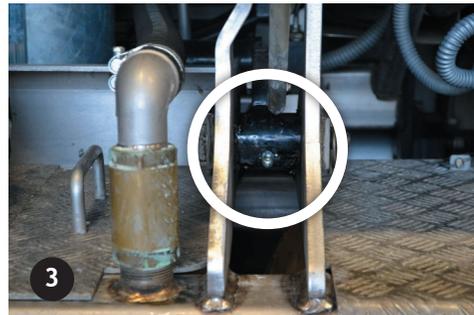
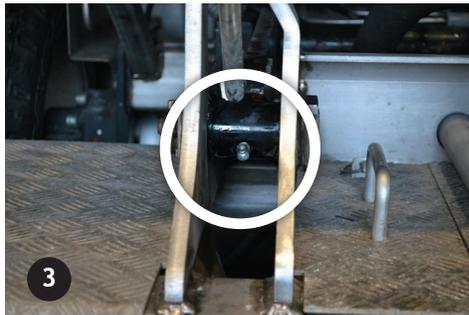
- Use a high- quality automotive wax to preserve the high- gloss finish of the OLYMPIA
- Disconnect the battery charger and leave the batteries unplugged. If storing for more than one month charge the batteries each month
- Have a qualified technician tighten all connections in the control cabinet
- Check the brake lines for leaks and wear
- Grease the entire ice resurfacers

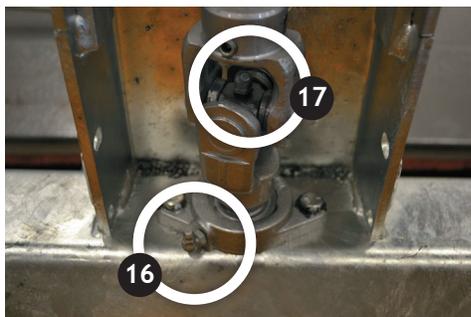
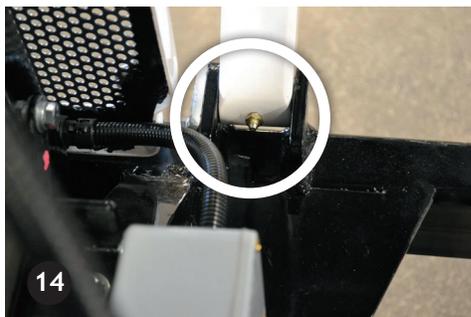
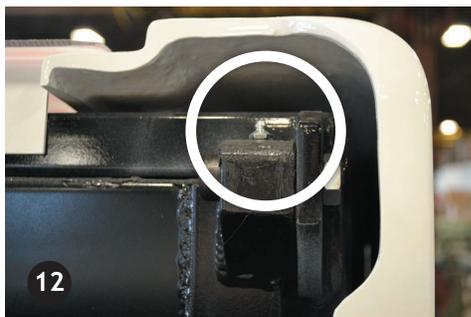
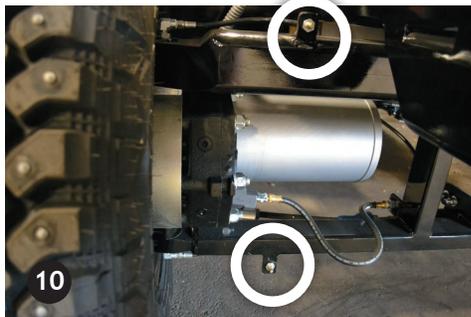


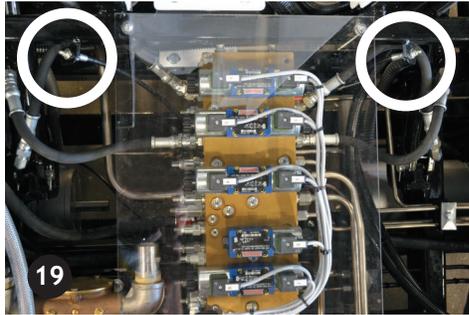
8.2.7 Lubrication to be Done Weekly and Before Long Term Storage



The lube points are shown on the separate lubrication chart in the appendix







Picture 1: Conditioner lift arm block left side

Picture 2: Conditioner lift arm block right side

Picture 3: Conditioner mount pins left and right sides

Picture 4: Board brush arm pivot and shaft

Picture 5: Blade holder pivot and horizontal auger bearing left side

Picture 6: Blade holder pivot and horizontal auger bearing right side

Picture 7: Blade adjustment screw,

Picture 8: Upper and lower king pin left side

Picture 9: Front axle center pivots

Picture 10: Upper and lower king pin right side

Picture 11: Snow dump tank cover pivot left side

Picture 12: Snow dump tank cover pivot right side

Picture 13: Snow dump tank pivot left side

Picture 14: Snow dump tank pivot right side

Picture 15: Upper bearing blade adjustment handle

Picture 16: Lower bearing blade adjustment wheel

Picture 17: Universal joint blade adjustment crank

Picture 18: Front bumper wheel

Picture 19: Parking brake linkage pivots on rear axle

8.2.8 Every 3 Years

- Change the wheel drive gear box oil (Dexron III)
- Change the board brush gear oil
- Change the hydraulic oil and filter



To put the OLYMPIA back into operation at the beginning of the season, perform the weekly maintenance procedure

9 SELF- HELP AND TROUBLESHOOTING

9.1 Squeegee Replacement

If the squeegee needs to be replaced, it should be mounted on the inside of the conditioner with hex head bolts (3/8" x 1-1/4") and locknuts. Install the squeegee such that the ends fit tightly against the sides of the conditioner.

Snow that is pushed by the squeegee is trapped between the squeegee and the runners and must not be able to escape to the outside, as it would form a ridge on the ice.

9.2 Towel Replacement

Inspect the towel and replace it if necessary. Attach the towel to the back of the towel holder with hex head bolts (3/8" x 1") and locknuts; make sure that the nuts are on the towel side of the towel holder.

9.3 Blade Replacement



Refer to Chapter 6.3, "Installation and Removal of the Blade".



10 APPENDIX

Documentation provided by the company DMC (Controllers)

Documentation provided by the company Elektron

Documentation provided by the company Siemens

Documentation provided by the company Safe T Alert

Documentation provided by the company DMC (Converter)

Electric Drawings

Hydraulic Drawings

Grease Plan

Battery Information