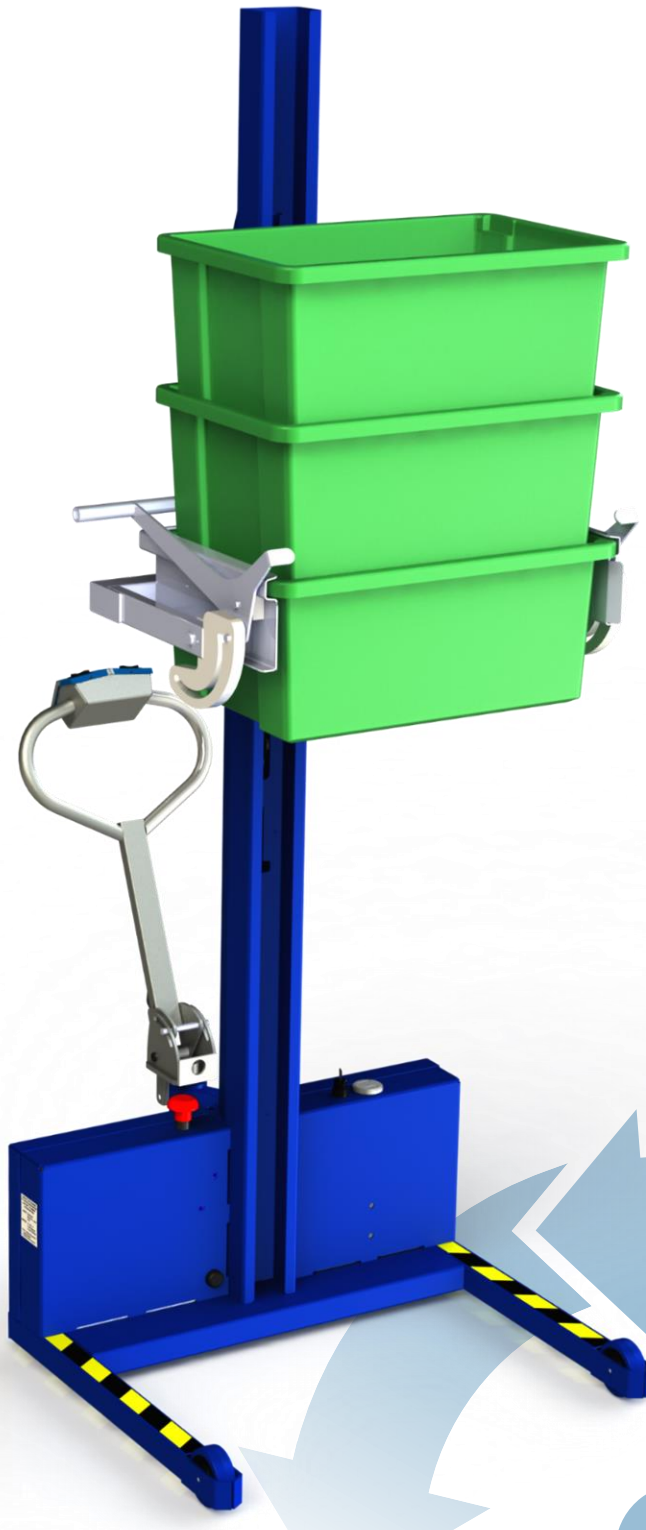
USER MANUAL

SIMPRO MICROSTACKER



For the purposes of standards compliance and international conformity, this document uses Système International (SI) units. These may be converted to Imperial units as follows:

1 kilogram (kg) = 2.2 pounds (lb)

1 metre (m) = 1000 millimetres (mm) = 39.37 inches (in) = 3.28 feet (ft) = 1.09 yards (yd)

The following stylistic conventions are used throughout this document:

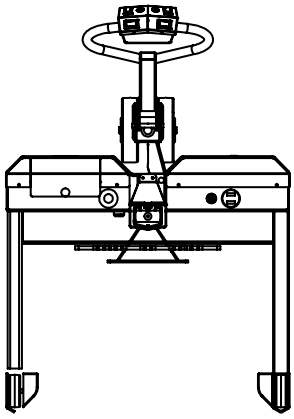
Point of interest

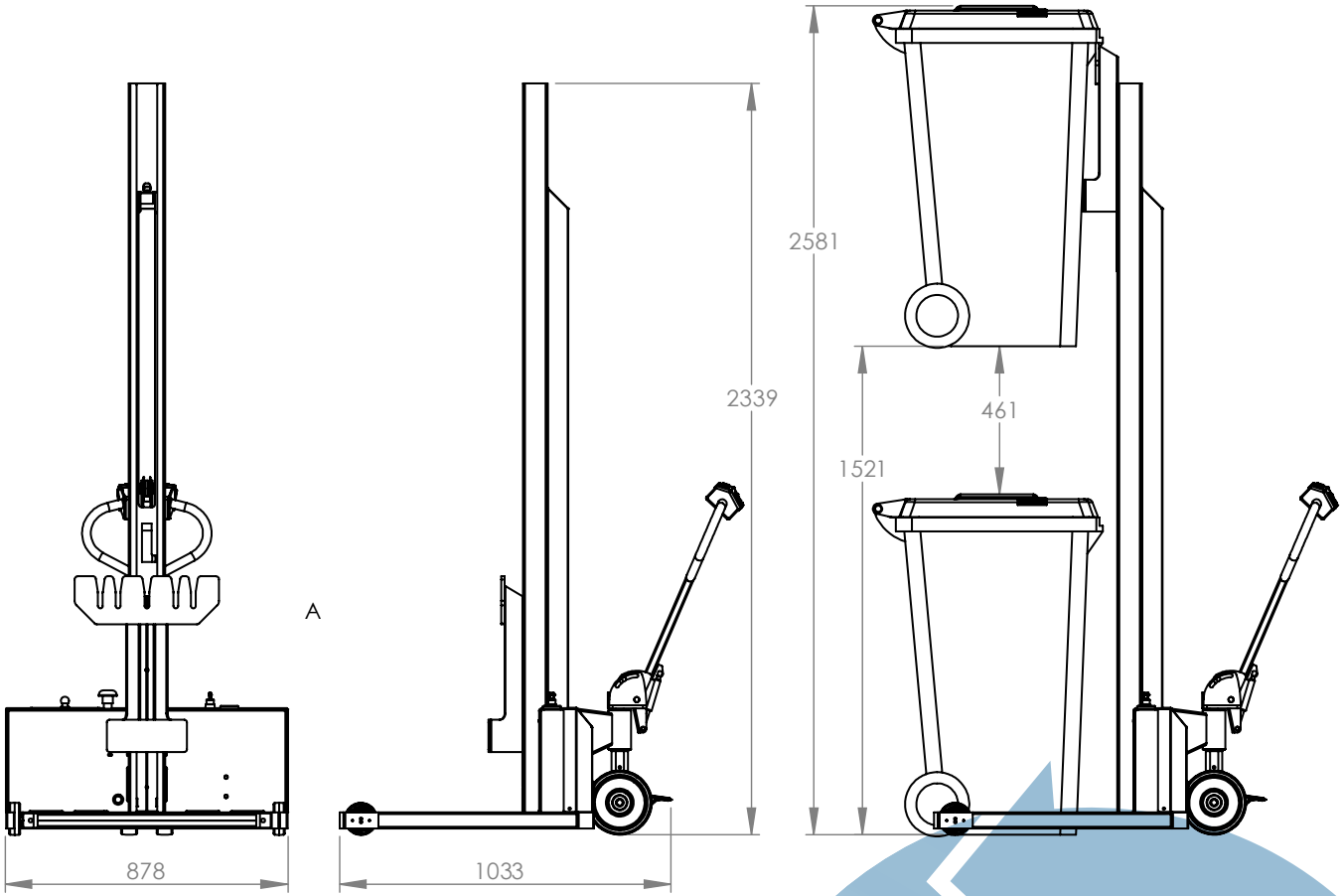
Safety hazard

§Internal cross-reference (hyperlink in PDF edition)

Simpro Partcode (hyperlink in PDF edition)

Errors in this document should be reported to info@simpro.world





MS1400 Default Layout

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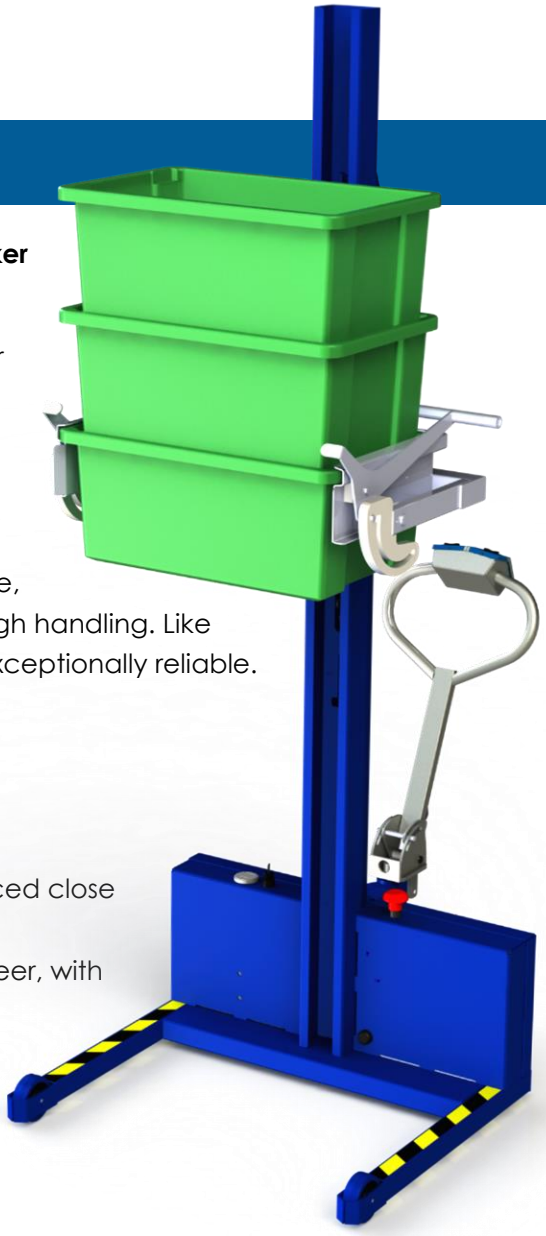


Congratulations on your purchase of a **Simpro Microstacker** electro-hydraulic pedestrian bin stacker.

With 150kg capacity and 1400mm lift height, Microstacker features interchangeable lifting arms to suit a range of common industrial bins and containers – allowing them to be lifted, stored, stacked, transported, and loaded onto trucks – quickly and safely.

Microstacker has a tiny footprint and is easy to manoeuvre, but is also very rugged and built to withstand years of rough handling. Like all Simpro products, it requires little maintenance and is exceptionally reliable.

1.1 Key features

Key features of the Microstacker include:

1. A very compact footprint, allowing bins to be placed close together.
2. A lightweight design which is easy to move and steer, with a 3-point 'stability triangle'.
3. A standard weight capacity of 150kg
4. A reliable, low-maintenance design.
5. A frame and lifting carriage manufactured from either powder-coated mild steel or SAE304 stainless-steel.
6. IP54 ingress protection, suitable for outdoors use.
7. A modular lifting carriage which can be exchanged or modified to suit a wide range of bins and containers.

1.2 Construction

The Microstacker consists of a steel or stainless-steel frame with a central mast and two stabilizing legs; a lifting carriage with various lifting attachments; a hydraulic ram, a 12VDC or 24VDC GEL or Lithium-ion battery, a hydraulic powerpack with an electric motor, pump and reservoir, a manual tiller with operating switches; electronic control circuits; two large steered wheels and two roller wheels.

1.3 Mechanism

When both RAISE buttons are pressed, an electrically-operated pump forces hydraulic fluid into the ram, causing it to extend. This movement is transmitted through a chain to the lifting carriage, which travels vertically in the mast.

When both LOWER buttons are pressed, a valve is opened which allows the hydraulic fluid to flow out of the ram back into the reservoir, causing the lifting carriage to descend. This action is not directly powered; the carriage is lowered by gravity alone.

1.4 Safe Working Load

The rated Safe Working Load of the Microstacker is **150 kilograms (330lb)**.

⚠ Never attempt to lift more than the factory-designated Safe Lifting Capacity of the machine.

1.5 Duty cycle

The figures given below are estimates only.

Power Supply	Duty Cycle	No. of bins equivalent (average ~75kg each)	Units
12V/20Ah GEL battery	3,000kg to 1.0m	40 bins	Per charge
24V/20Ah GEL battery*	6,000kg to 1.0m	80 bins	Per charge
24V/20Ah LFP battery	6,000kg to 1.0m	80 bins	Per charge

***2x 12V/20Ah batteries in series; default from 2022**

⚠ Powerpack specifications can usually be found on the machine's rating plate.

1.6 Service life

The nominal service life of the Microstacker is as follows:

Average Gross Load	Nominal Service Life
< 50kg	200,000 lift/lower cycles
50kg – 100kg	150,000 lift/lower cycles
100kg – 150kg	100,000 lift/lower cycles

1.7 Noise emissions

The noise emissions of the Microstacker do not typically exceed ~60 dB(A) at the operator's ear.

Hearing protection is not required, but is recommended if operating the machine for extended periods.

⚠ ISO standards for machinery safety specify that noise emissions are to be measured in A-weighted decibels (dB(A)), a unit of volume which is adjusted to reflect the sensitivity of human hearing. The measurements are taken at a point 1.6 metres above the ground at the operator's working position.

1.8 Environmental restrictions

The Microstacker may be used indoors or outdoors. However, the following restrictions apply:

1. Minimum floor area 2 square metres, with a clear passage to exits;
2. Height above sea level not more than 1000m;
3. Ambient temperature not higher than +40℃ and not lower than -10℃;
4. At ambient temperatures above 35℃, the relative humidity should not exceed 50%; at lower temperatures, higher relative humidity is permitted;

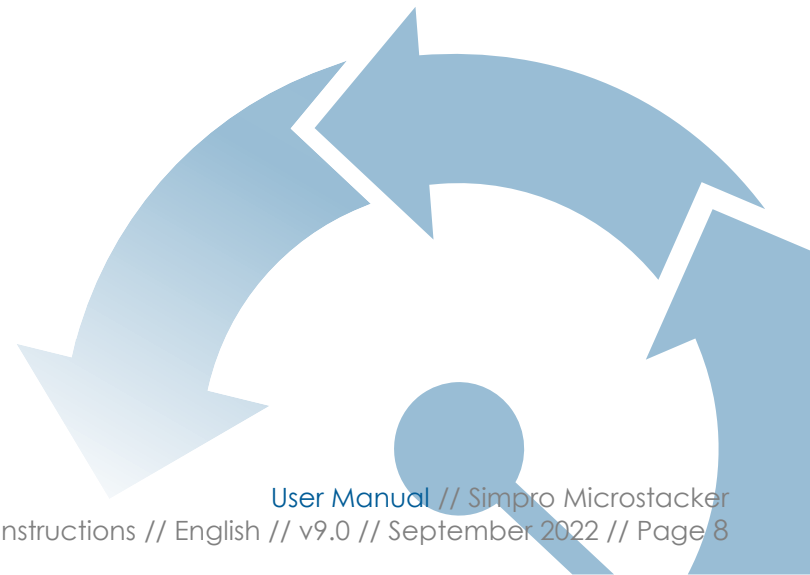
⚠ Never operate the Microstacker in highly explosive, corrosive, acidic or alkaline environments.

1.9 Ingress protection

Item	IP Rating
Push buttons, switches and lamps	IP66
Clamp-arms interlock	IP66
Coded magnetic switch	IP66
Motor	IP54 (additional protection provided by covers)
Overall	IP54 (optionally upgraded to IP66 or IP69K)

1.10 Notes

1. This User Manual describes approved procedures for the operation, maintenance, and routine inspection of the Microstacker pedestrian bin stacker.
2. This manual is written in English, and is to be considered the 'Original Instructions' for the purposes of EU Machinery Directive 2006/42/EC.
3. Operator(s) must read and understand this manual before using the machine.
4. If the machine is to be leased, sold or otherwise transferred, then this manual shall accompany the machine.
5. This is a generic manual. Simpro reserves the right to change the design of our products at any time without notification. In cases where the manual does not correspond with the actual product, use the manual as a reference guide only, and contact your authorized Simpro agent for assistance if required.
6. Contact your authorized Simpro agent if you encounter any problems or faults with the machine.
7. Errors in this manual should be reported by email to info@simpro.world.



2. Operating Instructions

Follow the instructions in this section to operate the Microstacker. Used correctly, the Microstacker can bring great improvements to workplace safety and efficiency.

- The Microstacker must be operated in strict accordance with the Safety Norms in §2.3.
- Before the Microstacker is used for the first time, a site-specific Hazard and Risk Assessment should be completed as per §5.3.
- Never attempt to operate the Microstacker if it is damaged or malfunctioning.

2.1 Identification of controls

2.1.1 EMERGENCY STOP

Press this button DOWN to instantly cut all power to the machine. Pull UP to reset.

- The Emergency Stop also functions as a heavy-duty battery isolator switch.

2.1.2 KEY SWITCH

Turn the key CLOCKWISE to turn on the power. Once turned on, the key cannot be removed.

- If the machine does not power on, check that the Emergency Stop is pulled UP.

2.1.3 BATTERY INDICATOR and HOUR METER (if fitted)

Some Microstacker models are fitted with a digital battery indicator and hour-meter. The level of charge in the battery is shown by a sequence of LED lamps. When the battery indicator shows one or two bars of charge, the machine should not be used, and should be placed on charge immediately as per §2.3.1 (AGM battery) or §2.3.2 (LFP battery).

The hour-meter shows the accumulated run time of the machine.

2.1.4 *RAISE/LOWER rocker switches*

Press the UPPER part of both switches (U1+U2) to raise the bin carriage.

Press the LOWER part of both switches (D1+D2) to lower the bin carriage.

The carriage will stop moving when either toggle switch is released, or when it reaches the maximum travel extent.

- When the arms reach the top of the mast, the lift ram comes up against a stopper. If the RAISE switches are hold on after the maximum height is released, the motor will continue to run, and hydraulic fluid will bypass through a pressure-relief valve. Although this causes no harm in normal operation, extended operation of the motor when the arms are not moving causes the hydraulic fluid to heat up and may eventually result in damage. The RAISE switches should not be held on longer than necessary.
- The pressure-relief valve limits the maximum weight that the machine can lift. If an attempt is made to lift more than the factory-set maximum (normally 150kg) the motor will run but the arms will not lift. If this occurs, DO NOT keep trying to lift the bin. Remove some material from the bin and try again.
- A flow-control valve is fitted to govern the lowering speed, which can be adjusted by a qualified technician.

2.1.5 *BATTERY SAVER button*

Where fitted, this button lights up to indicate that the Microstacker is powered on and ready to use. If the machine is left idle for several minutes, the power will be cut out automatically to maximise battery life. Pressing the button will re-awaken the machine.

2.1.6 *SAFETY SOUNDER button*

Press this button to sound an electronic warning tone.

- The horn should be regularly used when the Microstacker is moving through busy warehouses and dispatch zones, or when approaching corners.

2.1.7 *PARK BRAKE*

Lift the pedal with your foot to apply the park brake, and press down on the pedal to release the park brake. Both rear wheels are locked when it is applied.

- The park brake is not a service brake; it should not be used to slow the machine while moving down a ramp, or to bring the machine to a stop.

2.2 Basic operation

This section provides an overview of basic operation of the Microstacker.

⚠ The Microstacker does not require a license to operate. However, before using the machine in a production context, operators should be given the opportunity to familiarise themselves with its use in a safe, supervised and low-pressure environment.

⚠ Becoming a skilled Microstacker operator requires time and practice. Although the machine may feel clumsy at first, with frequent use it will soon become intuitive.

2.2.1 Turning on the power

1. Insert the KEY into the KEYSWITCH and turn it clockwise to power up the machine.
    a. The EMERGENCY STOP button may also need to be pulled out. This large red button instantly cuts power to all of the machine's systems, and also functions as a battery isolator switch.
2. If a BATTERY INDICATOR is fitted, it will now light up so you can check the level of charge.
    a. If the indicator shows only one or two bars, the Microstacker should not be used right now and should be plugged in overnight to recharge the battery.
    b. If the indicator shows two or more bars, the Microstacker is good to go.

2.2.2 Moving and steering

1. Release the park-brake by pressing it down with your foot.
2. Take hold of the tiller with both hands. By pressing forward on the tiller and turning it, you will find the machine moves and turns easily.

⚠ When operating the stacker around other people, you can make them aware of the machine by pressing the SAFETY SOUNDER button to emit an electronic warning tone.

2.2.3 Lifting and moving bins

1. Press both LOWER buttons to lower the carriage until it reached ground level.
2. Move the stacker towards a bin. The bin should be approached squarely from either the front or the rear, so that the lifting carriage correctly engages with it.

⚠ Bins that are not properly engaged with the lifting carriage may fall out at any time.

3. Press both RAISE buttons until the bin is lifted a short distance off the ground, then press forward on the tiller to start transporting the bin.
4. Once the destination (such as racking) is reached, press both RAISE buttons until the bin is lifted to the appropriate height, then slowly move the stacker forward until the bin is above the desired position.

⚠ If the racking has wheel chocks to prevent bins from moving, ensure that the bin's wheels are correctly aligned with the chocks before lowering it.

5. Press both LOWER buttons until the bin has been deposited, and the lifting arms have disengaged. The Microstacker can now be withdrawn.

2.3 Battery charging

2.3.1 AGM battery charging

To recharge the AGM batteries on an SME-spec Microstacker, simply connect the supplied C13 charging lead to the C14 socket on the machine, and plug it into a 1-phase power outlet (85-264VAC 50/60Hz).

From flat, a full charge should take around 5 hours. The charger automatically adapts to different input currents, manages the charging cycle to maximise battery life, and prevents overcharging.

- The Microstacker should be recharged whenever the battery indicator shows no more than 20% charge remaining (or when the lifting speed starts to slow noticeably).
- For optimum battery life, the Microstacker should also be placed on charge overnight and on weekends, even if the batteries are already fully charged.
- The charger is in an enclosed plastic case, and is protected against short-circuit, current overload, over-voltage, and over-temperature.

2.3.2 LFP battery charging

To recharge the LFP batteries on a PRO-spec Microstacker, simply unlatch and open the battery compartment cover, lift the battery out by its carry handle, and place it into the external charger (which can remain permanently plugged into a 1-phase power outlet).

A full charge from flat should take around 2 hours. The charger automatically adapts to different input currents, manages the charging cycle to maximise battery life, and prevents overcharging.

- The LFP batteries should be recharged whenever the battery indicator shows no more than 20% charge remaining.
- The charger is in an enclosed plastic case, and is protected against short-circuit, current overload, over-voltage, and over-temperature.

2.4 Safety Norms

The following safety norms must be observed for the safe use of a Microstacker.

- Only trained and authorised personnel may use the machine.
- Operators must read and obey all instructions and warning signs on the machine and elsewhere.
- Never transport bins while lifted more than 500mm from the ground
- Never operate the machine on soft, uneven or sloping ground.
- Never operate the machine near the edge of an elevated platform or dock with no fall protection.
- Never operate machine with covers or guarding panels removed.
- Never attempt to lift bins for which the machine was not specifically designed.
- Ensure persons other than the operator are at least 2 metres clear while operating the machine.
- Always keep feet and hands well clear of the lifting carriage and bins while operating.
- Do not place feet or foreign objects underneath the lifting carriage while it is raised.
- Do not lift over-filled or overflowing bins.

Before connecting the machine to a power supply to charge the battery, ensure the voltage and frequency correspond with that listed on the rating plate.

Do not attempt to charge the machine if the power cable or insulation is damaged.

Do not connect to a damp power socket.

Ensure the power socket is fitted with a residual current device.

Ensure there is complete continuity between the machine and an effective earthing system which complies with local and national regulations. The manufacturer cannot be held liable for the consequences of an inadequate earthing system.

3. Care and Maintenance

The Microstacker is designed to give many years of service with minimal maintenance. In the event a fault or malfunction does occur, refer to the Quick Trouble Shooting Guide in §3.1 before contacting your agent for support.

⚠ Contact your agent if repair or service work is required.

⚠ Repair and service work must be carried out by qualified personnel.
⚠ Replacement parts must be supplied by Simpro or an authorized Simpro agent, and must be of the same design and specification as the original parts.

3.1 Quick Troubleshooting Guide

Refer to the Quick Troubleshooting Guide below before contacting your agent for service.

Problem	Possible Causes	Remedy	Reference
The machine will not lift bins, and the motor does not run	Flat Battery	Recharge the battery.	§2.3.1 §2.3.2
	Tripped master circuit breaker	The master circuit-breaker may be tripped if the machine is operated with a flat battery, or a short-circuit occurs. It is designed automatically reset after a short delay.	§3.4.4
	Tripped battery circuit breaker	PRO machines are supplied with an EL20_C Lithium-ion battery pack, which has an integrated circuit breaker. Press the BATTERY SAVER button to reset this breaker.	§2.1.5 §3.4.2
	Faulty raise/lower buttons or wiring	Check and rectify.	
	Faulty raise relay	The relay contactor should click when the 'up' button is pressed – if not, contact your agent.	
The machine will not lift bins, although the motor runs	Bin too heavy	Manually remove material from the bin to reduce the weight. The Microstacker is designed to lift 150kg max.	§1.4 §3.3.1.1
	Pressure-relief valve set too low	Contact your agent for instructions on how to adjust the pressure-relief valve.	§3.5.2.2
Carriage will not come down from the fully raised position	Carriage sticking in masts	Spray lubricant inside of masts. Lubricate the roller arms at top of carriage.	§3.3.2
	Lift ram jamming	Contact your agent for support.	§3.3.2
	Faulty switch, wiring, or lowering valve	The lowering valve should click when the button is pressed – if not, check the switch, wiring and electro-magnetic coil.	§3.3.2

3.2 Cleaning

The machine can be washed down using water and a mild cleaning agent. Avoid directing high-pressure water jets at the controls or powerpack enclosure.

⚠ For IP ratings of the machine and various subcomponents see §1.9.

3.3 Carriage jams

Occasionally the bin carriage may become jammed at some point. This is normally a minor issue which can be easily rectified.

> ⚠ The bin carriage is not powered down – it is lowered by gravity alone.
> ⚠ See §3.5 for details and schematics of the hydraulic system.

3.3.1 Bin carriage jams while raising

If the carriage jams while raising the cause may be either an overweight bin, or a mechanical fault, such as a bent mast or misaligned sliding block.

3.3.1.1 Overweight bin

1. Lower the bin carriage to ground level.
2. Remove some material from the bin, then try again.

> ⚠ If the pressure-relief valve is adjusted incorrectly, the Microstacker might stall even when lifting bins that are within the machine's Safe Working Load (150kg) – see §3.5.2.2.

3.3.1.2 Mechanical fault

1. If possible, lower the carriage to ground level and remove the bin.
2. Attempt to visually identify the cause of the jamming. The most likely causes are:
    a. The mast may have been bent or damaged.
    b. Lack of lubrication.
3. With the carriage lowered, rectify the problem by straightening and/or realigning the mechanical components as required. If the mast is bent, you may need to contact your agent for support.
4. Carry out several complete lifting cycles to ensure the problem is fully resolved.

3.3.2 Carriage jams while lowering

If the carriage jams on the way down, or has jammed on the way up but will not come down, it may be due to a hydraulic, electrical, or mechanical fault.

3.3.2.1 Hydraulic or electrical fault

When the LOWER button is pressed, the lowering valve should emit a 'click' sound as it opens. If it does not, the problem may be either a hydraulic or electrical fault.

1. If the lowering valve is receiving a signal but not opening, it may simply need to be cleaned. This can be carried out by a technician with a knowledge of electro-hydraulic systems:
    a. Provide support for the bin carriage with a sling attached to a forklift or crane.

> ⚠ Never place any part of your body beneath the bin unless it is securely supported.

    b. Isolate the battery by pressing the EMERGENCY STOP button, and remove the covers from the powerpack enclosure.
    c. Remove the lowering valve coil from the valve stem.
    d. Unscrew the lowering valve cartridge.
    e. Clean the cartridge with compressed air.
    f. Replace the lowering valve by reversing the above procedure.

2. Release the bin carriage, power on the machine and carry out several lift/lower cycles to ensure the problem has been properly resolved.
3. If the lowering valve still does not operate correctly even after being thoroughly cleaned, it may need to be replaced – contact your Simpro agent.

3.3.2.2 *Mechanical fault*

If the lowering valve is operating correctly (emits a 'click' sound when the LOWER button is pressed), the problem may be a mechanical fault.

1. Isolate the battery by pressing the EMERGENCY STOP button.
2. Provide support for the carriage and bin with a sling attached to a forklift or crane.

⚠ Never place any part of your body beneath the bin unless it is securely supported.

3. Attempt to visually identify the cause of the jamming. The most likely causes are:
    a. The mast is bent or damaged.
    b. Lack of lubrication.
4. Rectify the problem by straightening, realigning, and/or lubricating the components as required. If the mast is bent, you may need to contact your agent for support.
5. Release the bin carriage, power on the machine and carry out several lift/lower cycles to ensure the problem has been properly resolved.
6. If the bin carriage still does not lower, contact your Simpro agent for support.

3.4 Electrical System

The Microstacker operates on 12VDC or 24VDC electric current supplied by an onboard battery. This current is used to power the control circuits and the series-wound 0.8kW electric motor which operates the hydraulic pump.

The motor only runs when both RAISE buttons are pressed; the bin carriage is lowered by gravity alone. As a rule, one full charge is sufficient to lift at least 40 bins, but this is dependent on the lifting height and condition of the battery.

3.4.1 SME-spec Microstacker

3.4.1.1 AGM batteries

The SME-spec Microstacker is fitted with two maintenance-free 12V/20Ah AGM batteries, connected in series to output 24VDC, and a 160A onboard charger.

⚠ Machines manufactured prior to 2022 are fitted with a single 12V/20Ah AGM battery and 136A onboard charger

3.4.1.2 AGM battery charger

The SME-spec Microstacker is fitted with a 160W onboard charger, which accepts 85-264V 50/60Hz 1-phase input, draws up to 3 Amps, and outputs 27.2VDC at up to 5.9 Amps.

⚠ The battery charger is in an enclosed plastic case and protected against short-circuit, current overload, over-voltage, and over-temperature conditions.

⚠ Machines manufactured prior to 2022 are fitted with a 136W onboard charger, which accepts 85-264VAC 50/60Hz 1-phase input, draws up to 3 Amps, and outputs 13.6VDC at up to 10 Amps.

3.4.1.3 Battery indicator and hour meter

Some SME-spec Microstackers are fitted with a combined battery indicator and hour meter, mounted onto the body of the machine.

⚠ When the indicator is showing one or two bars of charge, the machine should not be used, and should be recharged as soon as possible.
⚠ Attempting to operate the machine with flat battery may trip the master circuit breaker (see §3.4.4) and can also damage the battery.

3.4.1.4 AGM battery care

The AGM batteries are maintenance-free and designed to last up to five years. However, battery life is dependent on several factors, including the number of charge/discharge cycles, the depth of discharge and environmental conditions.

To maximize the life of the AGM batteries, observe the following rules.

- Recharge the batteries overnight and on weekends.
- Do not leave the batteries in a discharged state for more than 24 hours.
- Do not attempt to operate the machine when the batteries are flat.
- Do not expose the batteries to extremes of temperature.

⚠ The AGM batteries are supplied with a 12-month manufacturer's warranty, separate from the warranty on the rest of the machine.

3.4.2 PRO-spec Microstacker

3.4.2.1 LFP batteries

The PRO-spec Microstacker is fitted with a 24V/20Ah LFP battery in a removable carry case, and is supplied with an external charger. Additional battery packs can be recharged and "hot-swapped", allowing the Microstacker to operate 24/7.

The LFP batteries have an integrated circuit breaker, which automatically trips out if the voltage drops too low, or if the machine is not used for several minutes. It can be reset by simply pressing the BATTERY SAVER button on the tiller head.

3.4.2.2 LFP battery charger

The PRO Microstacker is supplied with an external smart charger which accepts 1-phase 100-240V 50/60Hz input, drawing up to 4 Amps. It outputs 24V continuous direct current at up to 10 Amps, for a maximum power output of 240 Watts.

The charger comes with a wall-mountable case to fit the EL_20C battery, and plugs into an ordinary 1-phase mains power outlet.

⚠ The charger is in an enclosed plastic case and is protected against short-circuit, current overload, over-voltage, and over-temperature.

3.4.2.3 *LFP battery indicator and hour meter*

Some PRO Microstacker models are fitted with a battery indicator, mounted on the body of the machine. This instrument also contains an hour meter.

3.4.2.4 *LFP battery care*

The LFP battery is maintenance-free and designed last up to 3000 charge/discharge cycles. However, battery life is dependent on several factors, including the depth of discharge and environmental conditions.

To maximize the life of the LFP battery, observe the following rules.

- Recharge the battery regularly.
- Do not leave the battery in a discharged state for more than 24 hours.
- Do not expose the battery to extremes of temperature.

⚠ LFP batteries are supplied with a 12-month manufacturer's warranty, separate from the warranty on the rest of the machine.

3.4.3 *Emergency Stop*

Some Microstacker models are fitted with a heavy-duty Emergency Stop button, which also serves as a battery-isolation switch. It should be pressed if the machine is to be placed in storage, or the powerpack covers need to be removed.

3.4.4 *Circuit breaker* 0790050374

Some Microstacker models are fitted with an auto-resetting circuit breaker on the battery cable. The breaker is triggered by excessive current draw and helps prevent potential damage caused by operating the machine with a flat battery, or by an internal short-circuit.

The circuit breaker will automatically reset a short time after it has been tripped.

⚠ Because the current draw of the motor increases as the battery voltage drops, operating the machine with a flat battery may trigger the circuit breaker.

3.5 Hydraulic System

3.5.1 *Powerpack*

The hydraulic powerpack is supplied as a complete unit. The motor, pump, oil tank, and all control valves are mounted into the centre manifold.

3.5.2 *Control valves*

The hydraulic system has four primary control valves.

3.5.2.1 *Check valve*

This is a one-way valve which prevents oil from flowing back through the pump when the motor is stopped.

3.5.2.2 *Pressure-relief valve*

This is a spring-loaded valve which allows oil to flow back into the reservoir when the hydraulic pressure exceeds its rated limit – usually from lifting an overweight bin, or from operating the machine when the carriage is already at the top of the cycle.

⚠ If this valve is adjusted incorrectly, the Microstacker might fail to lift bins that are within the machine's Safe Working Load (150kg). Should this occur, contact your Simpro agent for instructions on how to adjust the pressure-relief valve.

3.5.2.3 Lowering valve

This is a solenoid-operated valve which opens when the LOWER buttons are pressed and allows oil to flow back to the reservoir, lowering the carriage.

3.5.2.4 Lowering-speed valve

This is a pressure-compensating valve which limits the flow rate of oil passing through the lowering valve, regulating the descent speed of the carriage (regardless of bin weight).

3.5.3 Lift Ram

The lift ram is a single-acting displacement type, very robust and reliable, but easy to maintain should the need arise. A hydraulic line runs from the powerpack to the lift ram.

3.5.4 Open Ram

The open ram is a single-acting displacement type, very robust and reliable, but easy to maintain should the need arise.

A flexible hydraulic line runs up the mast from the powerpack to the open ram.

3.5.5 Hydraulic fluid

The hydraulic system is designed to use mineral oil-based hydraulic fluid with a viscosity grade of 22 (ISO VG22). Fluid with a higher viscosity grade may be used, but will reduce the lowering speed of the carriage and increase the likelihood of jams.

The hydraulic fluid should have physical lubricating and chemical properties as specified by:

- Mineral Oil Based Hydraulic Fluids HL (DIN 51524 part 1)
- Mineral Oil Based Hydraulic Fluids HL P (DIN 51524 part 2)

⚠ Ensure the carriage is completely lowered before replacing the hydraulic fluid.
⚠ The hydraulic reservoir has markings showing the recommended fill level. Do not fill beyond this level unless specifically advised to do so by the manufacturer.

3.5.6 Maintenance

As the pump only runs while the carriage is lifting, it can take more than 500 cycles to reach one hours' run time of the powerpack. The oil should be replaced, and the suction filter cleaned after 12 months, then after every 100 hours of run time. The lowering valve should also be removed and cleaned at this time.

3.6 Preventative Maintenance Inspections

It is recommended to carry out regular Preventative Maintenance Inspections of the Microstacker. This helps to ensure operator safety and extend the service life of the machine.

The PMI schedule is divided into two parts: monthly and annual inspections. The following section contains checklists and logs for documenting each PMI.

⚠ Operators should immediately stop using the machine and request an inspection if any fault or abnormal operation is observed.

3.6.1 Pre-inspection checklist

1. Wear suitable Personal Protective Equipment (PPE), including safety boots and protective eyewear.
2. Ensure there are no ignition sources nearby.
3. Lower the cradle and remove bin.
4. Turn off the key switch and unplug the charging lead.
5. Remove the powerpack cover.
6. Clean the powerpack and electric circuitry with compressed air.
7. Always use height safety equipment when servicing elevated areas.

3.6.2 Monthly inspection

The following inspection should be carried out monthly, and the results recorded in the log.

Monthly Inspection Checklist			
Category	**No.**	**Item**	**Check**
General	1	Entire machine	Visually inspect for dented or broken parts. Conduct a complete lifting cycle and check for any faults or abnormal behaviour.
Hydraulic systems	2	Hydraulic ram	Check there are no oil leaks.
	3	Oil reservoir	Check the level of hydraulic fluid, and top up if necessary as per §3.5.5.
Safety systems	4	Dual-hand controls	Check that dual-hand controls operate correctly, and machine stops instantly when either button is released.
Mechanical systems	5	Inside mast	Lightly lubricate with silicone spray.
	6	Wheels	Check that the wheels are running smoothly and the footbrake is working correctly.

Date	Service Person	Location	Checks complete	Notes on repairs or maintenance required	Parts and materials used

3.6.3 *Annual inspection*

The following inspection should be carried out annually, and the results recorded in the log.

Annual Inspection Checklist			
Category	**No.**	**Item**	**Check**
General	1	Entire machine	Visually inspect for dented or broken parts. Conduct a complete lifting cycle and check for any faults or abnormal behaviour.
Hydraulic systems	2	Hydraulic ram	Check there are no oil leaks.
	3	Oil reservoir	Drain and replace the hydraulic fluid as per §3.5.5. Clean the oil suction filter.
	4	Lowering valve	Remove and clean.
Electrical systems	5	Charging lead	Check that the charging lead is in good condition, with no frayed or damaged insulation.
Safety systems	6	Dual-hand controls	Check that dual-hand controls operate correctly, and machine stops instantly when one button is released.
	7	Safety Labels	Check that all warnings labels, guides etc are attached and clearly legible.
Mechanical systems	8	Mast, lifting carriage and arms	Not twisted or damaged. No cracked or broken welds.
	9	Inside mast	Lightly lubricate with silicone spray.
	10	Wheels	Check that the wheels are running smoothly, and the park brake is working correctly.

Date	Service Person	Location	Checks complete	Notes on repairs or maintenance required	Parts and materials used

4. Assembly, Handling and Storage

4.1 Assembly

The Microstacker is usually delivered fully assembled.

4.2 Moving

When the machine is standing upright it may be easily moved on its wheels, using the steering tiller. To ensure stability, the lifting carriage should be positioned just off the ground when moving the machine.

⚠ Extra care should be taken when moving the machine on sloping ground.

4.3 Lifting

If the machine needs to be lifted for any reason, carry out the following procedure:

1. Confirm the weight of the machine on the rating plate and check that the lifting equipment that is to be used has sufficient capacity.
2. Affix a lifting sling or chain around the top frame cross-member (or to the lifting lugs if provided).
3. Use one person to operate the lifting equipment, and at least one other person to watch for obstructions and hold the machine steady if required.
4. Lift, move and lower the machine into place, ensuring it always remains upright.

⚠ The Microstacker weighs between 150kg and 200kg. Always verify the weight of the machine on the rating plate, and check the lifting equipment that is to be used has sufficient capacity.

⚠ Never stand or reach underneath the machine while it is being lifted.

4.4 Transport

Carry out the following procedure to prepare the machine for transport:

1. Apply the brake and press the Emergency Stop.
2. Use appropriate lifting equipment to place the machine onto a wooden pallet, and securely strap it into place. If necessary, the Microstacker can be laid over onto its left or right side before being strapped down.

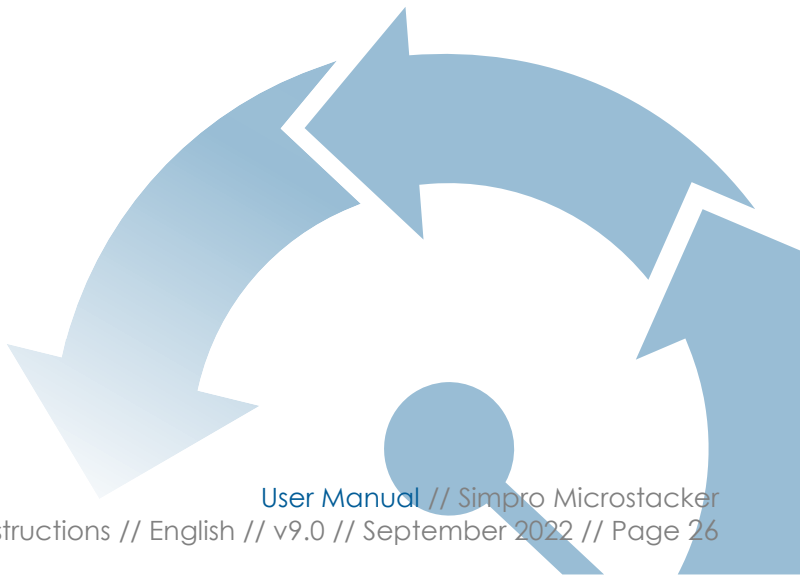
⚠ To prevent oil leaks and damage to the frame, do not lie the machine onto its front or back for transport.

3. Load the pallet onto the truck or trailer.
4. Tie the pallet and machine into position using only marked tie-down points and strops rated to at least 1000kg. Ensure it is fastened against lateral forces from any direction.

4.5 Storage

If the Microstacker is not to be used for a period of two months or more, it should be stored in a clean, dry place with good ventilation, at temperatures not below 0℃. Before placing the machine into storage, carry out the following procedures:

1. Clean the machine thoroughly.
2. Carry out several full lifting cycles, then lower the carriage to the ground.
3. Apply a thin layer of silicone lubricant to exposed surfaces of moving parts.
4. Charge the battery and apply a suitable contact oil to the electrical contacts.
5. Depress the Emergency Stop.
6. Remove the key and store in a safe location.



5. Safety Assessment

The Microstacker has been designed to be as safe as possible without restricting the ease-of-use and versatility of the machine.

⚠ Before the Microstacker is used for the first time, a site-specific Hazard and Risk Assessment should be completed as set out in §5.3.

5.1 Safety features

The safety features of the standard Microstacker design are as follows:

1. A dual-hand control system, which prevents the operator from moving their hands away from the control panel while using the machine.
2. A monomast design which provides a clear view of stacking operations while preventing access to the lift ram and chain.
3. A prominent EMERGENCY STOP button to instantly disable the machine.
4. A lifting action which maintains the mass of the bin within the machine footprint.
5. A pressure-compensating lowering valve, which automatically regulates the lowering speed regardless of the weight of the bin.
6. Covers to prevent unauthorised personnel from accessing internal electrical and hydraulic components.

5.2 Reasonably foreseeable misuse

The reasonably foreseeable misuse considered in the design of the Microstacker is as follows:

1. Attempts to use the machine by untrained operators;
2. Attempts to lift bins that the arms are not specifically designed to hold;
3. Attempts to bypass the two-hand controls, emergency stop or other safety systems;
4. Attempts to clean the machine without following proper procedures.
5. Service or repairs carried out by unqualified personnel

5.3 ISO12100 Hazard and Risk Assessment Guide

In most jurisdictions, health and safety legislation requires machinery owners to assess the safety of their machinery **in the actual conditions of use**, considering all relevant factors such as the area the machine is to be used, the training of operators, the proximity of other persons, frequency of use, etc.

The following section uses the **ISO12100:2010 risk assessment model** to assist Microstacker owners in carrying out this process. Hazards intrinsic to the Microstacker are pre-filled, while blank spaces are provided for assessing site-specific hazards.

ISO12100:2010 'Risk assessment and risk reduction', is a standard issued by the International Standards Organisation. It describes procedures for identifying hazards and estimating and evaluating risks during relevant phases of a machine life cycle.

As with all powered industrial equipment, some hazards will remain despite any precautions undertaken by the manufacturer or owner of the machine. It is essential that operators are aware of these residual hazards and what they must do to prevent harm to themselves or to others, as set out in §5.3.3.

5.3.1 ISO 12100:2010 risk assessment model

In the ISO 12100:2010 risk assessment model, each identified hazard is given a Risk Factor, from which is derived a final Risk Evaluation. These parameters can be determined as follows.

5.3.1.1 Determining the Risk Factor

The Risk Factor associated with any given hazard may be calculated using the following table, with the formula: **Risk Factor = LO x FE x DPH x NP**

LO	Likelihood of Occurrence	FE	Frequency of Exposure	DPH	Degree of Possible Harm	NP	Number of Persons at risk
0.1	Impossible, or possible only in extreme circumstances	0.1	Infrequently	0.1	Scratch or bruise	1	1 – 2 persons
0.5	Highly unlikely though conceivable	0.2	Annually	0.5	Laceration, mild ill-health	2	3 – 7 persons
1	Unlikely but could occur	1	Monthly	1	Break minor bone or illness (temporary)	4	8 – 15 persons
2	Possible but unusual	1.5	Weekly	2	Break major bone or illness (permanent)	8	16 – 50 persons
5	Even chance – could happen	2.5	Daily	4	Loss of 1 limb or eye/serious illness (temporary)	12	51 or more persons
8	Probable – not surprised	4	Hourly	8	Loss of 2 limbs or eyes/serious illness (permanent)	-	-
10	Likely, only to be expected	5	Constantly	15	Fatality	-	-
15	Certain, no doubt	-	-	-	-	-	-

5.3.1.2 Evaluating the Risk

Once the Risk Factor is determined, the risk can be evaluated using the following table.

Risk Factor	0-1	2-5	6-10	11-50	51-100	101-500	501-1000	1001 +
Evaluation	Negligible	Very Low	Low	Significant	High	Very High	Extreme	Unacceptable

5.3.2 *Identified Hazards*

The following hazards have been identified that are intrinsic to the Microstacker design. For each hazard a full Risk Evaluation has been completed and control measures described.

⚠ Blank template spaces are provided at the end for machinery owners to identify, assess and control additional site-specific hazards.

Entanglement or amputation of fingers or limbs in moving parts											
Operator	LO:	0.5	FE:	4	DPH:	1	NP:	1	Risk Factor:	2	
	Operation of the Microstacker requires the operator to have both hands on the control buttons. The operator cannot easily reach moving parts while lifting or lowering the bin carriage.										
Other persons	LO:	1	FE:	4	DPH:	1	NP:	1	Risk Factor:	4	
	The operator has a good view of the carriage while lifting and lowering and can simply stop all movement by removing either hand from the control button if any other persons approach the carriage while moving.										
Control measures	Operators are responsible to obey warning signs fitted to the machine and instructions, regarding keeping himself and others clear of all moving parts.										
Comments	The Microstacker is carefully designed so that trapping hazards are minimized. Both hands are required to operate the machine.										
Crushing due to unauthorized rapid descent of carriage											
Operator	LO:	0.5	FE:	4	DPH:	2	NP:	1	Risk Factor:	4	
	The operator is protected from the carriage by the frame and guarding during operation. There is nothing to stop an operator or other person moving under the carriage while it is elevated. Significant safety margins ensure that the probability of failure of any steel, hydraulic, or control parts failing is low.										
Other persons	LO:	0.5	FE:	4	DPH:	2	NP:	1	Risk Factor:	4	
	As above.										
Control measures	Operators are required to obey warning signs fitted to the machine regarding keeping himself and others away from the area under the carriage when raised. The machine must be regularly maintained, and all faults repaired promptly.										
Comments	A hydraulic flow-control valve limits the lowering speed in normal operation.										
Operator or others being hit by falling or flying debris											
Operator	LO:	1	FE:	4	DPH:	0.5	NP:	1	Risk Factor:	2	
	The operator is protected from the operating area by the frame and guarding during operation. The Microstacker is not required to invert or tilt bins, so the likelihood of any material falling is low.										
Other persons	LO:	1	FE:	4	DPH:	0.5	NP:	1	Risk Factor:	2	
	As above.										
Control measures	Operators are required to obey all instructions and warning signs regarding keeping themselves and others away from the machine while in use. Operators must not attempt to lift non-standard bins, or any type of bin which the Microstacker was not specifically designed to handle.										
Comments											

Crushing due to machine falling over										
Operator	LO:	2	FE:	4	DPH:	8	NP:	1	Risk Factor:	64
	Moderate risk when the Microstacker is lifting heavy bins to its full height, or when operating around low doorways.									
Other persons	LO:	2	FE:	1	DPH:	10	NP:	1	Risk Factor:	20
	As above.									
Control measures	When moving heavy bins, operators are required to lower the lifting carriage to below 500mm. The carriage should only be raised higher than this immediately prior to placing or removing bins from racking. Operators are required to remain watchful for and avoid overhead hazards such as low doorways and light fittings. The Microstacker must not be operated on soft or uneven ground, or on ground with a slope ratio higher than 1:12.									
Comments										
Electrocution or electric shock										
Operator	LO:	0.5	FE:	4	DPH:	15	NP:	1	Risk Factor:	30
	Some risk is always present when using equipment with a mains charging lead.									
Other persons	LO:	0.5	FE:	4	DPH:	15	NP:	1	Risk Factor:	30
	As above.									
Control measures	All power sockets used to recharge the Microstacker must be fitted with a Residual Current Device (RCD). All leads and power cables should be regularly checked and tagged by a registered electrician.									
Comments										
Contamination from lifting toxic powder and liquid										
Operator	LO:	2	FE:	4	DPH:	1	NP:	1	Risk Factor:	8
	Great care should be taken when lifting bins containing powder or liquids. If the product could cause any harm whatsoever to the operator or other personnel, all persons in the vicinity must wear appropriate PPE.									
Other persons	LO:	2	FE:	4	DPH:	1	NP:	1	Risk Factor:	8
	As above.									
Control measures	All operators must wear appropriate Personal Protective Equipment (PPE). Where possible, persons other than the operator should be kept clear of the operating area.									
Comments	Toxic materials which cannot be controlled by the use of appropriate PPE must not be handled with the Microstacker. Alternative methods should be used.									
Damage to skin when used in extreme environments										
Operator	LO:	2	FE:	4	DPH:	1	NP:	1	Risk Factor:	8
	If the machine is to be used in extreme cold or heat, the operator must wear gloves and other suitable Personal Protective Equipment.									
Other persons	LO:	2	FE:	4	DPH:	1	NP:	1	Risk Factor:	8
	As above.									
Control measures	All personnel must wear appropriate Personal Protective Equipment (PPE) when operating equipment in extreme environments.									
Comments	See §1.8 for Microstacker environmental restrictions.									

Site-specific hazard:										
Operator	LO:		FE:		DPH:		NP:		Risk Factor:	
Other persons	LO:		FE:		DPH:		NP:		Risk Factor:	
Control measures										
Comments										
Site-specific hazard:										
Operator	LO:		FE:		DPH:		NP:		Risk Factor:	
Other persons	LO:		FE:		DPH:		NP:		Risk Factor:	
Control measures										
Comments										
Site-specific hazard:										
Operator	LO:		FE:		DPH:		NP:		Risk Factor:	
Other persons	LO:		FE:		DPH:		NP:		Risk Factor:	
Control measures										
Comments										
Site-specific hazard:										
Operator	LO:		FE:		DPH:		NP:		Risk Factor:	
Other persons	LO:		FE:		DPH:		NP:		Risk Factor:	
Control measures										
Comments										

Site-specific hazard:									
Operator	LO:		FE:		DPH:		NP:		Risk Factor:
Other persons	LO:		FE:		DPH:		NP:		Risk Factor:
Control measures									
Comments									
Site-specific hazard:									
Operator	LO:		FE:		DPH:		NP:		Risk Factor:
Other persons	LO:		FE:		DPH:		NP:		Risk Factor:
Control measures									
Comments									

5.3.3 Residual Hazards

As with all powered lifting equipment, some 'residual hazards' may be present despite any interlocks, guarding or other safety systems that may be implemented.

The machinery owner has a legal responsibility to take **all reasonable precautions** to eliminate, isolate, or minimize these residual hazards. This may include:

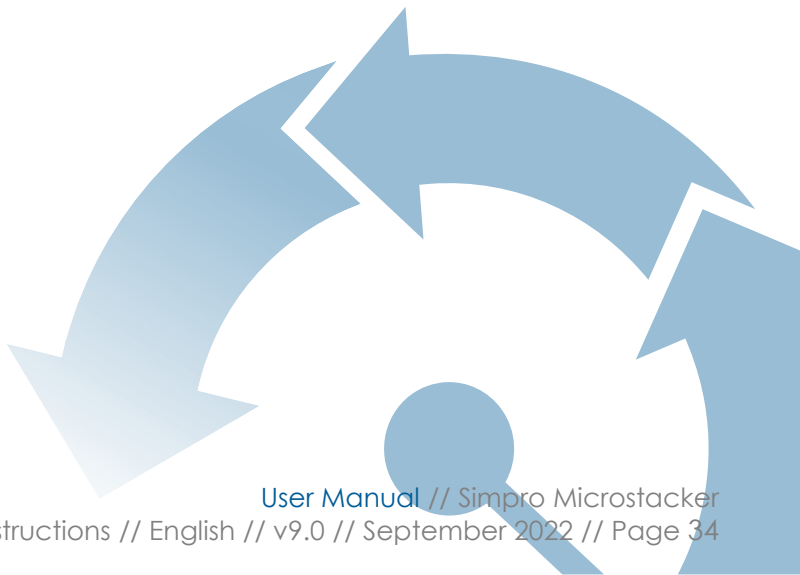
- Monitoring and enforcing the training of operators
- Design and implementation of Standard Operating Procedures
- Using rewards and/or disciplinary measures to encourage safe behaviours
- Posting signage, floor marking, or other warnings as appropriate
- Encouraging a culture of safety within the workplace

6. Spare Parts

The following table includes the most common Microstacker spare parts as at the time of publication. Additional parts, accessories and prices may be viewed at the following web address: shop.simpro.world/category/1243-spare-parts-explorer

	Partcode	Description	QTY*	BSK†	ASK‡
All models	0790050373	Key-Switch, 2-position, stay-put, with 2 x N/O contact blocks	1	✓	✓
	0790050067	Voltmeter, 12/24VDC, blue digital readout**	1	✓	✓
	0790050399	Battery voltage indicator & hour meter**	1	✓	✓
	0320050015	Raise/Lower toggle switch	2	✓	✓
	0790050261	Contact Block, N/O (for key-switch and raise/lower switches)	5-6		✓
	0790050403	Safety Sounder button, SS, raised momentary, 1x N/O block	1	✓	✓
	0790050402	Battery Saver button, SS, raised latching with ring LED, 1x N/O block**	1		✓
	0790050255	E-Stop head**	1	✓	✓
	0250090055	Lowering Valve Cartridge	1		✓
	0090090006	Ram Seal, 1in x 1¼in x ¼in (PU + NBR O-ring)	1	✓	✓
	0140120002	Ram Roller, standard, nylon	2	✓	✓
	0230090001	Ram, Ø1in x 875mm stroke, no rollers	1		
	0070010068	Roller chain, ½" British Standard simplex nickel-plated, 91 links	1		
SME 12V models only	0250090064	Lowering Valve Coil, 12VDC	1	✓	✓
	0880050017	Motor Solenoid, 12V/200A	1	✓	✓
	0880050030	Motor Kit, 800W/12VDC, with adaptor ring and spindle	1		
	0940090067	Powerpack & motor complete, 12VDC, 0.8cc pump, 2L horizontal tank	1		✓
	0250050004	Battery, 12V/20Ah GEL	1		
	0410050000	Battery Charger, 12V/7.2A	1		✓
SME 24V models only	0250090067	Lowering Valve Coil, 24VDC	1	✓	✓
	0880050015	Motor Solenoid, 24V/200A	1	✓	✓
	0880050040	Motor Kit, 800W/24VDC, with adaptor ring and spindle	1		
	0940090083	Powerpack & motor complete, 24VDC, 0.8cc pump, 2L horizontal tank	1		✓
	0250050004	Battery, 12V/20Ah GEL (two connected in series)	2		
	0390050006	Battery Charger, 160W/24V	1		✓
	0790050374	Circuit Breaker, 75A, auto-resetting	1		✓
PRO 24V models only	0250090067	Lowering Valve Coil, 24VDC	1	✓	✓
	0880050015	Motor Solenoid, 24V/200A	1	✓	✓
	0880050040	Motor Kit, 800W/24VDC, with adaptor ring and spindle	1		
	0940090083	Powerpack & motor complete, 24VDC, 0.8cc pump, 2L horizontal tank	1		✓
	1030440001	Battery, 24V/20Ah LFP, in carrycase	1		
	1030440002	Battery Charger, 24V/10A, for LFP battery (external)	1		✓
	0790050374	Circuit Breaker, 75A, auto-resetting	1		✓

*** Quantity per machine** ****Optional (not fitted to all machines)** **† Basic Spares Kit** **‡ Advanced Spares Kit**



7. Warranty

7.1 Definitions

1. "Simpro" means Simpro Handling Equipment Limited, New Zealand Registered Company No. 1827916.
2. "Agent" means a person or company authorized by Simpro to sell a Product.
3. "Service Agent" means a person or company authorized by Simpro to repair a Product.
4. "End User" means the first purchaser of a Product from a Sales Agent authorised by Simpro to sell the Product.
5. "Warranty" means the commitment that Simpro has to guarantee the workmanship and componentry to any End User of Products manufactured and sold by Simpro.
6. "Warranty Claim" means an application from an Agent to Simpro to be reimbursed for expenses relating to repairs done to remedy a fault with a Simpro Product.
7. "Warranty Period" means the length of time that Simpro undertakes to guarantee a Product.
8. "Back to Base" means that the costs associated with the transporting of a Product between the Service Agent and the End User is the End Users responsibility.
9. "Standard Products" means any Product displayed as a standard product on the Simpro website, https://simpro.world/.
10. "Part" and "Parts" refer to components of a Product.
11. "Minor Fault" means a fault or defect that requires less than one hour to rectify
12. "Instruction Handbook" means a document so titled that provides brief information and guidance on the operation of the Product for commonly performed functions.
13. "Service Manual" means a document so titled that provides comprehensive information and guidance for service, repairs and maintenance.
14. "Warranty Registration Process" means the process of an End User registering their product with Simpro. This may be done using the web form here: https://simpro.world/support/warranty-registration
15. "Application for Warranty Consideration Form" means the system used to file a Warranty Claim with Simpro. This may be done using the web form here: https://simpro.world/support/warranty-claim.

7.2 Coverage

1. Simpro provides a 12 month Back to Base Warranty on all Standard Products unless alternative terms have been agreed to in writing.
2. The Warranty terms and conditions on custom-built and non-standard machines are generally specified on quotations, and placing an order implies acceptance of the Warranty terms. If no specific Warranty details have been provided, the standard terms and conditions will apply.
3. The 12-month Warranty period shall be taken from the date the machine first leaves the Agent's premises, whether sold or just supplied for trial. The Agent shall keep accurate records of the date of all machine trials, sales. etc.
4. Simpro will, at its option, repair or replace any items that fail or prove defective within the Warranty period.
5. Simpro's liability under the terms of this Warranty shall be limited to remedying any fault that occurs on machines it has manufactured or supplied, and shall not cover any consequential loss or damage.
6. The Warranty on battery is for 6 months only. Information on maximising the life of your battery may be viewed here: https://simpro.world/connect/blog/deep-cycle-battery-watts-it-all-about

7.3 Exclusions

1. Simpro will not recognise a Warranty Claim against a machine where payment to Simpro for that machine is outstanding. If a Warranty Claim is made before payment is due, the full payment must be made on the due date. The Warranty Claim, if accepted, will be credited at a later date.
2. Warranty Claims may not be recognized unless the Warranty Registration Process has been completed. If not done at the time of sale, this should be done at the time of the Warranty Claim. If warranty registration has not been completed, proof of purchase may be required.

3. Damage caused or contributed to by misuse, abuse, accident, unauthorised repairs or modifications, or failure to use the machine in accordance with instructions is specifically excluded.
4. Travelling time and mileage are specifically excluded from the Simpro warranty coverage. However under certain circumstances Simpro at its discretion may contribute to these costs. Authorisation must be obtained from Simpro prior to any such Warranty Claim. This does not prohibit an Agent offering more extensive Warranty cover, outside of this Warranty, as negotiated between the Agent and the End User.

7.4 End User claim procedure

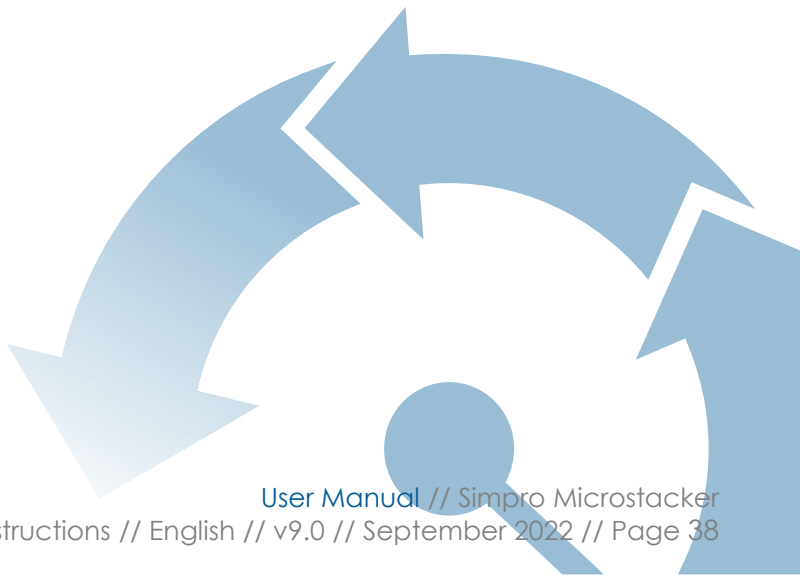
1. Where a fault or breakdown appears to have occurred the End User should, if applicable, first consult the Quick Troubleshooting Guide section of the User Manual provided with each machine, to ascertain the cause of the fault and remedy if possible. This information may also be accessed on the Simpro Support website: http://support.simpro.world.
2. If the fault is not able to be remedied, the End User should contact the Agent who sold the machine, and explain as fully as possible the fault, including all relevant factors such as:-
    1. Did the fault occur suddenly or has it been giving trouble over some time?
    2. Was the machine being used at the time?
    3. Is the fault intermittent?
    4. Are the battery fully charged?
    5. If repair is urgent, and the Agent cannot be contacted, the End User may contact Simpro direct.

7.5 Agent claim handling procedure

1. Upon receiving notification of a fault, the Service Agent should attempt to determine the cause and a course of action before going to see the machine.
2. The Service Agent should contact Simpro for assistance in identifying the fault, if it is not apparent. This step is important, so that if a site visit is necessary, the correct tools and spare Parts can be taken. It is also important to establish whether there may have been any negligence, misuse or an accident that contributed to or caused the fault.
3. Parts requiring replacement will be supplied by Simpro free of charge; in some cases, it may be necessary to source Parts locally if needed urgently, but Simpro must authorize this if the cost of the item exceeds $50.00 and is to be charged to Simpro.
4. If the fault is not a Minor Fault, the Agent must notify Simpro and receive authorization to proceed before the repair work is done. Simpro will assist in every way possible, including discussing the problem directly with the End User if necessary, to determine the best method of effecting the repair in the shortest time possible.
5. Upon completion of the repair to an acceptable standard, the Agent shall complete the Application For Warranty Consideration Form and include copies of any invoices for labour, and any Parts supplied.
6. The cost of Warranty repairs is not to be deducted from any payments due to Simpro, unless Simpro issues a credit note clearly stating the amount and which invoice it relates to.
7. Simpro undertakes to be reasonable in respect of all Warranty repairs undertaken by Agents, but reserves the right to decline payment for:-
    1. Work done or materials replaced that were not authorized in advance by Simpro.
    2. Work not done to an acceptable standard.
    3. Work taking an unduly long time, due (in part or in full) to the lack of knowledge or skill of the serviceman or the Agent. The time allowed for repair work will be based on Simpro's assessment of what a reasonably skilled tradesman would take. Full Service Manuals are available on request at any time from Simpro and all service visits should be conducted with a Service Manual at hand.

This warranty shall be interpreted according to the laws of New Zealand and the parties agree to submit to the jurisdiction of the Courts of New Zealand.

8.Notes



Simpro has been manufacturing and retailing smart lifting solutions for over thirty years.

From humble beginnings as a small engineering firm in Auckland, New Zealand, the company has grown to become a leading supplier of handling equipment for niche applications – such as bin-lifting, tipping and handling machines, bin stackers and goods lifts.

Simpro products play an unobtrusive but essential role for thousands of companies around the world, in industries as diverse as waste management, food processing, resource extraction and pharmaceutical manufacturing. They are available through a network of agents which spans the globe, and are backed by a sophisticated in-house design and fabrication capability.

Simpro is a family-owned company, registered with the New Zealand Companies Office as Simpro Handling Equipment Ltd, company no. 1827916.

The products in this document may contain intellectual property, including design elements registered to or licensed by Simpro Handling Equipment Ltd.

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