USER MANUAL

SIMPRO MEGADUMPER®

User Manual // Simpro MegaDumper®
Original Instructions // English // v94.0 // October 2022

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:

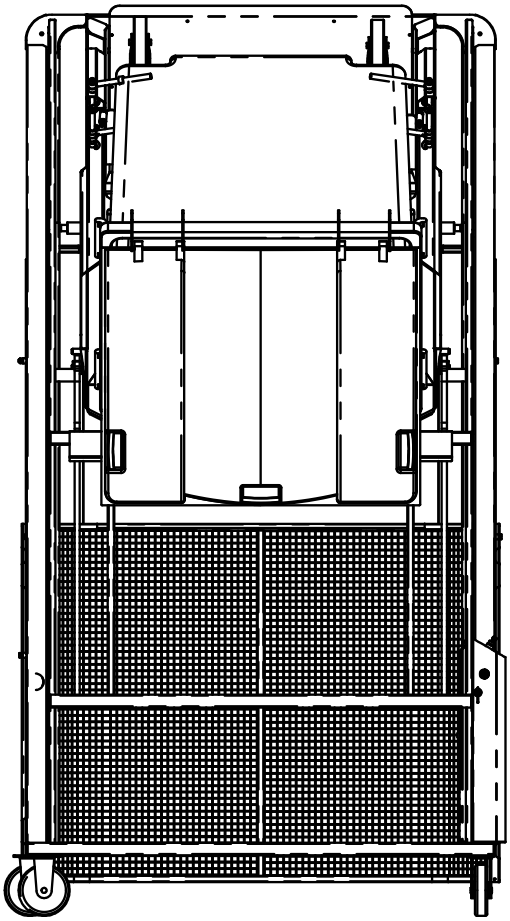
Point of interest

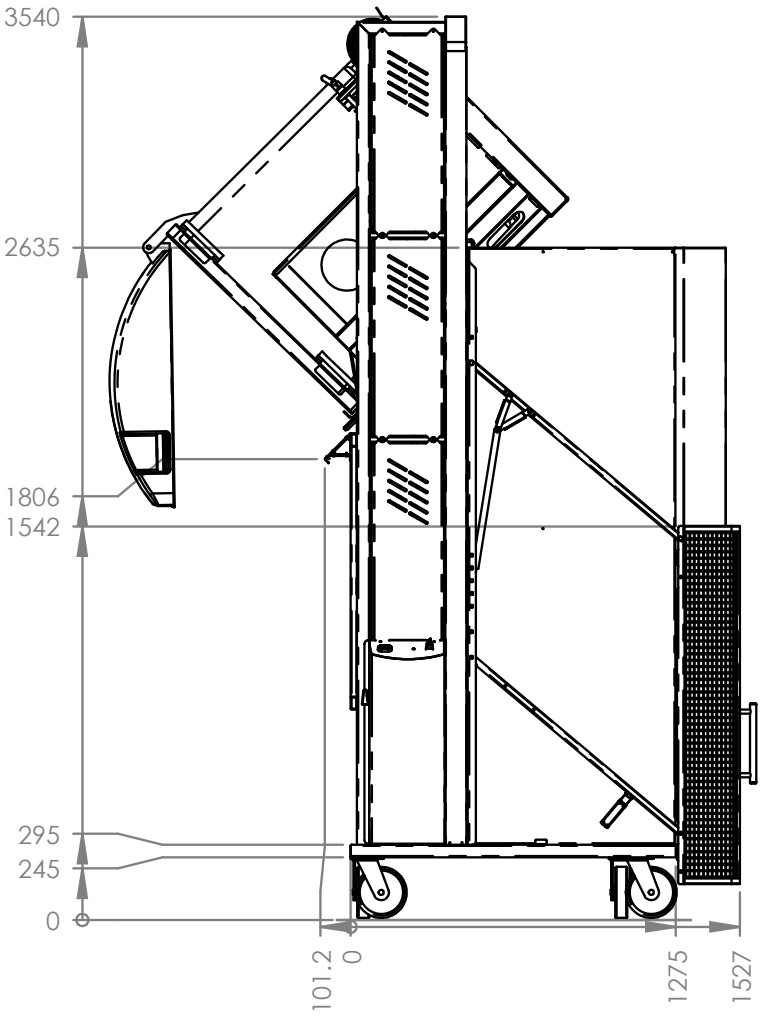
Point of warning

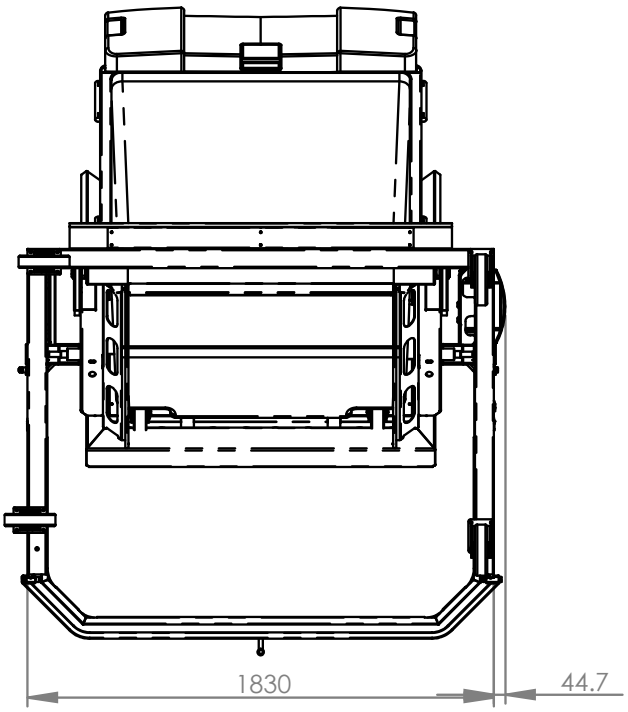
§ Section reference (hyperlink in PDF edition)

Simpro partcode (hyperlink in PDF edition)

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







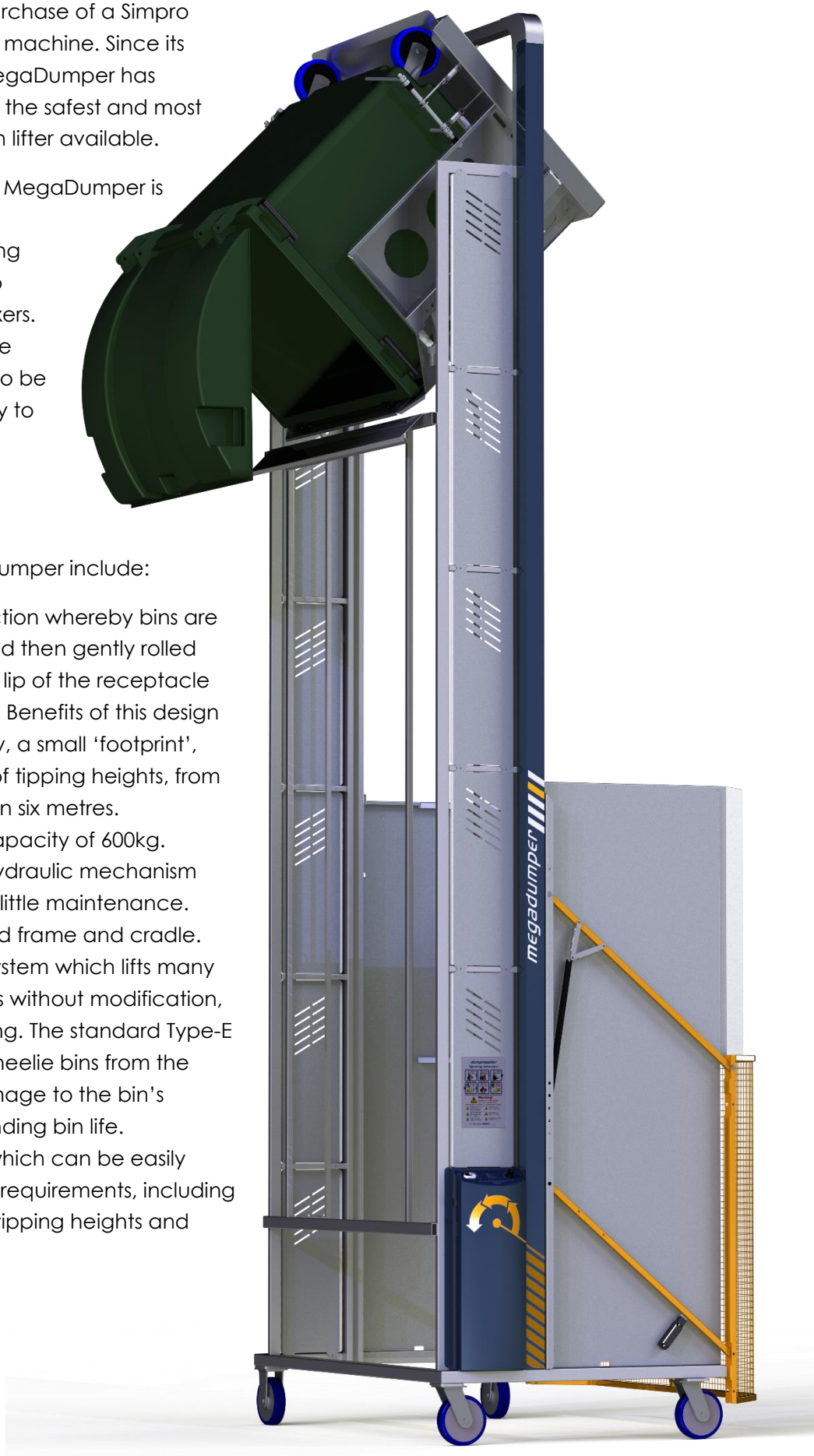
MegaDumper MD1800
Layout and Dimensions

Contents

I. Product Overview

Congratulations on your purchase of a Simpro MegaDumper® bin-tipping machine. Since its introduction in 1998, the MegaDumper has established a reputation as the safest and most reliable high-throughput bin lifter available.

With a modular design, the MegaDumper is suitable for many different applications – from emptying rubbish into compactors, to pouring ingredients into mixers. No matter how it is used, the MegaDumper has proven to be safe, economical, and easy to operate, year after year.



1.1 Key features

Key features of the MegaDumper include:

1. A unique tipping action whereby bins are lifted straight up, and then gently rolled forward around the lip of the receptacle being emptied into. Benefits of this design include high stability, a small 'footprint', and a wide range of tipping heights, from 900mm to more than six metres.
2. A standard lifting capacity of 600kg.
3. A reliable electro-hydraulic mechanism which requires very little maintenance.
4. A hot-dip galvanised frame and cradle.
5. A versatile cradle system which lifts many common waste bins without modification, clamping or retaining. The standard Type-E cradle lifts EN840 wheelie bins from the base, avoiding damage to the bin's combing and extending bin life.
6. A modular design which can be easily adapted to unique requirements, including non-standard bins, tipping heights and power supplies.

1.2 Construction

The MegaDumper consists of a steel frame with two vertical masts and stabilizing legs, a bin cradle, two hydraulic rams, lifting chains, guarding, powerpack cover, control panel, castor wheels, power lead or batteries, hydraulic powerpack and electronic control systems.

1.3 Mechanism

When the RAISE button is pressed, two hydraulic rams are extended, which pull on an arrangement of chains, causing the bin cradle to travel vertically in the masts. The cradle is inverted at the appropriate height by an arrangement of arms, rollers, and curved tracks.

The rams are supplied by a hydraulic pump, which may be driven by a 3-phase, 1-phase, battery, or compressed-air motor. Electrical, hydraulic, and mechanical control systems allow the operator to lift and lower the bin in a controlled manner.

1.4 Safe Working Load

The Safe Lifting Capacity of the standard MegaDumper is **600kg (1300lb)**.

- Safe Working Load (SWL) is a gross figure, referring to the weight of the bin, its contents, and any other objects placed on the cradle.
- Custom machines may be specified with different Safe Working Loads. The rating plate should be the first point of reference to determine SWL on any given machine.

- Never attempt to lift bins that are heavier than the factory-specified Safe Working Load.

1.5 Duty cycle

The duty cycle of the MegaDumper depends on the type of power supply and powerpack that is fitted to the machine, as well as various environmental factors and the manner in which the machine is used. The figures given below are estimates only.

Power supply	Duty Cycle (tipping ~300kg bins at 1800mm)		
	Net throughput	Number of bins	Units
24V/40Ah Gel Battery*	15,000kg	300 bins	Per charge
24V/40Ah Gel Battery with continuous charge	3,000kg	10 bins	Per hour
24V/40Ah Gel Battery with solar panel kit**	6,000kg	20 bins	Per day
Mains, 3-Phase ~415VAC	12,000kg	40 bins	Per hour
Mains, 1-Phase ~230VAC***	9,000kg	30 bins	Per hour

*4x 12V/20Ah batteries in series; default from 2015 **Subject to weather, latitude, and panel orientation; see §3.4.9 ***Deprecated since 2019

- Power supply specifications can be found on the machine's rating plate.

1.6 Service life

The nominal service life of the MegaDumper is as follows:

Average Gross Bin Weight	Intended operational life
< 200kg	100,000 cycles
200kg – 300kg	75,000 cycles
300kg – 500kg	50,000 cycles
500kg – 600kg	25,000 cycles
> 600kg	10,000 cycles

1.7 Noise emissions

The noise emissions of the MegaDumper do not typically exceed ~60 dB(A) at the operator's ear. Hearing protection 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 MegaDumper may be used indoors or outdoors. However the following restrictions apply:

1. Minimum floor area 4 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;

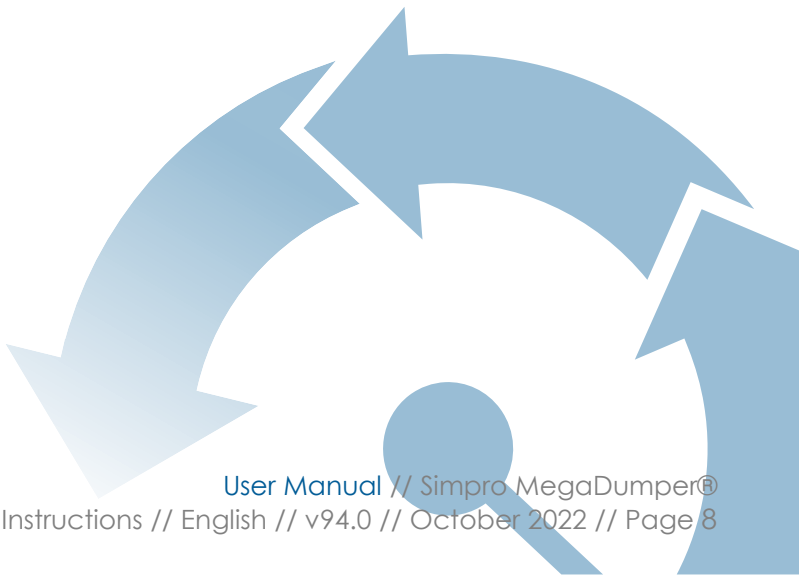
Never operate the MegaDumper in explosive, corrosive, acidic or alkaline environments.

1.9 Ingress protection

Item	IP Rating
Push buttons, switches, and lamps	IP66
Door interlock	IP66
Coded magnetic switch	IP66
Motor	IP54 (additional protection is provided by covers)
Overall	IP56 (optionally upgraded to IP66 or IP69)

1.10 Notes

1. This User Manual describes approved procedures for the operation, maintenance, and routine inspection of the Simpro MegaDumper hydraulic bin-tipping machine.
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. In cases where a discrepancy exists between the manual and the actual product, the manual is to be used as a reference only.
6. Contact your authorized Simpro agent if any problems or faults are encountered with the machine.
7. Errors in this manual should be reported by email to info@simpro.world.



2. Operating Instructions

⚠ Before the machine is used for the first time, a site-specific Hazard and Risk Assessment should be completed as per §5.3. The cradle may also need to be adjusted as per §3.3.3.

2.1 Before operation

Before operating a MegaDumper, check the following points to ensure that the machine is stable and safe to use:

1. The machine is on firm ground, with a slope ratio less than 1:12.
2. All covers and safety guards are in place.
3. The wheel brakes are applied, and/or the feet are wound down onto the ground.
4. All personnel other than the operator are well clear of the machine.
5. The cradle is fully lowered.
6. The key is inserted and turned to the ON position.
7. The battery indicator (if fitted) shows an acceptable level of charge.

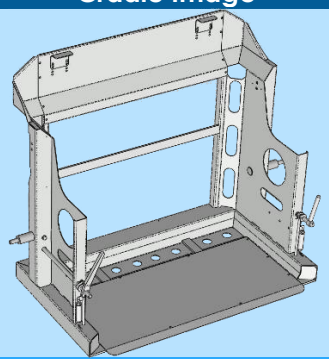
2.2 Emplacing and removing bins

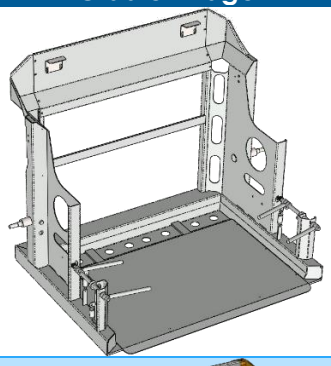
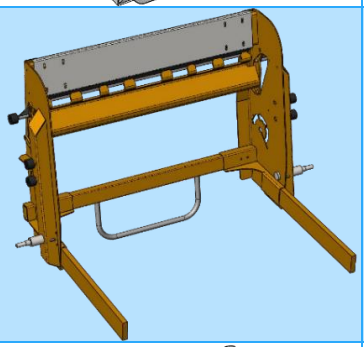
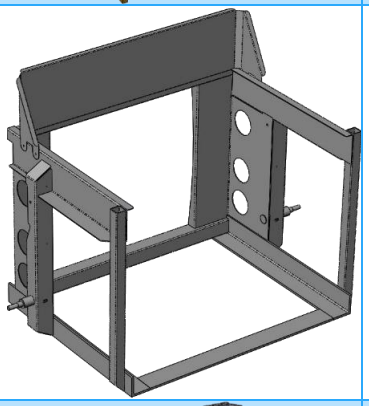
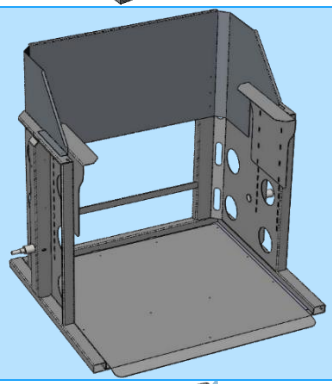
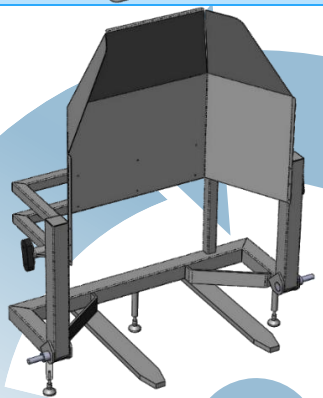
The MegaDumper cradle is designed to allow bins to be emplaced and removed easily, while also holding them securely throughout the tipping cycle.

⚠ It is important to understand how to correctly place bins onto the cradle, as improper placement may result in bins falling out of the machine when inverted.

2.2.1 *Cradle identification*

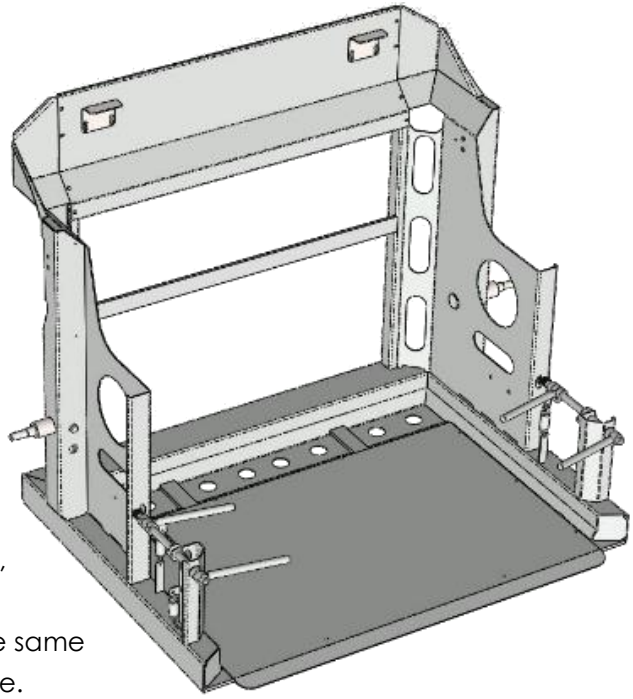
A range of different cradles may be fitted to the MegaDumper, depending on the bins it will be emptying. Use the following table to identify the correct instructions for your machine.

Cradle Type	Primary Use	Bin Compatibility		Cradle Image	Refer
Type-S (Short EN840 base-lift cradle)	General waste and recycling applications	EN840 mobile garbage bins (wheelie bins)	- 60L - 80L - 120L - 140L - 240L - 660L		§2.2.2

Cradle Type	Primary Use	Bin Compatibility		Cradle Image	Refer
Type-E (EN840 base-lift cradle)			- 60L - 80L - 120L - 140L - 240L - 660L - 770L - 990L - 1100L		§2.2.2
Type-C (EN840 comb-lift cradle)	High-flow waste and recycling applications	EN840 mobile garbage bins (wheelie bins)	- 60L - 80L - 120L - 140L - 240L - 360L - 660L - 770L - 990L - 1100L		§2.2.3
Type-M (1200x1000 Mega bin base-lift cradle)	Food processing and logistics applications	Bulk Bins Nally Bins Mega Bins Dolav Bins Pallet Bins	- 610L and smaller - Max dims 1200W x 1000L x 1200H		§2.2.4
Type-N (1200x1200 Nally bin base-lift cradle)			- 780L and smaller - Max dims 1200W x 1200L x 1200H		§2.2.4
Type-X (Custom)	Custom applications	Custom bins			§2.2.5

2.2.2 *Type-S and Type-E Cradles*

⚠ Type-S and Type-E cradles should be adjusted before first use, as set out in §3.3.3.



2.2.2.1 Emplacing bins

Open the door and place the bin onto the cradle:

- Large four-wheeled bins (660L/770L/1100L) should be positioned central and firm against the cradle backplate.
- Small two-wheeled bins (80L/120L/240L/360L) should be positioned to one side of the cradle, with a wheel inserted into the marked wheel catch. Two smaller bins can be emptied at the same time by placing one on each side of the cradle.

Once the bin is correctly emplaced, close the door.

⚠ The wheel catches are designed to work with standard EN840 wheelie bins from leading brands such as Europlast, Sulo, ESE, Weber, Craemer, OnePlastics and Trident.

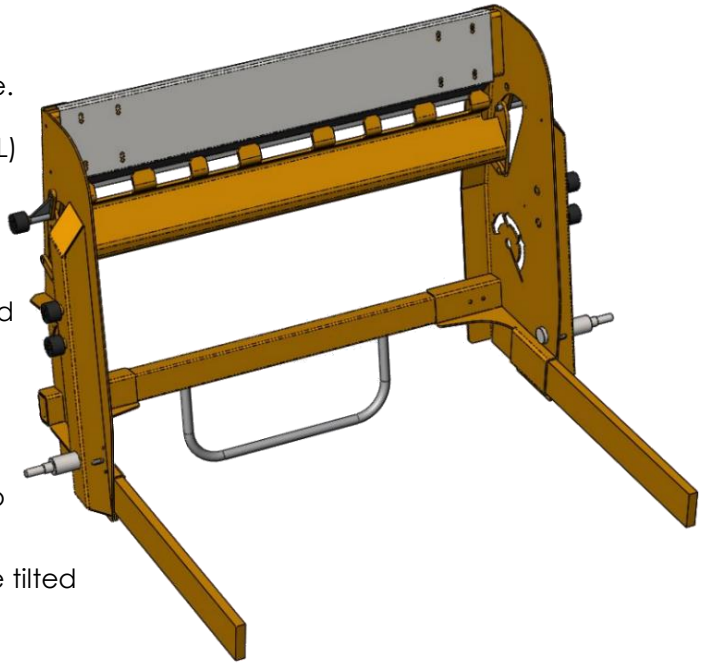
⚠ Some smaller bin manufacturers use tyres which are too wide to fit inside the wheel catches. Should this issue occur, simply insert additional packers (flat washers) onto the wheel catch mounting bolts, to increase the spacing as needed.

2.2.2.2 Removing bins

Open the door and, using the grab-handles provided, remove the bin from the cradle.

2.2.3 *Type-C Cradle*

2.2.3.1 Emplacing bins



Open the door and place the bin into the cradle.

- Large four-wheeled bins (660L/990L/1100L) should be positioned central and firm against the cradle backplate.
- Small two-wheeled bins (80L/120L/240L/360L) should be positioned against one side of the cradle. Two smaller bins can be emptied simultaneously, one on either side.

Ensure that the lifting teeth will securely hook into the bin combing when the cradle begins to lift. Smaller bins such as 60L and 80L may need to be tilted or lifted slightly to ensure a proper 'catch'.

Once the bin is correctly emplaced, close the door.

2.2.3.2 *Removing bins*

Open the door and, using the grab-handles provided, remove the bin from the cradle. Some bins may need to be lifted or tilted slightly to disengage the combing from the lifting teeth.

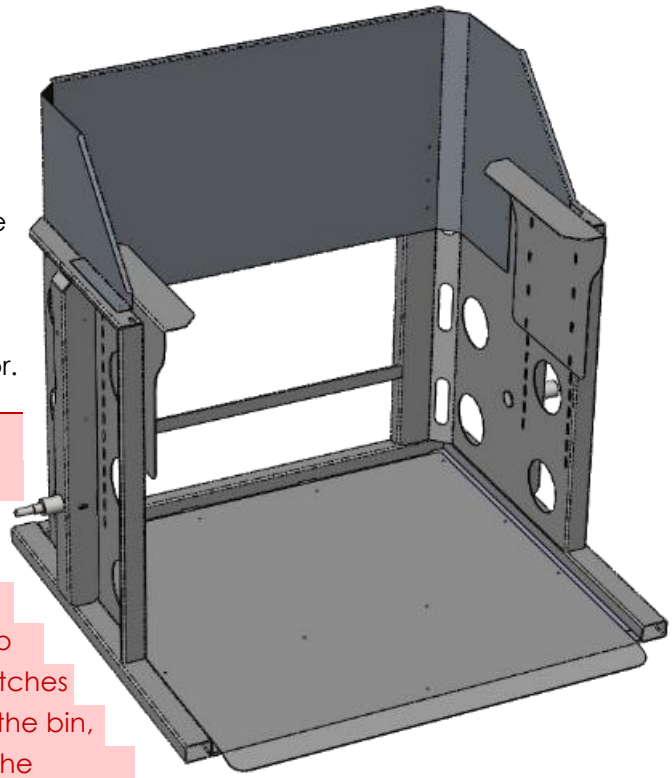
2.2.4 *Type-M and Type-N Cradles*

2.2.4.1 *Emplacing bins*

Open the door and place the bin onto the cradle, central and firm against the cradle backplate.

If using a forklift or powered pallet truck to load the bin, reduce speed to avoid heavy impacts which might damage the cradle.

Once the bin is correctly emplaced, close the door.



- Most common 610L bulk bins have a 1000x1200mm oblong plan view. These bins must be loaded in the correct orientation, with the longer 1200mm faces at front and rear, and the 1000mm faces at the sides.
- Bulk bins are held in place when inverted by 'lip catches' on either side of the cradle. These catches should be positioned to hold the top edges of the bin, with a maximum free travel of 25mm (1 inch). The catches can be unbolted and repositioned to allow emptying bins of different sizes.
- It is recommended to use a forklift or powered pallet truck when moving bulk bins.

2.2.4.2 *Removing bins*

Open the door and remove the bin from the cradle.

2.2.5 *Type-X Cradle (custom)*

- The exact procedure for emplacing bins into a custom cradle may vary. Contact your Simpro agent for advice or training if required.

2.2.5.1 *Emplacing bins*

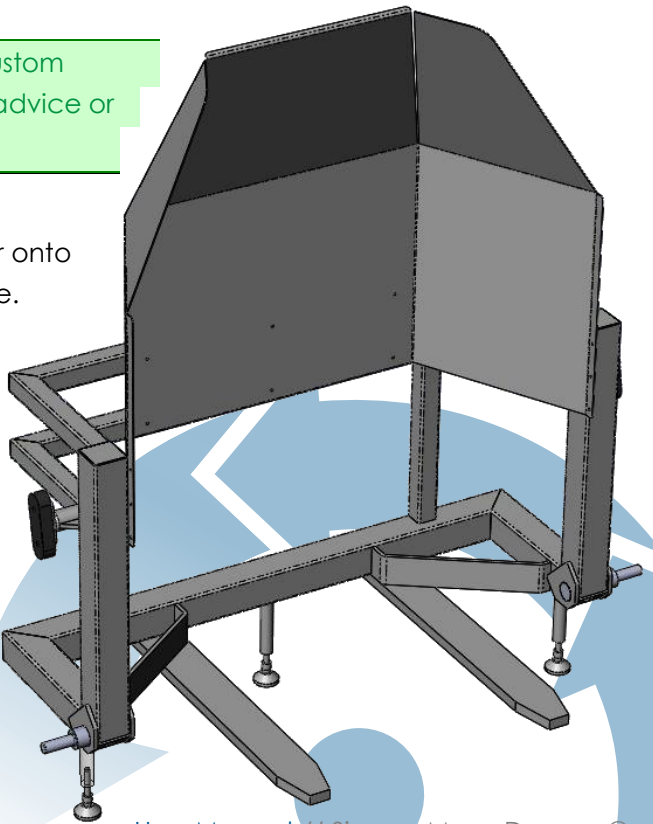
Open the door and place the bin, drum, or container onto the cradle, positioned centrally against the backplate.

If using a forklift or powered pallet truck to load the bin, reduce speed to avoid heavy impacts which might damage the cradle.

Once the bin is correctly emplaced, close the door.

2.2.5.2 *Removing bins*

Open the door and remove the bin, drum, or container from the cradle.



2.3 Operation of controls

The MegaDumper controls are designed to allow safe, intuitive operation of the machine.

2.3.1 *Control Panel identification*

The MegaDumper may be fitted with a variety of different controls, depending on the operational and safety requirements of the machine. Use the following table to identify the correct instructions for your machine.

⚠ It is important to understand how to use the controls correctly, as improper operation may result in a safety hazard or damage to the machine.

⚠ The control panel is normally atop the powerpack cover, but on some models, it is mounted onto a separate enclosure.

Control Panel Type	Primary Usage	Controls	Image	Refer
Standard	Standard machines	- RAISE/LOWER - KEY SWITCH - VOLTMETER (battery machines only)	 	§2.3.2
Autocycle	Machines with an autocycle controller	- RAISE/LOWER - EMERGENCY STOP - CONTROL MODE (AUTO/MANUAL)		§2.3.3
VSD	Machines with a Variable Speed Drive controller	- JOYSTICK FOR RAISE/LOWER - KEY SWITCH		§2.3.4
Safety-Monitored	Machines with safety-monitoring systems to comply with 13849-1:2015 and AS/NZS4024 up to CAT3/CAT4	- RAISE/LOWER - EMERGENCY STOP - CONTROL MODE (AUTO/MANUAL) - SAFETY RESET - Panel describing the architecture of the safety-monitoring systems (CAT3/CAT4)	 *Example Only*	§2.3.5

2.3.2 *Standard Control Panel*

How to operate the controls of a standard machine, with no PLC or autocycle controller.

1. Before operation, check that the machine is stable and safe to use as per §2.1.
2. Open the door and place the full bin onto the cradle, taking care that it is properly positioned as per §2.2, then shut the door.
3. **Press and hold the RAISE button** until the bin reaches the inverted position, then release. Wait for the contents of the bin to empty.

Release the RAISE/LOWER button to stop the cradle at any time.
Do not continue pressing the RAISE button after the cradle has reached the top of the cycle, as this can overheat the hydraulic fluid and cause premature wear on the motor.

4. **Press and hold the LOWER button** until the cradle rests on the ground.
5. Open the door and remove the empty bin as per §2.2.
6. Repeat from step 2. as required.

2.3.3 *Autocycle Control Panel*

How to operate the controls of a machine with an autocycle controller, allowing bins to be emptied without continuous input.

MegaDumper models that are fitted with an autocycle control system may be used in either MANUAL or AUTO mode, selected using a switch on the control panel.

The operating procedure for each mode is as follows:

2.3.3.1 AUTO mode

1. Before operation, check that the machine is stable and safe to use as per §2.1.
2. Open the door and place the full bin onto the cradle, taking care that it is properly positioned as per §2.2, then shut the door.
3. Turn the mode-selector switch to AUTO.
4. **Press the RAISE button once**. The cradle will automatically lift, hold the bin inverted for a short time, and return to ground level.

Press the EMERGENCY STOP button to stop the cradle at any time.

5. Open the door and remove the empty bin as per §2.2.
6. Repeat from step 2. as required.

2.3.3.2 MANUAL mode

1. Before operation, check that the machine is stable and safe to use as per §2.1.
2. Open the door and place the full bin onto the cradle, taking care that it is properly positioned as per §2.2, then shut the door.
3. Turn the mode-selector switch to MANUAL.

4. **Press and hold the RAISE button** until the bin reaches the inverted position, then release. Wait for the contents of the bin to empty.

⚠ Release the RAISE/LOWER button or press the EMERGENCY STOP button to stop the cradle at any time.

5. **Press and hold the LOWER button** until the cradle returns to the ground.
6. Open the door and remove the empty bin as per §2.2.
7. Repeat from step 2. as required.

2.3.4 *VSD Control Panel*

⚠ How to operate the controls of a VSD machine, with a joystick to allow progressive control of the lifting speed.

1. Before operation, check that the machine is stable and safe to use as per §2.1.
2. Open the door and place the full bin onto the cradle, taking care that it is properly positioned as per §2.2, then shut the door.
3. **Push the JOYSTICK FULLY FORWARD** to begin lifting the bin.
4. When the bin reaches the top of the mast and starts to invert, **gently move the JOYSTICK SLIGHTLY BACK** so that the material is poured from the bin in a controlled manner, as desired**.** Wait for the contents of the bin to empty.

⚠ Release the JOYSTICK to stop the cradle at any time.

5. **Pull the JOYSTICK FULLY BACK** until the cradle rests on the ground.
6. Open the door and remove the empty bin as per §2.2.
7. Repeat from step 2. as required.

2.3.5 *Safety-Monitored Control Panel*

⚠ How to operate a machine with a safety-rated PLC control unit and CAT3/CAT4 monitoring system.

MegaDumper models that are fitted with a safety-monitored control system may be used in either MANUAL or AUTO mode, selected using a switch on the control panel.

The operating procedure for each mode is as follows:

2.3.5.1 AUTO mode

1. Before operation, check that the machine is stable and safe to use as per §2.1.
2. Open the door. If the door is locked, press the LOWER button to unlock it.
3. Place the full bin onto the cradle, taking care that it is properly positioned as per §2.2, then shut the door.
4. Turn the mode-selector switch to AUTO.
5. Press and hold the blue RESET button for two seconds.

a. The safety system will now conduct an auto-diagnostic check. If no faults are detected, the blue light will go out and the machine will be enabled.
a. If the safety system detects a fault, the blue light will not go out and the machine will be disabled. The fault must be found and corrected before the machine can be used, as per §3.9.

6. **Press the RAISE button once**. The cradle will automatically lift, hold the bin inverted for a short time, then return to ground level.

⚠ Press the EMERGENCY STOP button to stop the cradle at any time.

7. Open the door and remove the empty bin as per §2.2.
8. Repeat from step 2. as required.

⚠ Once the cradle has lowered, the door is automatically unlocked for about 15 seconds. If the door re-locks, press the LOWER button to unlock it at any time.

2.3.5.2 MANUAL mode

1. Before operation, check that the machine is stable and safe to use as per §2.1.
2. Open the door. If the door is locked, press the LOWER button to unlock it.
3. Place the full bin onto the cradle, taking care that it is properly positioned as per §2.2, then shut the door.
4. Turn the mode-selector switch to MANUAL.
5. Press and hold the blue RESET button for two seconds.
    a. The safety system will now conduct an auto-diagnostic check. If no faults are detected, the blue light will go out and the machine will be enabled.
    b. If the safety system detects a fault, the blue light will not go out and the machine will be disabled. The fault must be found and corrected before the machine can be used, as per §3.9.
6. **Press and hold the RAISE button** until the bin reaches the inverted position, then release. Wait for the contents of the bin to empty.

⚠ Release the RAISE/LOWER button or press the EMERGENCY STOP button to stop the cradle at any time.

7. **Press and hold the LOWER button** until the cradle rests on the ground.
8. Open the door and remove the empty bin as per §2.2.
9. Repeat from step 2. as required.

⚠ Once the cradle has lowered, the door is automatically unlocked for about 15 seconds. If the door re-locks, press the LOWER button to unlock it at any time.

2.4 Safety Norms

The following safety norms must be observed for the safe use of a MegaDumper bin lifter.

- Only trained and authorised personnel are permitted to use the machine.
- Operators must read and obey the instructions displayed on the machine.
- Never operate the machine on soft ground, or ground with a slope ratio greater than 1:12.
- Never operate machine on the edge of a raised dock or platform, unless designed for that application.
- Never operate the machine with any covers or guards removed.
- Never attempt to empty the contents of closed-top drums unless the machine is securely bolted down.
- All persons other than the operator must keep at least two metres clear while the machine is in use.
- Always keep hands and feet well clear of the bin and cradle when operating.
- Do not place limbs, feet or foreign objects under the side guards or safety door.
- Never attempt to empty over-filled bins, or bins that weigh more than the machine's rated capacity.

Before connecting machine to mains supply, ensure voltage and frequency correspond with that listed on the rating plate.

Do not use an extension lead longer than 15 metres to connect the machine to mains power.

Do not operate if power lead, insulation or power plugs are damaged.

Do not connect a damp power plug or socket.

Ensure the power supply 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 MegaDumper is designed to give many years of service with minimal maintenance. In the event a fault or malfunction does occur, refer to the Quick Troubleshooting Guide in §3.1 before contacting your Simpro agent for support.

- Contact your agent in the first instance if repair or service work is required.
- All 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.
- A detailed Service Manual giving specific testing and repair instructions is available on request from Simpro.

3.1 Quick Troubleshooting Guide

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

Problem	Possible Causes	Remedy	See also
The motor does not run, and cradle does not lift	Flat battery	The battery needs to be charged if voltmeter reads less than 24 volts.	§3.4.3 Batteries 0250050004
	Triggered circuit breaker (60A fuse on older models)	Wait 1-2 minutes for circuit breaker to auto-reset (or replace fuse). Avoid operating machine with flat battery.	§3.4.8 Breaker 0790050374 Fuse 0790050101
	Faulty up/down switch or wiring	Check and rectify; replace switch if necessary.	Up/Down Switch 0790050454
	Faulty 24VDC motor solenoid or 415VAC motor contactor	Solenoid/contactor should 'click' when the UP button is pressed – if not it may need to be replaced.	24VDC Solenoid 0880050015 415VAC Contactor 0250050069
	Interlock switch on door not working	Check interlocks and cabling; replace if necessary.	§3.8.2 Interlock 0790050408
The motor runs, but the cradle still does not lift	Bin too heavy	Remove excess material from bin.	§3.3.1.1
	Pressure-relief valve set incorrectly	Contact your agent for instructions on adjusting the pressure-relief valve.	§3.7.2.2
	3-phase motor running backwards	Swap over any two of the phase wires in the plug.	§3.5.2
The cradle does not come back down from the tipped position	Cradle sticking in masts	Spray inside of masts at top of slots. Smear grease on top of the curved tipping tracks. Lubricate roller arms.	§3.3.2.2 Roller Arms L/R Pair 0680200013
	Chains derailed from chain guide	Remove access plates at top of mast and realign chains onto guides	§3.3.2.2
	Faulty up/down switch, wiring, or lowering valve coil	Lowering valve should 'click' when the DOWN button is pressed – if not, check the up/down switch, wiring and lowering valve coil.	§3.3.2.1 Up/Down Switch 0790050454 Lowering Valve Coil 0250090067
The cradle gets stuck part way down	Follower rollers not turning freely	Lubricate rollers; replace if necessary.	§3.3.2.2 Main roller 0090120000 Steel roller 1000000196
	Roller arms twisted or cradle sitting out of level	Check and straighten roller arms; replace if necessary.	§3.3.2.2 Roller Arms L/R Pair 0680200013

3.2 Cleaning

The machine should be cleaned with a low-pressure water jet, a microfiber cloth, and a mild cleaning solution. Cleaning should only be carried out with the cradle lowered.

⚠ Do not clean the machine with a high-pressure water jet or waterblaster.

⚠ See §1.9 for IP ratings of the machine and major subcomponents.
⚠ If it is necessary to clean underneath the cradle, the control system can be modified to allow this while maintaining operator safety – contact your Simpro agent for assistance.

3.3 Cradle jams and adjustment

Occasionally the cradle may become jammed at some point in the tipping cycle. This is usually a minor problem which can be easily corrected.

⚠ The cradle is not powered down – it is lowered by gravity alone.
⚠ See §3.7.6 for a schematic diagram of the hydraulic system.

3.3.1 *Cradle jams while raising*

There are two types of problem which can prevent the cradle from lifting when the RAISE button is pressed: **overload** and **mechanical** faults.

3.3.1.1 Overload fault

1. Lower the cradle to ground level, open the door, and remove the bin.
2. Manually remove some material from the bin to lighten it, then try again.

⚠ If the pressure-relief valve is adjusted incorrectly, the cradle can stall even when lifting bins that are within the machine's Safe Working Load as per §1.4. The pressure-relief valve may only be adjusted by a qualified technician, with prior authorisation from Simpro.

3.3.1.2 Mechanical fault

1. If possible, lower the cradle to ground level, open the door and remove the bin.
2. Attempt to visually identify the cause of the jamming. The most likely problems are:
    a. One of the lifting chains being derailed from the top chain guide 0140120004 (accessed by removing the cover plates at the top of the mast).
    b. The mast being bent or damaged, jamming one of the mast rollers 0140120007.
    c. Part of one of the curved tipping tracks being bent, interfering with the correct movement of the follower rollers 0090120000.
    d. Lack of lubrication of the follower rollers or main cradle axle 0220110000.
    e. The cradle being out of level due to poorly adjusted or broken lifting chains.

⚠ A technical guide on adjusting the MegaDumper lifting chains is available from Simpro.

    f. The roller arms 0680200013 pressing too tightly against the tipping tracks, due to the cradle being either out of level, or not correctly centred in the masts.

3. With the cradle lowered, rectify the problem by lubricating, straightening and/or realigning the mechanical components as required. If the mast is bent, you may need to contact your agent for support.
4. Close the door and test the machine to see if the cradle now lifts correctly.
5. Run the machine through several complete tipping cycles to ensure the problem has been fully resolved.

3.3.2 *Cradle jams while lowering*

There are three types of problem which can prevent the cradle from lowering when the LOWER button is pressed: **hydraulic, electrical,** and **mechanical** faults.

3.3.2.1 Hydraulic or electrical fault

When the LOWER button 0790050454 is pressed, the lowering valve should make a 'click' sound as it opens. If it does not, the problem is likely to be either a hydraulic or electrical fault.

1. Manually disable the safety door interlocks as per §3.8.2.1, and open the door.
2. Attach lifting slings to a forklift or hoist, and carefully take the weight of the cradle.

⚠ Never place any part of your body underneath the cradle unless it is securely supported.

3. Remove the powerpack cover 0140020312.
4. Unscrew the fitting attaching the steel hydraulic pipe to the powerpack, and hold the end of the pipe over a container with a capacity of at least 2 litres.
5. Slowly lower the cradle with the forklift, collecting the hydraulic fluid in the container.
6. Once the cradle is fully lowered, remove the bin from the machine.
7. Reconnect the hydraulic pipe and fitting, and refill the oil reservoir.
8. Check that the lowering valve coil 0250090067 is receiving an electrical signal. A small LED should glow on the coil plug when the LOWER button is pressed. If it does not, check the wiring for breaks, corrosion, and rodent damage.
9. If the coil is receiving an electrical signal but not opening, the lowering valve cartridge 0250090055 may need to be cleaned:
    a. Remove the lowering valve from the valve stem.
    b. Unscrew and remove the cartridge from inside the valve.
    c. Clean the cartridge with compressed air.
    d. Replace the lowering valve by reversing this procedure.
10. With the lowering valve replaced, close the door, and test the machine to see if the cradle now lowers correctly. If the problem persists, the lowering valve coil or cartridge may need to be replaced – contact your agent for support.
11. Re-enable the interlocks as per §3.8.2.1, and run the machine through several complete tipping cycles to ensure the problem has been fully resolved.

3.3.2.2 Mechanical fault

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

1. Manually release the safety door interlocks as per §3.8.2.1, and open the door.
2. Provide support for the cradle, either with a structure underneath or with a sling holding it to the top of the main frame. Allow for it to fall no more than 50mm.

⚠ Never place any part of your body underneath the cradle unless it is securely supported.

3. Attempt to visually identify the cause of the jamming. The most likely problems are:
   a. One of the lifting chains being derailed from the top chain guide[0140120004] (accessed by removing the cover plates at the top of the mast).
   b. The mast being bent or damaged, jamming one of the mast rollers[0140120007].
   c. Part of one of the curved tipping tracks being bent, interfering with the correct movement of the follower rollers[0090120000].
   d. Lack of lubrication of the follower rollers or main cradle axle[0220110000].
   e. The cradle being out of level due to poorly adjusted or broken lifting chains.

⚠ A technical guide on adjusting the MegaDumper lifting chains is available from Simpro.

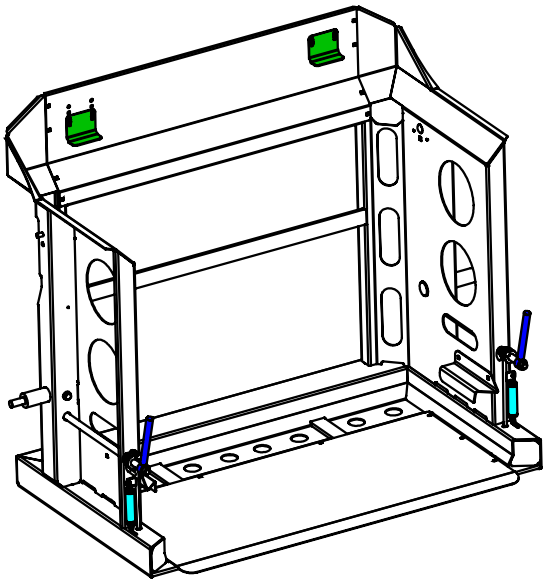
   f. The roller arms[0680200013] pressing too tightly against the tipping tracks, due to the cradle being either out of level, or not correctly centred in the masts.
4. Rectify the problem by lubricating, repositioning, or straightening the components as required. If the mast is bent, you may need to contact your agent for support.
5. Close the door and test the machine to see if the cradle now lowers correctly.
6. Re-enable the interlocks as per §3.8.2.1, and run the machine through several complete tipping cycles to ensure the problem has been fully resolved.

3.3.3 *Cradle adjustment*

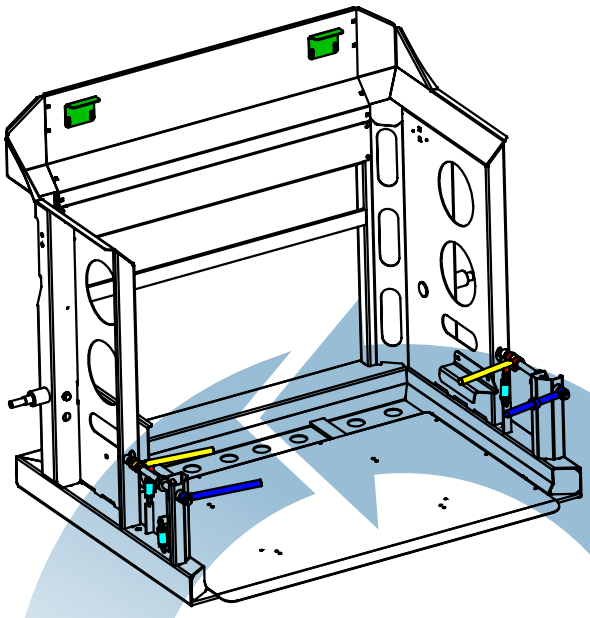
Most MegaDumpers are fitted with either a **Type-S cradle**[0650200001] (for wheelie bins up to 660L) or a **Type-E cradle**[0650200000] (for wheelie bins up to 1100L). These 'base-lift' cradles are very versatile, but can require minor adjustment to safely retain some types of wheelie bin.

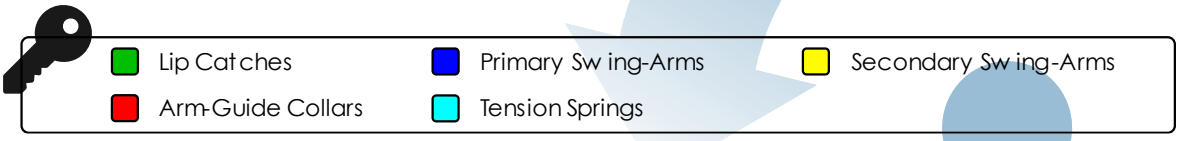
⚠ Use of a Type-S or Type-E cradle that is not correctly adjusted may result in bins falling out of the cradle when tipped.

TYPE-S CRADLE



TYPE-E CRADLE





⚠ In 2021, MegaDumper model codes were simplified to a string of 8-9 characters, indicating the model, tipping height, cradle type and powerpack. The letter in the seventh position indicates the type of cradle; for instance, **MD2100S-3** is a machine with a Type-S cradle. Where this letter is omitted, the default Type-E cradle is assumed.

⚠ On older models such as the **MD600B-1800.3.C**, the letter 'B' indicates a 660L cradle. This cradle design was renamed from 'Type-B' to 'Type-S' in 2021.

3.3.3.1 Lip Catch adjustment

Both Type-S and Type-E cradles have two small steel brackets called **Lip Catches** 0400020049 (green in the above diagram) to prevent bins from 'sliding forward' out of the cradle when inverted. These should be adjusted to suit the largest bins that are to be emptied in regular operation (usually 660L for Type-S cradles or 1100L for Type-E cradles).

The procedure to adjust the Lip Catches is as follows:

1. Lower the cradle completely to the ground and open the safety door.
2. Place **a sample of the largest bin that is to be emptied** onto the cradle. Ensure it is centrally positioned and firm against the cradle backplate.
3. Standing at the tipping face of the MegaDumper, use a 13mm torque wrench or spanner to release the bolts holding the lip catches to the cradle.
4. Adjust the catches so that the horizontal tab sits approximately **10mm above the front lip of the bin**.
    - A series of bolt-holes are provided in the cradle for repositioning the catches.
    - For smaller bins the catches can be fixed with the horizontal tabs below the bolts, to form a shape like **L**. This is shown on the diagram of the Type-S cradle.
    - For larger bins the catches can be fixed with the horizontal tabs above the bolts, to form a shape like **⅂**. This is shown on the diagram of the Type-E cradle.
    - The combination of catch position and orientation allows about 200mm of vertical adjustment, from 1070mm to 1270mm. This is sufficient to suit almost all 4-wheel bins.
5. Once the catches are correctly positioned, re-tighten the bolts (torque ~10Nm).

3.3.3.2 Primary Swing-Arm adjustment

Both Type-S and Type-E cradles have a pair of pivoting arms called **Primary Swing-Arms** 0670200043 (blue in the above diagram) to prevent large 4-wheel bins from 'rolling over' while being tipped.

When the cradle is resting on the ground, the Primary Swing-Arms are moved into the open position (vertical) by means of a ground rod 0670200039. When the cradle is lifted off the ground, the arms are moved into the closed position (horizontal) by springs 0320150000.

Because the Primary Swing-Arms are collar-mounted on axles, their position and rotation can be configured independently. They should be adjusted to suit the largest bins to be emptied in regular operation (usually 660L for Type-S cradles or 1100L for Type-E cradles).

The procedure to adjust the Primary Swing-Arms is as follows:

1. Lower the cradle to the ground and open the safety door.

2. Place **a sample of the largest bin that is to be emptied** onto the cradle. Ensure it is centrally positioned and firm against the cradle backplate.
3. Use a 13mm torque wrench or spanner to release the collar bolt holding one of the swing arms onto its axle.
4. Rotate the arm horizontal and slide it forwards on its axle until it contacts the face of the bin, then withdraw it by 10mm.
5. Rotate the arm back to vertical, and re-tighten the collar bolt (torque ~10Nm).
6. Repeat steps 3-5 for the swing arm on the other side of the cradle.
7. Check that the arms are correctly adjusted:
    a. Visually assess that both arms are standing at 90° degrees (vertical) while the cradle is lowered.
    b. Close the door and raise the cradle a short distance off the ground, then check that both arms have pivoted horizontally across the face of the bin, standing no more than 25mm proud.
    c. Conduct a complete lifting/lowering cycle and check that the bin is held securely throughout, and can then be easily removed.

3.3.3.3 *Secondary Swing-Arm adjustment*

Type-E cradles have another pair of pivoting arms called **Secondary Swing-Arms** 0670200042 (yellow in the above diagram) to prevent 660L/770L wheelie bins from 'rolling over' while being tipped. This is necessary because the Primary Swing-Arms usually retain only 1100L bins.

The Secondary Swing-Arms have similar functionality to the Primary Swing-Arms, and are mounted on the same axle, but are moved independently by **guide collars** 0670200044 (red in the above diagram). By adjusting the guide collars, the Secondary Swing-Arms can be configured separately from the Primary Swing-Arms. They should be adjusted to suit the second-largest bins that are to be emptied in regular operation (typically 660L or 770L).

The procedure to adjust the Secondary Swing-Arms is as follows:

1. Lower the cradle completely to the ground and open the safety door.
2. Place **a sample of the second-largest bin that is to be regularly emptied** onto the cradle, ensuring it is centrally positioned and firm against the backplate.
3. At the front of the cradle, use a 4mm hex key to loosen the two screws securing one of the guide collars.
4. Rotate the swing arm horizontal and slide it forwards on its axle until it contacts the back of the bin, then withdraw it by 10mm.
5. Rotate the arm back to vertical, and holding it in this position, rotate the guide collar until its crossbar makes firm contact with the swing arm.
6. Re-tighten the screws on the guide collar.
7. Repeat steps 3-6 for the collar and arm on the other side of the cradle.

⚠ In some cases, the collar screws do not lock onto the axle with enough force, causing the collar to gradually slide out of position. Should this problem occur, shallow 'dimples' may be drilled into the axle with a 4mm drill bit, so the screws can lock into place.

8. Check that the arms are correctly adjusted:

a. Visually assess that both arms are standing at 90 degrees (vertical) while the cradle is lowered.
b. Close the door and raise the cradle a short distance off the ground, then check that both arms have pivoted horizontally across the face of the bin, standing no more than 25mm proud.
c. Conduct a complete lifting/lowering cycle and check that the bin is held securely throughout, and can then be easily removed.

3.4 Electrical System (battery)

If you do not operate a battery-powered machine, please disregard this section.

Battery MegaDumpers are supplied with four 12V/20Ah deep-cycle gel VRLA batteries in an external battery box, a digital smart charger, and a series-wound 800W/24VDC motor. The control voltage is 24VDC.

The motor only runs when the RAISE button is pressed; the cradle is lowered by gravity alone. As a rule, a full charge is sufficient to empty 15 tonnes of material, but this is dependent on the tipping height and the condition of the batteries.

3.4.1 *International conformance*

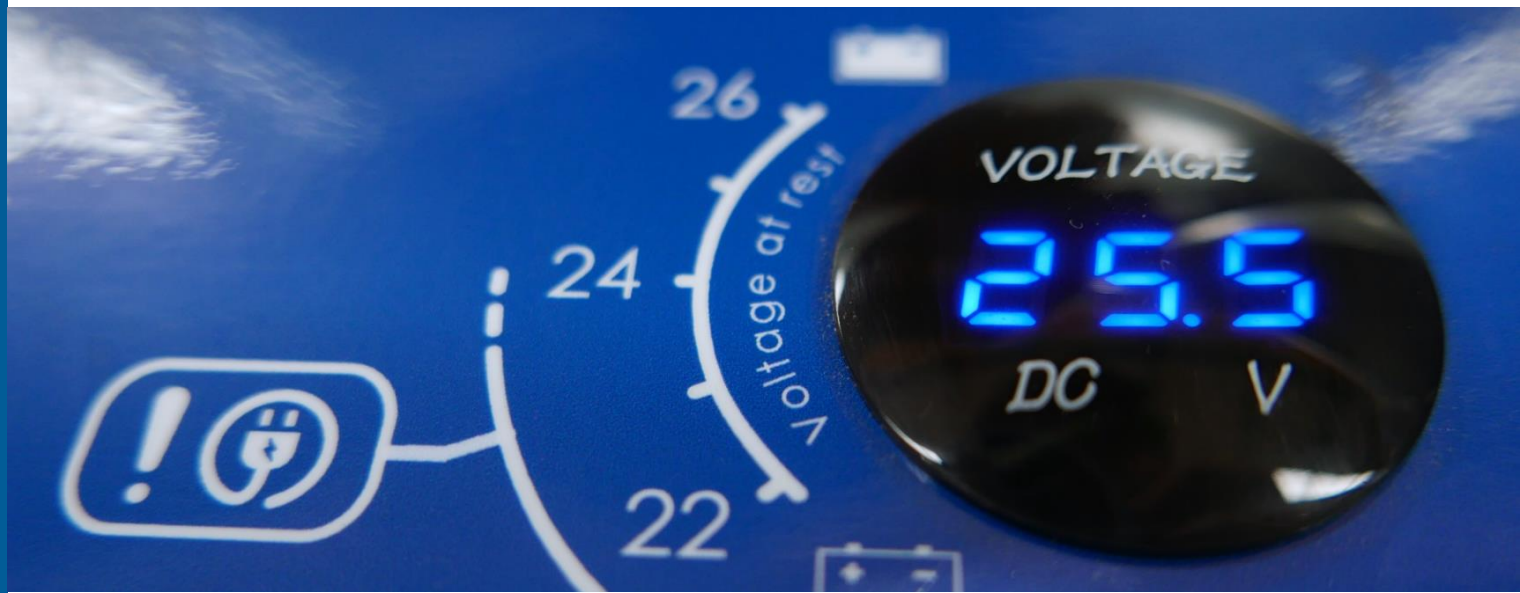
The MegaDumper is fitted with a digital smart charger which accepts 1-phase mains power at voltages of 85-264VAC and frequencies of 50/60Hz, with a maximum current draw of 3 Amps. This means the machine can be charged using a standard household power outlet in almost any country around the world.

3.4.2 *Voltmeter* 0790050067

The MegaDumper is fitted with a voltmeter on the control panel, which is used to indicate the level of charge in the batteries. **When the voltmeter reads below 24 volts the batteries are flat.** The machine should not be used, and should be recharged as soon as possible.

Because the voltage will fluctuate when the machine is operated, the charge level should be checked while the machine is at rest.

Operating a machine with a flat battery may trigger the circuit breaker (see §3.4.8) or fuse. This is to prevent excessive current flow from damaging the electrical system.



3.4.3 *Batteries* 0250050004

The MegaDumper is fitted with four 12V/20Ah deep-cycle gel VRLA batteries in two parallel series circuits to deliver 24VDC (nominal) to the motor and control circuits.

The batteries are sealed and maintenance-free, with a nominal lifespan of five years. However, battery life is dependent on several factors, including the number of charge cycles, the average discharge depth, and environmental conditions.

3.4.3.1 Charging the batteries

To recharge the batteries, plug one end of a 1-phase extension lead into the appliance socket on the machine, and the other end into a 1-phase mains power outlet.

A full charge usually takes about 10 hours. The machine can be used while on charge.

- The battery charger automatically adapts to different input currents, manages the charging cycle to maximise battery life, and prevents overcharging.
- The charger delivers enough power to empty a 200kg bin in about 5 minutes, which means that in most cases a battery machine can be operated as a 1-phase mains machine (see duty cycle table in §1.5).

3.4.3.2 Maximising battery life

Observing the following rules can help to maximize the life of the batteries:

- Place the batteries on charge every night (not just when they are flat).
- Do not allow the machine to sit with flat batteries for more than 24 hours.
- Do not operate the machine when the voltmeter reads less than 24V.

- Batteries are supplied with a 12-month warranty, separate from the warranty on the rest of the machine.

3.4.4 *Battery charger* 0390050006

The MegaDumper is fitted with a digital smart charger which accepts 1-phase mains power at 85-264VAC (multi-voltage) and 50/60Hz, with a maximum current draw of 3 Amps.

The charger outputs up to 6 Amps of continuous direct current at 27.2 Volts, for a maximum power output of 160 Watts.

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

3.4.5 *Battery box* 1001000001

The MegaDumper batteries are contained in a separate battery box, which is mounted beside the main enclosure and connected to the powerpack with a 175A Anderson plug. This allows the battery box to be quickly removed for offsite charging, or multiple battery boxes to be charged and swapped for 24/7 operation.

- The battery box has a backup LED battery indicator and a 24V 'cigarette lighter' outlet, which can be used for light-duty power needs such as charging mobile phones.
- Simpro can supply a standalone charger 0390050006 for offsite battery charging.

3.4.6 *Appliance inlet* NZ/AU 0790050272

The MegaDumper is fitted with an IP66-rated appliance socket on the right-hand side of the machine (opposite the control panel). This allows the machine to be charged using a regular 1-phase mains extension lead.

3.4.7 *Isolator switch* 0210050002

The MegaDumper is fitted with an isolator switch on the forward side of the powerpack cover. This switch isolates the batteries from the electrical systems, and should be turned OFF if the machine is to be placed in storage, or if the powerpack cover needs to be removed.

3.4.8 *Circuit breaker* 0790050374

The MegaDumper has an auto-resetting 75A circuit breaker fitted to the main battery cable. This cuts power to the machine if excessive current is being drawn, helping to protect the electrical systems. It automatically resets after a period of 1-2 minutes.

> ⚠ Because electric motors draw more current as the voltage decreases, operating the machine with a flat battery may trigger the circuit breaker.
>
> ⚠ Machines produced prior to 2020 were fitted with an 60A automotive blade-fuse instead of a circuit breaker. Fuses are available from Simpro 0790050101 or any auto-parts store.

3.4.9 *Solar panel* 0090040079

> ⚠ If you do not operate a machine with a solar panel, please disregard this section.

The MegaDumper can be fitted with a solar panel kit for use in off-grid locations. The two 80W monocrystalline solar panels (dimensions 930x673x35mm) are mounted on adjustable steel brackets at the top of the mast, and charge the battery via a 12V/24V digital regulator.

As per the table in §1.5, in ideal conditions the solar panels provide enough power to dump about 6,000kg of material each day, which is equivalent to about 20 full 660-litre wheelie bins. There are many factors affecting this figure, including the season, the amount of sunlight available, cloud cover, panel alignment and cleanliness, and the condition of the batteries.

> ⚠ To deliver maximum power, both solar panels must be correctly aligned, clean, and exposed to direct sunlight throughout the day.

3.4.9.1 Solar panel alignment

The solar panels are mounted on steel H-frames 0560190006, which in turn are mounted on adjustable brackets 0560190009 offering one axis of movement. To deliver maximum power, the panels should both be aligned to cast the largest-possible shadow when the sun is at its highest point in the sky. However, because the brackets have only one axis of movement, the orientation of the machine itself affects the optimum panel alignment.

Use the following guidelines to align the solar panels:

1. Ideally, orient the machine so that adjustment arc of the panel mounting brackets runs from North to South.
2. If the adjustment arcs cannot be oriented North-South, the panels should be angled at 0° degrees (vertical). While this is suitable close to the equator, it will progressively reduce the power output at latitudes beyond ±20° degrees.

3. With the machine in its long-term location, **tilt both panels towards the equator** by the same number of degrees as the machine's geographic latitude.
4. If required, a further 5-10% increase in output can be achieved by tuning the panel alignment for the Summer and Winter months:
    a. At the beginning of Spring, reduce the angle of the panels so it is equal to the machine's geographic latitude **less 15° degrees**.
    b. At the beginning of Autumn (Fall), increase the angle of the panels so it is equal to the machine's geographic latitude **plus 15° degrees**.

⚠ The panel angles referred to above are measured in degrees of arc from vertical.
⚠ Without correct adjustment the solar panels may deliver as little as 20% of the theoretical maximum output. Correctly adjusting the panels when the machine is installed can increase this figure to ~70%, and adjustment twice a year can increase output to ~75% of the theoretical maximum.

3.4.9.2 Solar panel cleaning

The solar panels should be cleaned every six months, using a microfiber cloth or damp rag.

⚠ Always use height-safety equipment when servicing or cleaning the solar panels.

3.5 Electrical System (3-phase mains)

⚠ If you do not operate a 3-phase mains machine, please disregard this section.

Machines powered by 3-phase mains electricity are generally the same as other models, but use a 3-phase 2-pole electric motor to drive the hydraulic pump. A transformer provides 24VDC current to the control systems. In some regions a VSD is also fitted to provide suitable current to the motor.

The motor only runs when the RAISE button is pressed; the cradle is lowered by gravity alone.

3.5.1 *International conformance*

The exact specifications of 3-phase machines differ depending on the standard voltage and frequency of 3-phase mains power in the intended country of use.

In regions where 3-phase/~400VAC/50Hz power is standard (primarily in Europe, Australasia, and Asia) the motor is driven directly by the mains current in 'delta configuration'. In locations where different voltages and frequencies are common (primarily in North and South America) an electronic Variable Speed Drive (VSD) is fitted, which modulates the local mains supply and outputs 3-phase/400VAC/50Hz current to the motor in 'star configuration'.

⚠ A list of 3-phase power standards in different countries and territories may be viewed here: https://www.worldstandards.eu/three-phase-electric-power/.

⚠ Connecting the MegaDumper to a power supply for which it is not designed may damage the motor and other components. Consult an electrician if you are unsure.

3.5.2 *Appliance inlet* 415VAC 0790050174

The MegaDumper is fitted with an IP66-rated appliance inlet, allowing it to be operated with a regular 3-phase extension lead. Depending on the phase polarity of the AC power supply, the power plug may need to be rewired to make the motor turn in the right direction.

> 3-phase electric motors turn in different directions depending on the polarity of the input current, so a mismatch will make the motor run backwards. This does not damage the motor, but prevents the hydraulic system from lifting the cradle. An electrician can correct this problem by exchanging two of the phase wires in the power plug.

3.5.3 *Isolator switch* 0210050002

The MegaDumper is fitted with an isolator switch on the forward side of the powerpack cover. This isolates the electrical systems from the power supply. It should be turned OFF if the machine is to be placed in storage, or if the powerpack cover needs to be removed.

> The isolator switch must be turned OFF before the powerpack cover is removed.

3.5.4 *Power supply unit* 415VAC 0790050111

The MegaDumper is fitted with an electronic power supply unit to provide 24VDC current to the control systems. The input voltage and frequency are specified to suit standard 3-phase mains power in the intended country of use.

3.6 Electrical System (1-phase mains)

> If you do not operate a 1-phase mains machine, please disregard this section.

MegaDumpers powered by 1-phase mains electricity are generally the same as other models, but use a Variable Speed Drive (VSD) to drive a 3-phase 2-pole electric motor, which drives the hydraulic pump. A transformer provides 24VDC current to the control systems.

The motor only runs when the RAISE button is pressed; the cradle is lowered by gravity alone.

3.6.1 *International conformance*

The exact specifications of 1-phase machines differ depending on the standard voltage and frequency of 1-phase mains power in the intended country of use. Both the transformer (§3.6.4) and VSD (§3.6.5) are specified to suit local norms.

> A list of 1-phase power standards in different countries and territories may be viewed here: https://www.worldstandards.eu/electricity/plug-voltage-by-country/.

> Connecting the MegaDumper to a power supply for which it is not designed may damage the motor and other components. Consult an electrician if you are unsure.

3.6.2 *Appliance inlet* NZ/AU 0790050272

The MegaDumper is fitted with an IP66-rated appliance inlet, allowing it to be operated with a regular 1-phase extension lead.

3.6.3 *Isolator switch* 0210050002

The MegaDumper is fitted with an isolator switch on the forward side of the powerpack cover. This isolates the electrical systems from the power supply and should be turned OFF if the machine is to be placed in storage, or if the powerpack cover needs to be removed.

⚠ The isolator switch must be turned OFF before the powerpack cover is removed.

3.6.4 *Transformer* NZ/AU 0250050122

The MegaDumper is fitted with a transformer which outputs 24VDC current to the control systems. The input voltage and frequency are specified to suit standard 1-phase mains power in the intended country of use.

3.6.5 *Variable Speed Drive*

The MegaDumper is fitted with a Variable Speed Drive (VSD) unit, which provides 3-phase/400VAC/50Hz current to the electric motor in 'star configuration'. The input voltage and frequency are specified to suit 1-phase mains power in the intended country of use.

The VSD has many parameters that can be set to suit specific applications. They can be modified or calibrated by a PC that has the appropriate program and cable drivers loaded.

⚠ The VSD can be fitted with a joystick controller to provide progressive control over the lifting speed, as set out in §2.3.4.

⚠ Residual voltages may be retained in the VSD after it has been disconnected from the power supply. Use extreme caution when servicing all electrical components.

3.7 Hydraulic System

3.7.1 *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.

3.7.2 *Control valves*

The hydraulic system has four primary control valves:

3.7.2.1 Check valve

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

3.7.2.2 Pressure-relief valve Cartridge 0430090001

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 cradle is already at the top of the cycle.

3.7.2.3 Lowering valve Cartridge 0250090055 Coil 0250090067

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

3.7.2.4 *Lowering-speed valve* 0250090056

This is a pressure-compensating valve which limits the maximum flow rate of oil passing back to the reservoir through the lowering valve – thus regulating the descent speed of the cradle (regardless of the weight of the bin).

3.7.3 *Lift rams*

The MegaDumper has two lift rams of the single-action displacement type. Each ram has a 1¼ -inch chrome bar, a single rubber seal 0090090002, and two ram rollers 0140120002 which transfer motion into the lifting chains. Hydraulic lines run from the powerpack to the lift rams.

The rams are very robust and reliable, but easy to maintain should the need arise.

3.7.4 *Hydraulic fluid*

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

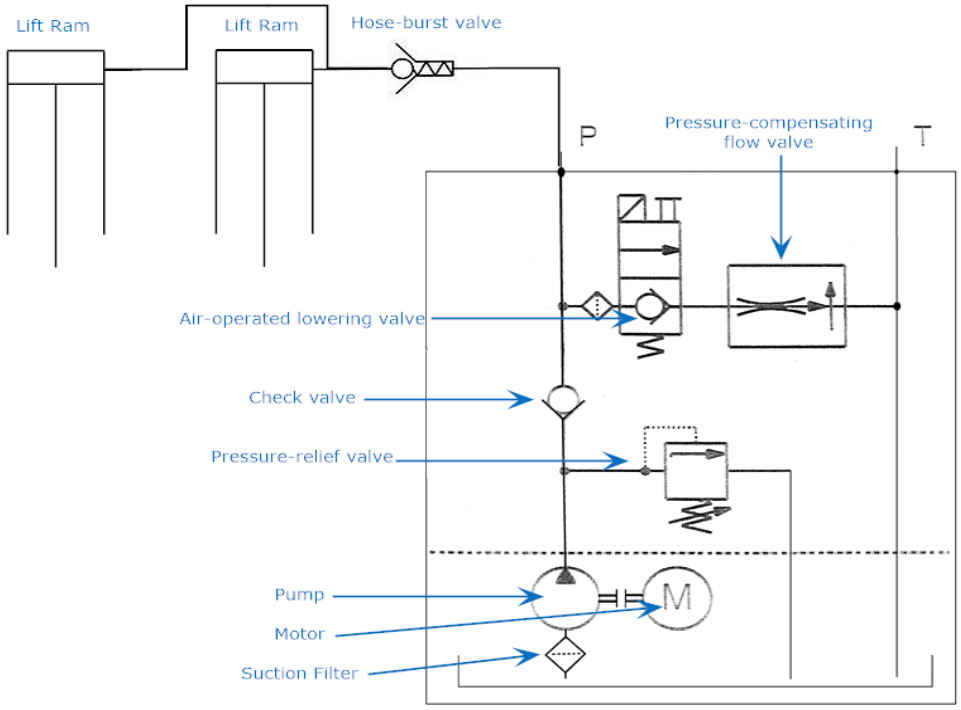
⚠ Ensure the cradle is completely lowered before replacing the hydraulic fluid.
⚠ The hydraulic reservoir has markings showing the recommended fill level. Do not fill beyond this level unless specifically instructed by the manufacturer.

3.7.5 *Maintenance*

After every 12 months of operation the hydraulic fluid should be drained and replaced, as per specifications in §3.7.4. The intake suction-filter and the lowering valve should also be removed and cleaned at this time.

⚠ See §3.10 for other preventative maintenance inspection procedures.

3.7.6 *Hydraulic system schematic*



3.8 Safety Door and Interlock System

3.8.1 *Swing-up safety door (standard)* 1000000278

Standard MegaDumper models are fitted with a swing-up safety door, consisting of a steel tube frame with wire mesh or sheet-metal guarding, supported by two gas struts. This type of door takes up a minimum of space, but has several moving parts and will benefit from annual servicing as follows:

1. Lubricate the arm pivot points with silicone spray (both ends of all four arms).
2. Check both safety door interlocks 0790050408 to ensure they work as intended:
    a. Raise the cradle 100mm off the ground and try to open the safety door. If it can open, the cradle-position sensor and/or the door interlocks may need adjusting or replacing. Contact your agent for instructions.
    b. Open the door, then press the RAISE and LOWER buttons to verify that the machine is now disabled. If it is not, contact your agent for instructions.
3. Ensure the end caps on the arm pivot bars are in place, and all fixings are tight.
4. The gas struts are designed to balance the weight of the door throughout its travel, and hold it open. Over time, the gas in the struts can leak out, resulting in reduced lifting force. If the struts do not hold the door open, they may need to be replaced.

3.8.2 *Idec interlocks* Interlock 0790050408 Actuator 0250050065 Cable 0790050410

The MegaDumper is fitted with two solenoid-operated safety interlocks. These are Idec HS5E-D4403-G or HS5E-F4403-G 'power-to-unlock' models, with four internal contacts which are used to determine whether the door is closed and locked.

3.8.2.1 Interlock manual override

⚠ This work should only be carried out by a qualified technician.

⚠ The interlock Override Key should be stored in a location only accessible to supervisors and technical staff.

Normal Position

Manual Unlocking Position

All routine cleaning and maintenance on the MegaDumper should be conducted with the cradle in the lowered position. If for any reason the interior of the safety cage needs to be accessed **while the cradle is raised**, the interlock(s) can be manually disabled by carrying out the following procedure:

1. Move the cradle to the desired position for cleaning or maintenance.
2. Insert the supplied yellow Override Key into the triangular cam on **both** door interlocks, and turn it to the UNLOCK position. **The door can now be opened even while the cradle is raised.**
    - On machines with a standard control system, the safety door will now function as a switch – the cradle cannot be moved while the door is open, but can still operate while the door is shut.
    - On machines with a PLd or PLe safety-monitored control system, the system will enter SAFE MODE – the machine is completely disabled, and the cradle cannot be moved until the door is closed, the interlock is re-enabled, and the system is reset.

3. Open the safety door and carry out cleaning or maintenance as required.
4. Once the work is complete, shut the safety door and turn **both** interlock cams back to the LOCK position.
5. Remove the Override Key and **store in a safe location**.
6. Fully test the machine and all safety functions before returning to service. If the machine is fitted with a PLd or PLe safety-monitored control system, press the blue RESET button for two seconds to test and reset the safety functions.

- ⚠ Do not open the safety door with the Override Key inserted in an interlock cam but not fully turned (less than 90°) as this may damage the interlock.
- ⚠ Do not apply excessive force to the Override Key or interlock components.
- ⚠ Do not leave the Override Key inserted in an interlock during normal operations.

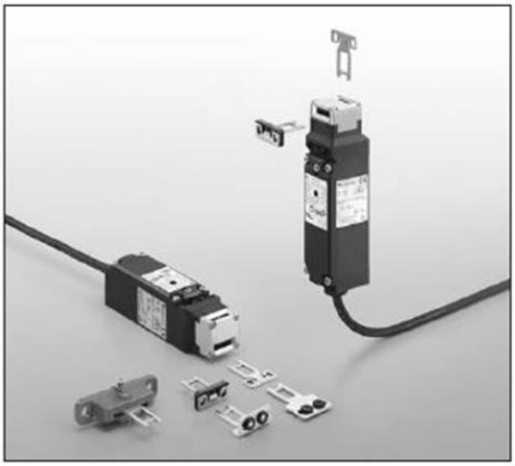
3.8.2.2 *Interlock specifications*

A summary of the interlock specifications is included below. The complete Idec user manual can be downloaded from the following link: https://goo.gl/iafPoI.

HS5E Safety Door Lock Switches

Small safety switch with four poles and solenoid. Ideal for applications in small spaces.

- Compact body. 35 × 40 × 146 mm.
- Four-pole internal switches.
- Gold-plated contacts.
- Spring lock and solenoid lock types are available.
- The head orientation can be rotated, allowing 8 different actuator entries.
- A metal entry slot ensures the high durability.
- An actuator with rubber cushions alleviates the impact of actuator entry into the slot.
- The locking strength is 1000N minimum (GS-ET-19).
- Integral cable design minimizes wiring, preventing wiring mistakes.
- LED pilot light indicates the solenoid status.
- RoHS directive compliant.
- Degree of protection: IP67 (IEC60529)
- NC contacts are of direct opening action (IEC/EN60947-5-1).
- Proprietary actuators prevent unauthorized opening (ISO14119, EN1088).
- Double insulation structure.



BG standard in Germany | Direct Opening Action | Double Insulation

Spring Lock Type

- Automatically locks the actuator without power applied to the solenoid.
- After the machine stops, unlocking is completed by the solenoid, providing high safety features.
- Manual unlocking is possible in the event of power failure or maintenance.

Solenoid Lock Type

- The actuator is locked when energized.
- The actuator is unlocked when de-energized.

Ratings

• Contact Ratings

Rated Insulation Voltage (Ui) (Note 1)			250V (between LED or solenoid and ground: 30V)		
Rated Thermal Current (Ith)			2.5A		
Rated Voltage (Ue)			30V	125V	250V
Rated Current (Ie) (Note 2)	AC	Resistive load (AC-12)	—	2A	1A
		Inductive Load (AC-15)	—	1A	0.5A
	DC	Resistive load (DC-12)	2A	0.4A	0.2A
		Inductive Load (DC-13)	1A	0.22A	0.1A

• Minimum applicable load (reference value): 3V AC/DC, 5 mA

Note 1: UL rating: 125V
Note 2: TUV, BG rating: AC-15, 0.5A/250V, DC-13, 0.22A/125V
UL, c-UL rating: Pilot duty AC 0.5A/125V, Pilot duty DC 0.22A/125V

• Solenoid

Locking Mechanism	Spring Lock Type	Solenoid Lock Type
Rated Voltage	24V DC	
Rated Current	266 mA (initial value)	
Coil Resistance	90Ω (at 20°C)	
Pickup Voltage	Rated voltage × 85% maximum (at 20°C)	
Dropout Voltage	Rated voltage × 10% minimum (at 20°C)	
Maximum Continuous Applicable Voltage	Rated voltage × 110%	
Maximum Continuous Applicable Time	Continuous	
Insulation Class	Class F	

• Pilot Light

Rated Voltage	24V DC
Rated Current	10 mA
Light Source	LED
Light Color	Green

Specifications

Applicable Standards	ISO14119 IEC60947-5-1 EN60947-5-1 (TÜV approval) EN1088 (TÜV approval) GS-ET-19 (BG approval) UL508 (UL recognized) CSA C22.2, No. 14 (c-UL recognized)
	IEC60204-1/EN60204-1 (applicable standards for use)
Operating Temperature	–25 to 50°C (no freezing)
Relative Humidity	45 to 85% (no condensation)
Storage Temperature	–40 to +80°C (no freezing)
Pollution Degree	3
Impulse Withstand Voltage	2.5 kV (between LED, solenoid and grounding: 0.5 kV)
Insulation Resistance (500V DC megger)	Between live and dead metal parts: 100 MΩ minimum Between live metal part and ground: 100 MΩ minimum Between live metal parts: 100 MΩ minimum Between terminals of the same pole: 100 MΩ minimum
Electric Shock Protection	Class II (IEC61140)
Degree of Protection	IP67 (IEC60529)
Shock Resistance	Operating extremes: 100 m/s² Damage limits: 1000 m/s²
Vibration Resistance	Operating extremes: 10 to 55 Hz, amplitude 0.35 mm minimum Damage limits: 30 Hz, amplitude 1.5 mm minimum
Actuator Operating Speed	0.05 to 1.0 m/s
Direct Opening Travel	Actuator HS9Z-A51: 11 mm minimum Actuator HS9Z-A51A/A52/A52A/A53/A55: 12 mm minimum
Direct Opening Force	80N minimum
Tensile Strength when Locked	1000N minimum (GS-ET-19)
Operating Frequency	900 operations per hour
Mechanical Life	1,000,000 operations minimum (GS-ET-19)
Electrical Life	100,000 operations minimum (operating frequency 900 operations per hour, load AC-12, 250V, 1A)
Conditional Short-circuit Current	50A (250V) (Use 250V/10A fast acting type fuse for short-circuit protection.)
Cable	UL2464, No. 21 AWG (8-core: 0.5 mm² or equivalent/core)
Cable Diameter	ø7.6 mm
Weight (approx.)	400g (HS5E-•••01)

idec

3.9 Safety-Monitoring System (CAT3/CAT4 only)

> ⚠ If you do not operate a machine with a CAT3 or CAT4 safety monitoring system, please disregard this section.

Machines with CAT3 or CAT4 safety architecture are supplied with a Rockwell CR-30 Safety Relay 0960050027 to monitor the safety functions. The Safety Relay continuously monitors the status of the Emergency Stop contacts, door lock, cradle-lowered sensor, and any other installed sensors.

The Safety Relay goes into SAFE MODE:

1. If any fault is detected;
2. Whenever the door is unlocked or opened;
3. Whenever the Emergency Stop is pressed;
4. Whenever the tipper is moved away from the 'safe' position (optional).

Whenever the machine is in SAFE MODE the blue RESET lamp glows, and the machine must be 'reset' before it can be operated. To reset the machine, first ensure the door is correctly closed and locked, the Emergency Stop is released, and the tipper is in the correct position. Next, press and hold the RESET button for about two seconds. A diagnostic test is run on the machine, and if all safety functions are operating correctly the lamp will go out when the button is released, indicating a successful reset. If a fault has been detected in any of the safety equipment or connections, the machine will not reset and cannot be operated – the RESET lamp will continue to glow.

This documentation is to assist an engineer or electrician to find and repair any fault preventing the system from resetting. Most faults can be traced from the LEDs on the CR30 safety relay itself; some locks and sensors also have LEDs to assist in trouble-shooting.

3.9.1 *440C-CR30 Safety Relay* 0960050027

The 440C-CR30-22BBB (CR30) relay is a software-configurable safety relay. This device is intended to be part of the safety-related control system of a machine. The CR30 safety relay is based on the Micro800 platform and must be configured using a personal computer (PC) with the Allen-Bradley® Connected Components Workbench software.

> ⚠ The CR30 housing is red to signify it as a safety device and to distinguish it from the grey-coloured standard controllers.

The CR30 safety relay accommodates up to 24 safety monitoring functions. Examples of safety monitoring functions are single channel input, dual channel input, two hand control, reset, and feedback. It has 22 embedded safety rated inputs and outputs and accepts up to two plug-in modules, each of which has four standard inputs and four standard outputs.

The CR30 safety relay can be configured to accept two single-wire safety inputs and to provide two single-wire safety outputs. This feature allows the CR30 safety relay to be an integral part of an extensive machine safeguarding system.

There are 10 Input LEDs, 5 General Status LEDs, and 6 Output LEDs. These can help to identify faults and perform basic troubleshooting. The input and output LEDs are set up when designing the program. A print-out of the program function and what each LED refers to should be provided with each machine.

The PWR and RUN LEDs should be illuminated when the system is ready for use. If the FAULT or LOCK LEDs are showing, try cycling the power. If the LEDs remain on, a computer with the *Connected Components Workbench* software must be connected to identify and resolve the problem.

3.9.2 *Troubleshooting*

Faults in the CR30 relay fall into two categories: recoverable faults, and non-recoverable faults. Non-recoverable faults require power cycling to recover after the fault is corrected. Recoverable faults can be cleared by eliminating the cause of the fault and cycling the inputs associated with the fault. The output that is connected to an input with that fault is switched off. The other outputs, which are not affected by the fault, will continue to work.

Examples of recoverable faults include:

- SMF Faults
- Cross loop
- Simultaneity Faults
- Reset button fault
- Muting: Synchronization time exceed
- Muting time exceeded
- Sequence fault

3.9.3 *Configuration*

The CR30 is software configurable using the Rockwell Automation *Connected Components Workbench* (CCW) software. CCW is a set of collaborative tools supporting the CR30 safety relays. It is used to configure the CR30, program the Micro 800 controllers, and configure many PowerFlex drives and PanelView graphic display terminals.

The CCW software is free and can be downloaded from the Rockwell website at the following link: goo.gl/7wgw1d. To help you configure your relay through the Connected Components Workbench software, you can refer to the Connected Components Workbench Online Help (provided with the software).

The CR30 has a USB interface for connection to a personal computer for configuration. Use a standard USB A Male to B Male cable for connecting to the relay.

3.10 Preventative Maintenance Inspections

Regular preventative maintenance inspections (PMIs) should be carried out on the MegaDumper. This helps ensure operator safety and extend the service life of the machine.

The MegaDumper PMI schedule is divided into three parts: weekly, monthly, and annual inspections. The procedures are set out in the following section, with matching log sheets.

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

⚠ In the United Kingdom, the Lifting Operations and Lifting Equipment Regulations 1998 specifies that all workplace lifting equipment be subjected to 'thorough inspection' on regular basis. These are sometimes known as LOLER checks. The following schedules and logs may be used to demonstrate conformance with UK LOLER regulations.

3.10.1 *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.

3.10.2 *Weekly inspection*

The following inspection should be carried out every week, and the results recorded in the log sheet on the following page.

Weekly Inspection Checklist			
Category	**No.**	**Item**	**Check**
General	1	Entire machine	Conduct a complete tipping cycle and check for any faults or abnormal behaviour.
Safety systems	2	Door interlock actuators ✾ 0250050065	Check that the actuators are securely attached to the door with security screws, and enter the interlocks freely and smoothly, without force. Check that the actuators lock the door while the cradle is raised above 100mm.
Mechanical systems	3	Inside masts	If the tipping motion appears to be jerky or inconsistent, spray a small amount of silicone lubricant inside the masts and on the roller arms to minimise friction.
	4	Roller arms ✾ Handed pair 0680200013	

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

3.10.3 *Monthly inspection*

The following inspection should be carried out every month, and the results recorded in the log sheet on the following page.

Monthly Inspection Checklist			
Category	**No.**	**Item**	**Check**
General	1	Entire machine	Conduct a complete tipping cycle and check for any faults or abnormal behaviour.
Hydraulic systems	2	Hydraulic rams Seal 0090090002	Check there are no oil leaks.
	3	Oil reservoir	Check the level of hydraulic fluid. If necessary, top-up with new fluid as per specifications in §3.7.4.
Electrical systems	4	Power lead (if fitted)	Check that the lead is in good condition.
Safety systems	5	Door interlock actuators 0250050065	Check that the actuators are securely attached to the door with security screws, and enter the interlocks freely and smoothly, without force. Check that the actuators lock the door while the cradle is raised above 100mm.
Mechanical systems	6	Inside masts	Lightly lubricate with silicone spray.
	7	Roller arms Handed pair 0680200013	Lightly lubricate with silicone spray.
	8	Door hinges	Lightly lubricate with silicone spray.
	9	Cradle axles 0220110000	Lightly lubricate with silicone spray.
	10	Castor wheels Unbraked 0250040084 Braked 0250040085	Check that the castor wheels are running smoothly and the brakes working correctly.

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

3.10.4 *Annual inspection*

The following inspection should be carried out every 12 months, and the results recorded in the log sheet on the following page.

Annual Inspection Checklist			
Category	**No.**	**Item**	**Check**
General	1	Entire machine	Conduct a complete tipping cycle and check for any faults or abnormal behaviour.
Hydraulic systems	2	Hydraulic rams Seal 0090090002	Check there are no oil leaks.
	3	Oil reservoir	Drain and replace the hydraulic fluid as per specifications in §3.7.4. Clean the fluid intake filter.
	4	Lowering valve Coil 0250090067 Cartridge 0250090055	Remove and clean.
Electrical systems	5	Power lead (if fitted)	Check that the lead is in good condition.
Safety systems	6	Door interlock actuators 0250050065	Check that the actuators are securely attached to the door with security screws, and enter the interlocks freely and smoothly, without force. Check that the actuators lock the door while the cradle is raised above 100mm.
Mechanical systems	7	Lifting chains	Check the length and condition of the lifting chains. If the length is outside the allowable tolerance, or there are signs of corrosion or wear, they should be replaced. Lightly lubricate with silicone spray.
	8	Ram rollers 0140120002	Lightly lubricate with silicone spray.
	9	Follower rollers 0090120000	Lightly lubricate with silicone spray.
	10	Inside masts	Lightly lubricate with silicone spray.
	11	Roller arms Handed pair 0680200013	Lightly lubricate with silicone spray.
	12	Door hinges	Lightly lubricate with silicone spray.
	13	Cradle axles 0220110000	Lightly lubricate with silicone spray.
	14	Castor wheels Unbraked 0250040084 Braked 0250040085	Check that the castor wheels are running smoothly and the brakes 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 MegaDumper is usually delivered fully assembled, but in some cases guarding panels may be removed to minimise volume for shipping. Assembly instructions can be viewed at the following link: https://support.simpro.world/help/megadumper-assembly-guide.

⚠ A sealed 'transit plug' may be fitted to the hydraulic fluid tank to prevent oil leaks during shipping. This must be replaced with the supplied 'breather plug' before the machine is operated, or the tank may be damaged.

4.2 Moving

When the MegaDumper is standing upright it may be easily moved on its castor wheels, using the two grab-handles provided. To ensure stability the cradle should be positioned 100mm off the ground when moving.

⚠ On a hard, flat surface, the MegaDumper can be moved by a force of approximately 100 Newtons at a height of 1.6 metres.

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

4.3 Lifting

Observe the following procedures when lifting the MegaDumper:

1. Check that the lifting equipment is in good condition and rated to lift at least 1000kg.
2. Affix a sling or chain to the lifting lugs on either side of the top frame cross-member.
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 remains upright at all times.

⚠ Most MegaDumper models weigh between 500kg and 600kg. Always verify the weight of the machine on the rating plate, and check that the lifting equipment to be used has sufficient capacity.

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

4.4 Transportation

Observe the following procedures when transporting the MegaDumper:

1. Lower the cradle, apply both brakes and turn the isolator switch OFF.
2. Firmly tie the cradle into position against the lower frame cross-member with plastic strapping or cable ties. This will maintain positive tension on the chains during transit, helping prevent them from derailing from the chain-guides inside the mast.

⚠ If the chains become derailed the cradle may jam when lowering as per §3.3.2.2. If this occurs, use a screwdriver to remove the cover-plates at the top of the mast, and realign the chains into the correct channels on the guide plate and roller.

3. Use lifting equipment to lie the machine onto its front (tipping) face on a wooden pallet, and securely strap it into place.
4. Use a 1-tonne forklift to load the pallet onto the deck of the truck.
5. Tie the machine into position using marked tie-down points and strops rated to at least 1000kg, ensuring it is fastened against lateral forces from any direction.

⚠ Never lie the machine onto its sides or back (safety door) as this may cause hydraulic fluid leaks and/or damage to the guarding.

4.5 Storage

If the MegaDumper 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 as per §3.2.
2. Carry out two complete tipping cycles, then lower the cradle to the ground.
3. Apply a thin layer of silicone lubricant to exposed surfaces of moving parts.
4. Charge the batteries (if fitted) and lubricate the electrical contacts.
5. Turn the isolator switch OFF.
6. Remove the key and store it in a safe place.

5. Safety Assessment

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

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

5.1 Safety features

Safety features of the standard MegaDumper design include:

1. Mesh and sheet-metal panels which prevent access to all moving parts.
2. A safety interlock system which disables the machine unless the door is shut, and electrically locks the door as soon as the cradle leaves the ground.
3. A tipping action which maintains the weight of the bin within the machine footprint.
4. A pressure-compensating lowering valve which automatically regulates the lowering speed regardless of the weight of the bin.
5. A control system which either:
    a. stops the machine unless continuous operator input is received, or;
    b. features a prominent EMERGENCY STOP button to disable the machine.

5.2 Reasonably foreseeable misuse

Reasonably foreseeable misuse considered in the standard MegaDumper design includes:

1. Attempts to use the machine by untrained operators;
2. Attempts to empty bins that the cradle is not specifically designed to hold;
3. Attempts to bypass the door interlock or other safety systems;
4. Attempts to clear spilt material from inside the guarding without proper procedures;
5. Attempts to clean the machine without following proper procedures.

5.3 Hazard and Risk Assessment Guide

As set out in §5.4, organisations seeking to demonstrate ISO13849 conformance must assess the safety of their machinery **in the intended 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 prospective MegaDumper owners in carrying out this process. Hazards intrinsic to the MegaDumper are pre-filled, while blank spaces are provided to assess application-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 *The ISO 12100 risk assessment model*

In the ISO12100 risk assessment model, each identified hazard is given a **Risk Factor**, from which is derived a **Risk Evaluation**. These parameters are assessed as follows.

5.3.1.1 Determining the Risk Factor

The Risk Factor associated with any given hazard may be calculated from the following table, using 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, or beyond doubt	-	-	-	-	-	-

5.3.1.2 Evaluating the Risk

Once a Risk Factor has been calculated, 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

⚠ Risks evaluated as Very High, Extreme or Unacceptable are likely to require additional or uprated safety functions, as per §5.4.4. These must be specified at the time of order.

5.3.2 *Identified Hazards*

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

Blank template spaces are also provided to identify, assess, and describe control measures for application-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
	Guarding prevents access to all moving parts and trapping hazards.										
Other persons	LO:	1	FE:	4	DPH:	1	NP:	1	Risk Factor:	4
	As above.										
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 MegaDumper is designed so that trapping hazards are eliminated, minimized, or isolated.										
Crushing by unauthorized rapid descent of cradle											
Operator	LO:	0.5	FE:	4	DPH:	1	NP:	1	Risk Factor:	2
	The operator is protected from the cradle by the frame and guarding during operation. A door safety interlock ensures that the door can only be opened when the cradle is on the ground, and the cradle cannot be raised unless the door is closed and locked. Significant safety margins ensure that the probability of failure of any steel, hydraulic, or control parts failing is very low.										
Other persons	LO:	0.5	FE:	4	DPH:	1	NP:	1	Risk Factor:	2
	As above.										
Control measures	Operators are responsible to obey all instructions and warning signs, regarding keeping personnel away from the area beneath the cradle when raised. The machine must be regularly maintained, and all faults repaired immediately.										
Comments	A hydraulic speed-control valve limits the maximum speed of descent in normal use.										
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 cradle by the frame and guarding during operation. There is some risk if items such as broken glass are being tipped.										
Other persons	LO:	1	FE:	4	DPH:	0.5	NP:	1	Risk Factor:	2
	There is some risk to others standing close to the bin if items such as broken glass are being tipped										
Control measures	Operators are responsible to obey all instructions and warning signs regarding keeping personnel from the machine while in use. If tipping product such as glass, metal or liquids, suitable PPE should be worn.										
Comments											

Crushing if the machine falls over										
Operator	LO:	0.5	FE:	2.5	DPH:	1	NP:	1	Risk Factor:	1.25
	Low risk as MegaDumpers are very stable, and the bin's centre of gravity remains within the machine's footprint throughout the tipping cycle.									
Other persons	LO:	0.5	FE:	2.5	DPH:	1	NP:	1	Risk Factor:	1.25
	As above.									
Control measures	Do not operate on soft ground, or ground with a slope of more than 1:12. Never attempt to empty liquids from closed-top drums.									
Comments										
Electrocution or electric shock										
Operator	LO:	1	FE:	4	DPH:	15	NP:	1	Risk Factor:	60
	Some risk is always present with mains leads.									
Other persons	LO:	1	FE:	4	DPH:	15	NP:	1	Risk Factor:	60
	As above.									
Control measures	Ensure a Residual Current Device (RCD) is fitted to all power sockets. Check all leads frequently and repair or replace if damaged. All leads should be tested and tagged by a registered electrician at regular intervals.									
Comments	Mains-powered MegaDumpers are earthed and comply with AS60204.1. The charger on battery-powered MegaDumpers is double-insulated.									
Contamination from tipping toxic powder and liquid										
Operator	LO:	2	FE:	4	DPH:	1	NP:	1	Risk Factor:	8
	Great care should be taken when tipping powder or liquids. If the product could cause any harm whatsoever to the operator or to any other person, appropriate PPE must be worn. An operator screen may be fitted.									
Other persons	LO:	2	FE:	4	DPH:	1	NP:	1	Risk Factor:	8
	As above.									
Control measures	The operator must wear appropriate PPE, and ensure that all other persons are well clear of the area. Powder should only be tipped when there is no wind, and/or a wind shield should be installed.									
Comments	Substances of a toxicity that cannot be protected against with PPE should not be emptied with a MegaDumper. Alternative methods should be used.									
Damage to skin when used in extreme weather conditions										
Operator	LO:	2	FE:	4	DPH:	1	NP:	1	Risk Factor:	8
	Operators must wear appropriate PPE when operating the MegaDumper in extreme environmental conditions.									
Other persons	LO:	2	FE:	4	DPH:	1	NP:	1	Risk Factor:	8
	As above.									
Control measures	All personnel must wear appropriate PPE when working in extreme environmental conditions.									
Comments	See §1.8 for MegaDumper 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										

5.3.3 *Residual Hazards*

As with all industrial lifting equipment, some **residual hazards** may be present despite any interlocks, guarding or other safety functions that can be fitted to the machine.

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

5.4 OSH Compliance Specification Guide

Companies in most jurisdictions (including Australia, NZ, UK, USA, Canada, and the EU) are required by law to provide a safe workplace for their staff, including ensuring that all new and existing machinery is safe to operate.

Although the particulars of safety legislation differ, most countries accept that machinery is 'safe to operate' if it can be demonstrated to **comply with ISO 13849-1:2015** (or an equivalent local standard).

ISO 13849-1:2015 may call for additional guarding, interlocks, and other safety features, depending on the particular conditions of use. The following section is provided to assist potential Dumpmaster operators in determining whether any additional safety features are required for their application.

- ISO 13849-1:2015 is a machinery-safety standard issued by the International Standards Organisation. It provides safety requirements and guidance on the principles for the design and integration of safety-related parts of control systems (SRP/CS), including the design of software.
- ISO 13849-1 has been modified for local conditions and reissued under different terminology by some national standards authorities. In Australia and New Zealand, the derivative standard is called AS/NZS 4024.1:2014.
- In the USA, ANSI standards are commonly used to demonstrate the safety of machinery, rather than ISO 13849-1. However, since the US model relies largely on 'best practise' and 'liability' to enforce workplace H&S norms, US companies who demonstrate machinery safety using ISO 13849-1 may be considered to have met their H&S obligations.

5.4.1 *The ISO13849 functional safety model*

Unlike the *system architecture* model used by earlier safety standards, ISO 13849-1:2015 uses a *functional safety* model of machinery safety. That means it takes account of the reliability of parts as well as other factors to create a comprehensive measure of the risk reduction achieved by a safety function – an indicator called **Performance Level (PL).**

The standard defines five Performance Levels, ranging from **PLa** (lowest performance) to **PLe** (highest performance).

The standard also defines the Performance Level that a given safety function must achieve to reduce the risk to an acceptable level – a value called **Performance Level required (PLr)**.

5.4.2 *Identifying the required safety functions*

To identify the safety functions required for a given machine, a site-specific hazard and risk assessment must first be completed as per §5.3. Identified hazards that cannot be avoided or eliminated must be addressed by appropriate safety functions.

5.4.3 *Determining the Performance Level required (PLr)*

As defined by the ISO13849 safety model, the minimum PLr for any given safety function is derived from three parameters:

1. Severity of injury expected from the associated hazard
2. Frequency and/or duration of exposure to the associated hazard
3. Possibility of manually avoiding the associated hazard

The following table may be used to determine the minimum PLr from these parameters.

Safety Function PLr Determination Table			
Severity of injury expected from hazard	**Frequency and/or duration of exposure to hazard**	**Possibility of manually avoiding the hazard**	**Min PLr**
Slight injury (reversible)	Seldom to quite often and/or short exposure time	Possible under specific conditions	**PLa**
		Scarcely possible	**PLb**
	Frequent to continuous and/or long exposure time	Possible under specific conditions	
		Scarcely possible	**PLc**
Serious injury or death (irreversible)	Seldom to quite often and/or short exposure time	Possible under specific conditions	
		Scarcely possible	**PLd**
	Frequent to continuous and/or long exposure time	Possible under specific conditions	
		Scarcely possible	**PLe**

To demonstrate compliance with ISO 13849-1:2015, the minimum acceptable PLr of the safety functions must be assessed for each identified hazard **in the specific conditions in which the machine is to be used**.

⚠ Safety function performance may be assessed as part of the regular Hazard and Risk Assessment set out in §5.3. Although this assessment includes all hazards intrinsic to the MegaDumper design, other safety functions may be required to address site-specific hazards, which can be evaluated using the blank spaces provided.

5.4.4 *Achieving the Performance Level required (PLr)*

Because all hazards intrinsic to the MegaDumper design are addressed by safety functions with a baseline performance of PLc, it follows that additional or uprated safety functions are only required in the following cases:

1. The risk assessment identifies application-specific hazards which are not addressed by the safety functions built into the standard MegaDumper design.
2. The risk assessment identifies application-specific hazards which are sufficiently serious and/or frequent as to require safety functions with a performance level of PLd or PLe.

3. The operating environment is subject to corporate policies, union contracts, OSH regulations or other external factors which specify that all machinery must have a safety performance level of PLd or PLe.

In any of these cases, information about the hazard and risk assessment, required safety function and performance level should be provided to Simpro before placing an order.

Simpro can then specify and quote additional or uprated safety functions, such as:

- CAT3 Kit 0960050014 to achieve PLd safety performance
- CAT4 Kit 0960050017 to achieve PLe safety performance
- Additional guarding
- Remote controls
- Training of operators
- Custom signage or floor markings

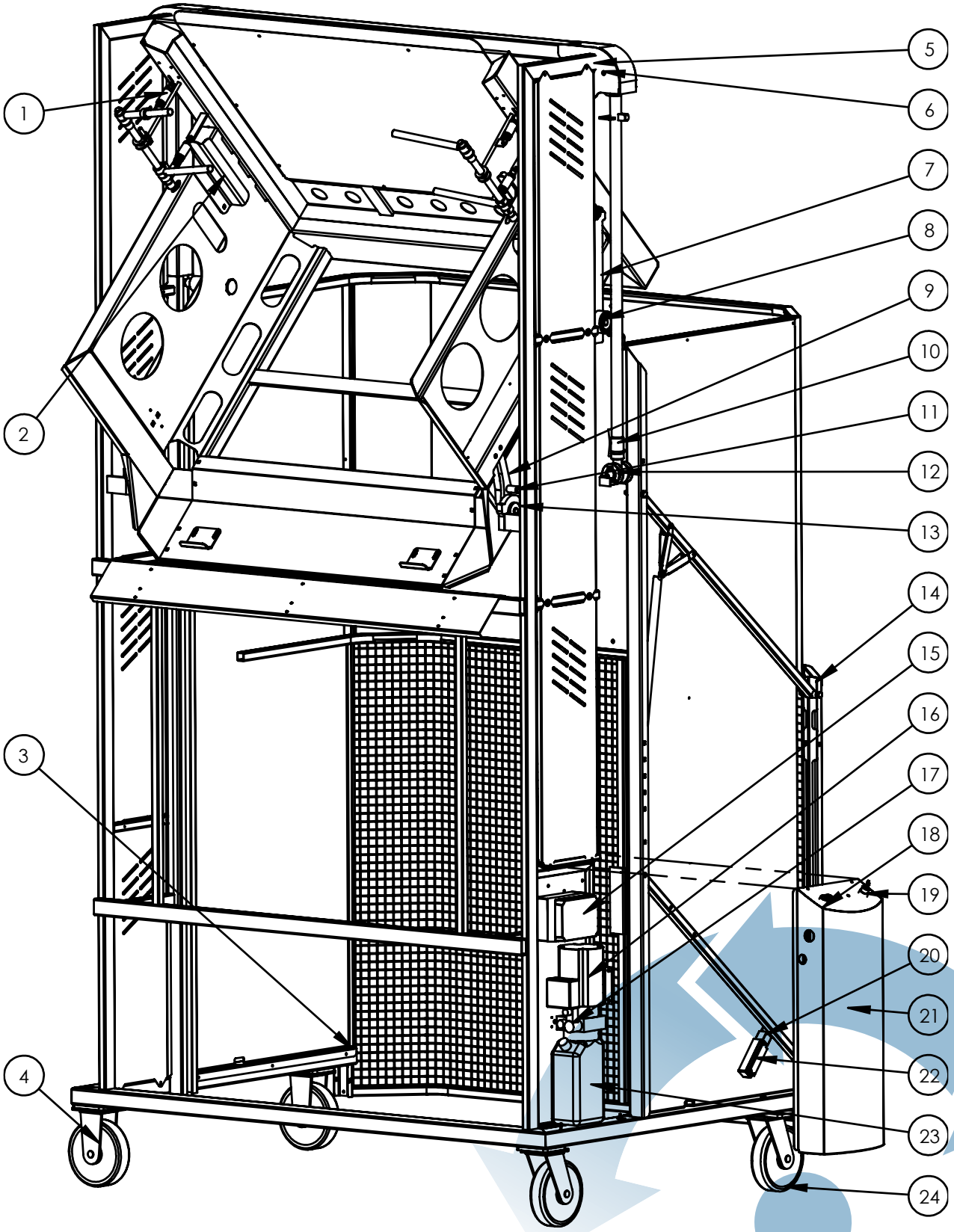
⚠ The CAT3 Kit is the most common MegaDumper safety function upgrade. It is typically specified when any of the following conditions apply:
- Intensive 24/7 operating cycle
- Transient or low-skilled operators
- Personnel frequently entering the machine (ie for daily cleaning)
- Corporate or union policies require machinery to have CAT3/PLd safety functions

6.Spare Parts

The following table includes only the most common MegaDumper spare parts as at the time of publication. Additional parts, accessories and prices may be viewed at the following web address: simpro.world/megadumper-spare-parts

Ref	Partcode	Description	Qty*	BSK†	ASK‡	DOM#
5	0640200064	Top Roller, complete with 2x 6301 bearings	2	✓	✓	-
6	0140110003	Top Roller Axle, Ø12mm, stainless steel with knurled end	2	✓	✓	-
-	0140120004	Chain Guide, moulded, for top frame	2	✓	✓	-
3	0140120005	End Cap, plastic, for 75 x 50 x 3 RHS	2	✓	✓	-
10	0330090027	Ram, Ø1¼in x 1010mm stroke, double port (MD1500 only)	1			-
	0330090028	Ram, Ø1¼in x 1010mm stroke, reverse port (MD1500 only)	1			-
	0330090030	Ram, Ø1¼in x 1160mm stroke, double port (MD1800 only)	1			-
	0330090031	Ram, Ø1¼in x 1160mm stroke, reverse port (MD1800 only)	1			-
	0330090032	Ram, Ø1¼in x 1310mm stroke, double port (MD2100 only)	1			-
	0330090033	Ram, Ø1¼in x 1310mm stroke, reverse port (MD2100 only)	1			-
	0090090002	Ram seal, 1¼" x 1½" x ¼" (PU + NBR O-ring)	2	✓	✓	-
12	0140120002	Ram Roller, standard, nylon	4	✓	✓	-
18	0790050454	Up/Down Switch, with 2x N/O contact blocks, coupler and boot	1	✓	✓	-
19	0790050373	Key-switch, 2-position, stay-put, with 2 x N/O contact blocks	1	✓	✓	-
	0790050261	Contact Block, N/O (for key-switch and up/down switch)	4		✓	-
	0790050067	Voltmeter, 12/24VDC, blue digital readout (MDXXXX-B only)	1	✓	✓	2017-
-	0250050004	Battery, 12V/20Ah, deep-cycle gel VRLA (MDXXXX-B only)	4			-
-	1001000001	Battery Box, black plastic, 180 x 330mm (MDXXXX-B only)	1		✓	2020-
-	0230020136	Battery Box Mounting Bracket, 3.0mm PGI (MDXXXX-B only)	1			2020-
15	0210050002	Isolator Switch, configurable, 16A/20A	1		✓	2016-
	0790050374	Circuit Breaker, 75A, auto-resetting (MDXXXX-B only)	1		✓	2019-
	0880050015	Motor Solenoid, 24V/200A, round silver (MDXXXX-B only)	1	✓	✓	2015-
	0390050006	Battery Charger, 160W/24V/6A (MDXXXX-B only)	1	✓	✓	2015-
	0790050111	Power Supply, 400VAC/24VDC, 120W/5A (MDXXXX-3 only)	1		✓	2017-
16	0880050023	Motor, 800W/24VDC (MDXXXX-B only)	1			2015-
	0880050035	Motor, 3-ph 2 Pole 1.1kW 400V 71-Frame (MDXXXX-3 only)	1			2015-
	0250050069	Contactor, 24VDC coil, EBSIC-0016KZ Mini (MDXXXX-3 only)	1		✓	2020-
	0250050003	Thermal Overload Relay, 2.6-3.7A (MDXXXX-3 1.1kW only)	1			2019-
	0790050387	Thermal Overload Relay, 4.0-6.0A (MDXXXX-3 1.5kW only)	1			2019-
17	0250090067	Lowering Valve Coil, 24VDC	1	✓	✓	2015-
23	0940090001	Powerpack, 24VDC, 1.0cc, 4L steel tank, no relay (MDXXXX-B only)	1		✓	2017-
	0940090004	Powerpack, 3-ph 2-pole 1.1kW, 1.5cc, 4L Steel tank (MDXXXX-3 only)	1		✓	2017-
21	0140020312	Outer Cover, universal, left-handed	1			2017-
-	1000000124	U-Bar, MD standard, PGI tube	1			-
-	0220020066	Side Guard Panels, handed pair, 2.0mm PGI (E-series only)	1			-
14	1000000278	Safety Door, swing-up, mesh, yellow powdercoat	1			-
22	0790050408	Idec Solenoid Door Lock, 24VDC, plug-n-play	2		✓	2016-
	0790050410	Idec Cable Kit, 5m, plug-n-play, complete with gland	2			2016-
20	0250050065	Idec Actuator, rubber-cushioned	2	✓	✓	2016-
-	0650200001	Cradle, Type-S baselift, for 660L wheelie bins (S-series only)	1			-
-	0650200000	Cradle, Type-E baselift, for 1100L wheelie bins (E-series only)	1			-
-	0670200043	Primary Swing-Arm, 200mm long, for Type-E/S cradles (S/E-series only)	2		✓	2016-
-	0670200042	Secondary Swing-Arm, 200mm long, for Type-E cradles (E-series only)	2			2016-
-	0670200044	Secondary Swing-Arm Guide Collar, for Type-E cradles (E-series only)	2			2016-
-	0670200039	Swing-Arm Ground Rod, for Type-S/E cradles (S/E-series only)	2			2016-
-	0670200040	Swing-Arm Axle, 630mm long, for Type-S cradles (S-series only)	2			2016-
-	0670200041	Swing-Arm Axle, 420mm long, for Type-E cradles (E-series only)	2			2016-
1	0320150000	Swing-Arm Tension Spring	2	✓	✓	2016-
2	0400020168	Bin Catch Plate, 3.0mm PGI, for 120L/240L wheelie bins (S/E-series only)	2			2017-
9	0680200013	Roller Arms, handed pair, 195mm centres, zinc-plated, no rollers	1		✓	2016-
	0550060021	Roller Arm Axle, MS zinc-plated, with welded tab	2		✓	2016-
13	0090120000	Follower Roller, Ø16-50mm x 35mm long (MD primary roller)	2	✓	✓	-
11	1000000196	Steel Bush, Ø16-22mm x 35mm long (MD secondary roller)	2	✓	✓	-

Ref	Partcode	Description	Qty*	BSK†	ASK‡	DOM#
7	0640200099	Sliding Plate, welded and zinc-plated (without rollers)	2			2016-
	0220020131	Sliding Plate Pivot Block, 10.0mm MS	2			2016-
8	0140120007	Mast Roller, moulded and machined	2		✓	-
-	0220110000	Cradle Axle, drilled and zinc-plated	2		✓	-
-	0060010013	Bronze Bush for cradle axle, Ø20-24 x 50mm long	2		✓	2016-
4	0250040084	Castor, 200mm, fixed unbraked	2		✓	-
24	0250040085	Castor, 200mm, swivel braked	2		✓	-



7. Warranty

7.1 Definitions

1. "Simpro" means Simpro Handling Equipment Limited, New Zealand 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, 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: simpro.world/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: simpro.world/warranty-claim.

7.2 Coverage

1. Simpro provides a 24-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 24-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 batteries is for 12 months only, and is distinct from the warranty on the rest of the machine. Information on maximising battery life is provided in the User Manual.

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: 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 develop over a period of time?
    2. Was the machine being used at the time?
    3. Is the fault intermittent?
    4. Are the batteries fully charged?
3. If repair is urgent, or the Agent cannot be contacted, the End User may contact Simpro directly.

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 technician would take. A detailed Service Manual is available on request from Simpro, and all service visits should be conducted with this document 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.EC Declaration of Conformity

DECLARATION OF CONFORMITY

ORIGINAL

Business Name and Full Address of Manufacturer

Simpro Handling Equipment Ltd
66 Rangi Road, Takanini 2105
Auckland, New Zealand

Name and Address of Authorised Representative

As above

Name and Address of the Person in Community Authorised to compile the Technical File (if different to above)

Safe Machine Limited
DBH Business Centre, Coxwold Way, Billingham, Tees Valley TS23 4EA UK

Description of product (Commercial Name)

MegaDumper

Function, Model, Type, Serial Number

Function: Bin Tipper
Type:

Model: MegaDumper
Serial No:

Standards Used

EN 349 1993, EN 574 1996+A1:200, EN 953 1997, EN ISO 4413 2010, EN ISO 12100 2010, EN ISO13849-1 2006, EN ISO 13857 2008, EN 60204 2006+A1 2009, EN61000-6-2 2005, EN61000-6-4 2007

Place of Declaration

66 Rangi Road, Takanini 2105
Auckland, New Zealand

Date of Declaration:

13 March 2018

Declaration

I declare that the machinery fulfils all the relevant provisions of the following Directives:- Machinery Directive 2006/42/EC, Electromagnetic Compatibility Directive 2004/108/EC.

Person Empowered to Draw Up Declaration

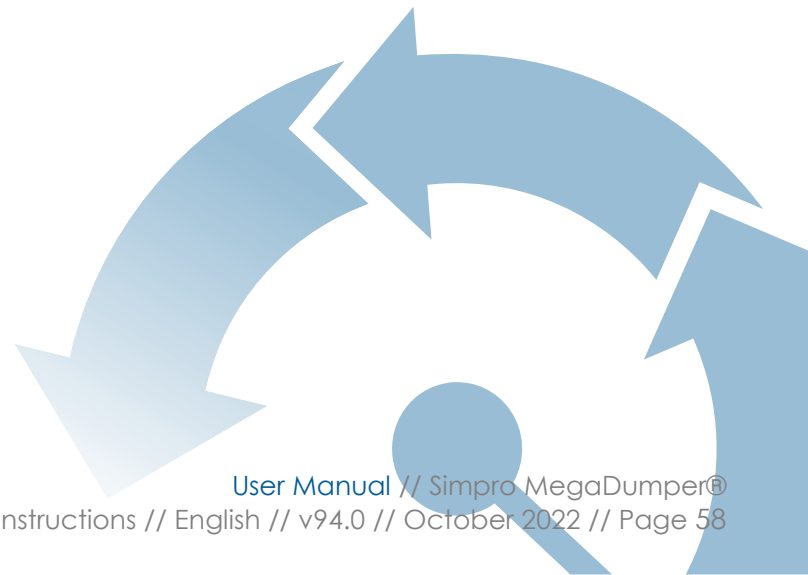
Name: Daniel Craig Currie

Position: Business Development Manager

Signature:

Declaration No: 004

9. Notes



Simpro has been supplying Smart Lifting solutions for over 30 years. Founded in 1986 as a light engineer, the company has since built a unique position in the supply chain for specialist materials-handling equipment - from bin lifters and crate stackers to Lithium-ion forklifts.

With business activities including design, manufacture, import, export, wholesale and retail, Simpro products now play a quiet role for thousands of companies around the world. Customers range from SMEs to bluechips, operating in sectors as diverse as warehouse logistics, food processing and waste management.

Simpro's OEM products are now sold around the world through a distribution network covering most large economies. The product range continues to evolve thanks to a policy of continuous R&D, new ideas and new partnerships.

Simpro is a family company, based in Auckland and registered with the New Zealand Companies Office as Simpro Handling Equipment Ltd (1827916).

This document may contain intellectual property belonging to Simpro, including patents, trademarks and/or registered designs.

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