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E SERIES
OPERATION, MAINTENANCE & SAFETY MANUAL

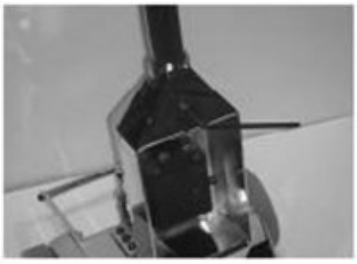
Contents

Instructions Upon Receipt of Goods - Receipt, Checking for Damage and Unpacking

Please note if there is any noticeable damage to the exterior packaging and if so, immediately inform PowerHandling of the damage. If possible also take digital photos of the damaged box and email them to sales@powerhandling.com.

If there is no physical damage to the outside packaging, please place the box on the ground or worktable with the "THIS WAY UP" arrows pointing up and open from the top to reveal the equipment inside, consisting of (1) machine, (2) charged Battery Packs and (1) Charger. If at this time there is any noticeable damage to the equipment inside, such as from pieces making contact with each other during shipping (they are packed such that this should not be able to occur), please again inform PowerHandling. If everything appears undamaged, remove all of the above from the shipping box and **save the box along with all the interior packaging** should you be returning the machine after the trial period (or if in the future you may be returning the machine to PowerHandling for repair or any upgrades).

Unpacking and Assembling Your E Series PowerHandler

		
1) Prior to unpacking, read the enclosed Operation, Maintenance and Safety Manual	2) Supplied in the manual are the tools needed to assemble the PowerHandler and adjust the handle to the operating position. 4mm Hex Wrench, 5mm Hex Wrench - Connector, Lock	3) Now that you have read the manual, you are ready to assemble the PowerHandler and begin using it.
		
4) Plug the connector together, making sure to match the colours on the plug. Attached the connector lock supplied in the manual packet.	5) Insert the upper handle into the lower handle. Align the slot in the upper handle with the bolt in the lower handle. Tighten the bolt on the lower handle, ensuring the upper handle is held in place.	6) The upper handle shaft is designed to move up and down based on operator height. Align one of the four holes in the shaft to the position that is most comfortable for the operator. Do not pull the handle past the holes shown in the picture.
		
7) Align your selected hole with the set screw in the upper handle. Tighten the set screw, ensuring the shaft cannot move.	The PowerHandler is now completely assembled and ready for operation. If you have questions not covered in the Operations Manual, please phone (02) 9680 7944 or email sales@ums.net.com.	

Battery Pack Charging

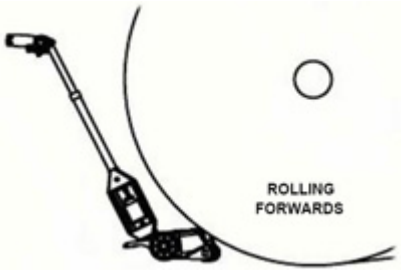
Unwrap the Charger cable and connect one end to the Charger and the other to a grounded, 110V or 240V power supply. Two LED's (small lights on the top display panel of the Charger) should illuminate. (Further instructions on the charger operation appear later in this manual). Set the PowerHandler on the ground and rotate the handle shaft to the forward (centred) position and tilt forward to rest the elbow of the handle shaft on the drive roller. (This is its "Park" Position). In this position you can install the 2nd Battery Pack into the handle receptacle.

In both cases above, Battery Pack installation involves holding the Battery Pack by its handle (at the top) and moving it laterally into the receiving location (of Machine or Charger), nearer to the top of the cavity. When it reaches the back of the cavity, press down on the Battery Pack and it will slide down channel guides to make terminal (i.e. electrical) contact and you will feel it click into place

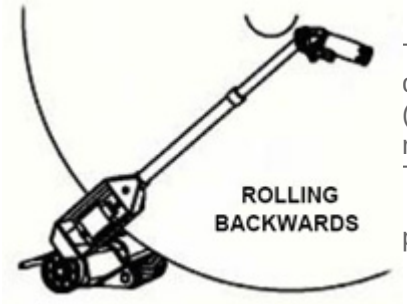
- In the case of the Charger, you will see a 2 light illuminate on the top display panel which indicates the Battery Pack is correctly seated. (Refer to the detailed Operations Manual Enclosed for full instructions prior to operation).

- **NOTE: that you may receive one of two different brands of PowerHandling chargers.** Operating instructions are the same for either charger, there is no functional difference. One charger has LED's to show the status of the charge, one has a digital display for the status of the battery.

General Overview

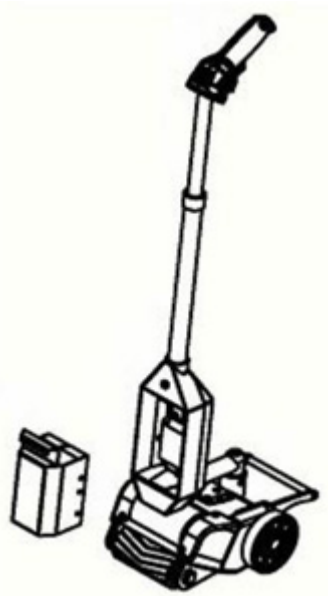


The E Series is a Battery-Operated Materials Handling device, capable of moving varying tons of smooth rolling weight on a level surface and configured with a Swivelling handle shaft. The swivelling handle allows the machine to roll forwards and roll backwards cylindrical objects (such as paper rolls, wire cable reels or the wheels of an aircraft or other heavy vehicle).

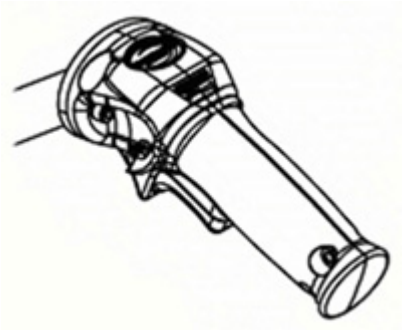


The top (drive) roller of the machine rolls the object to be moved while simultaneously making contact with the bottom (support) roller that moves the device (and therefore object) along the ground. To roll backwards, the Swivelling handle units can be manoeuvred in behind the load and the handle pivoted forward to enact a pulling motion (see diagram to the left).

To overcome the inertia of a heavy load, load moving devices require a significant amount of traction - both with the load and the ground on which it is being moved. Regardless of the amount of power (or specifically 'torque') generated, the load will not move without the necessary traction. Many materials handling devices achieve this traction with large, lead-acid batteries and also lead ballast in the device. The PowerHandler uses an entirely different approach, directing the weight of the load being moved down onto the drive roller to generate as much traction as the load requires. In the case of moving cylindrical loads, the small diameter, lighter loads are more of a problem. In these cases the weight of the load is directed more horizontally than vertically at the drive roller and there is a greater tendency for the drive roller to slip and spin against the load, rather than wedging in under it and rotating it. (Please refer to the "Trouble-Shooting" section for suggestions on how to address this issue if it occurs).

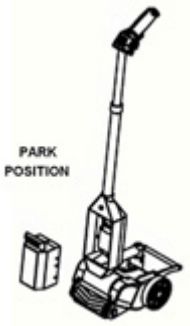


All E Series models function as a "system", operating in conjunction with at least one additional Battery Pack and Charging Station. This Charger should be located in the same approximate vicinity the device is operating in. This proximity allows fast changing out of a depleted Battery Pack with a recharged Battery Pack from the Charger, providing virtually uninterrupted operation during a shift.



Two-Way Operation

All E-Series are equipped with a two-way motor controller (standard) so it will only operate in forward and reverse. The Reverse feature can be helpful in certain applications, such as quickly removing the drive roller out from under a paper roll after it has been lifted up onto a raised dollie.



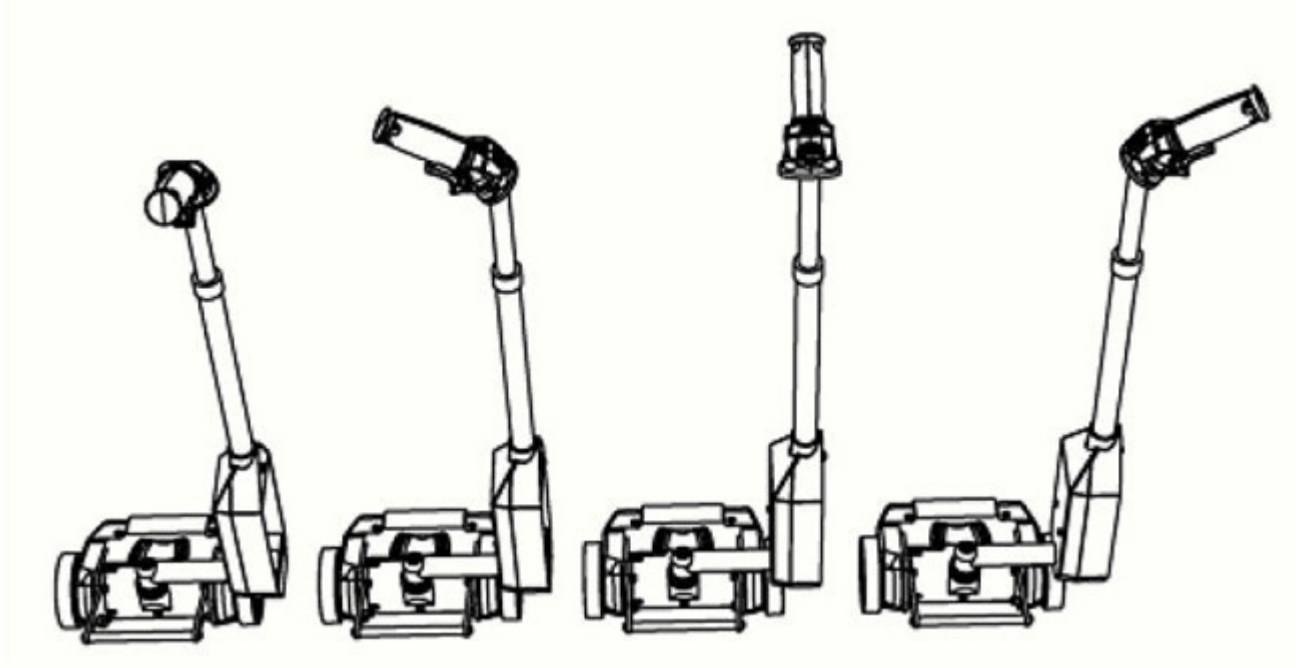
OPERATION MANUAL - E Series

Park Position - Rotate the Handle to bring the bottom elbow (below the Battery Pack) of the handle shaft to the forward-most position, and then tilt the handle forward so the elbow rests on the drive roller. This will balance the handle's weight over the base frame while providing the smallest possible 'foot-print' of floor space occupation while the machine is not in use.

Rotate the handle grip to be pointing to the left, centre or right, which will provide different orientations of the handle grip as the handle shaft is rotated into each of its four operating position (rolling forwards or backwards, in each case from the left or right side).

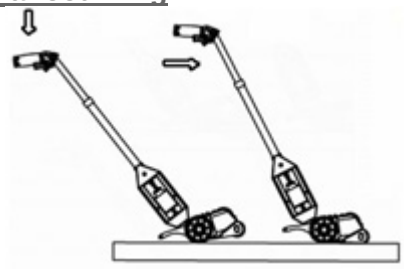
Generally, the most typical grip orientations can be determined from how the E20S will be used.
So with the handle in the Park Position:

- If loads are being rolled forwards and only from the centre of the load, orient the grip to be pointing backwards;
- If the operator operates the handle with the handle grip almost always to one side, orient the handle grip to that side. To the left (if the handle will be operated swivelled left) or to the right (if it will be operated swivelled right);
- If loads are being rolled forward from the side of the load (left or right) and/or the operator will be rolling loads backwards, orient the grip to be pointing forwards.



Each operator may have a different preferred handle grip height and orientation. However, this is easily and quickly adjustable for each operator at the commencement of the device's operation.

Manoeuvring



To move the machine to the load, take the handle grip in your hand (without depressing the throttle switch), rotate the handle shaft from the Park Position to either the left or right side before tilting it back (by pushing down on the handle grip) until the front support roller lifts up off the ground. In this position (the manoeuvre position) the device can be easily rolled into the required position on its rear wheels.

The weight of the batteries in the handle shaft counter-balance the weight of the base frame, providing the operator almost effortless tilting and manoeuvring of the machine.

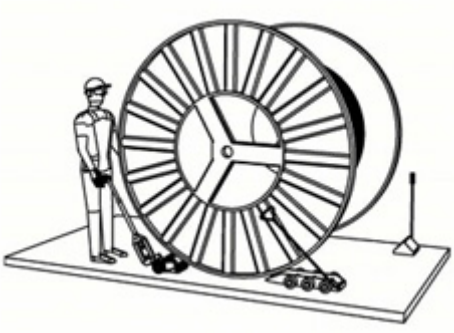
Precautions to Take Before Rolling a Load

The PowerHandler should be operated on relatively level and smooth concrete (or similar) flooring, as is typical for indoor industrial applications. Operation on sloping (gradient) floors or in outdoor work areas is not recommended.

Before moving a load, ensure the path over which the load will travel is not occupied (by either people or obstacles) and a slope away from the load is not present (which could result in the load accelerating at an uncontrolled rate). Ensure if appropriate, a "Safety Stop" is in place to stop the load at the end of its intended travel. Operator's should refer to the safety procedures of the facility in which the PowerHandler is being used as to all appropriate steps and precautions required in ensuring a clear path is available, sufficient warning or safety lock-out is affected, a Safety Stop or other intended obstruction is in place so as to ensure that moving the load will not result in damage or injury to property or person (either the operator or another person).

Special Note: The PowerHandler in itself does not "control" any load it moves. It rolls the load forwards without braking or controlling that movement and therefore precautions must be taken to ensure such movement does not result in damage or injury to others.

Rolling Forwards



Once all appropriate precautionary measures have been taken and the load is ready to be moved, manoeuvre the PowerHandler to the contact point of the cylindrical load and then depress the throttle switch forwards to energize the motor. Being a variable-speed throttle, it is generally safest to engage the power gradually so as to prevent the possibility of accelerating the load too rapidly and rolling it beyond the intended travel distance (as a result of the momentum from a rapid acceleration). Caution should be exercised in this respect as the operator builds up familiarity with the machine, as the extremely compact size of the PowerHandler can deceive the operator into thinking it does not have much torque. However the torque output of the PowerHandler is considerable and as such the operator should be aware there is the possibility of over-driving a load and creating a potentially dangerous scenario.

Rolling Backwards

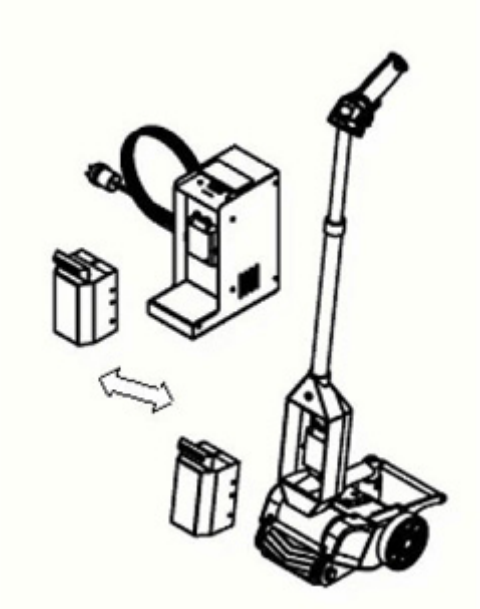
Rolling backwards is not unlike rolling forwards, however it is essential additional caution is exercised to ensure there are no obstacles to the operator as he walks backwards, pulling the load with him. Tripping/falling while pulling the load could result in the operator unintentionally depressing the throttle as he falls, accelerating the load backwards and onto himself. To minimize the risk of such circumstance, at a minimum the following additional precautions should be implemented:

1. The path checked for obstacles or other potential encumbrances to the operator's travel;
2. The operator to have the handle grip rotated "out" (Handle grip pointing backwards when the PowerHandler is in its Park Position);
3. The operator walking "outboard" of the load being rolled backwards;
4. A Safety Stop to be used to limit the travel of the load.

Special Note: On first use an operator's natural tendency may be to "lean into" or push the PowerHandler against the roll. However the addition of the operator's weight to the torque the PowerHandler already generates is negligible. This practice should be avoided as not only does it offer very little assistance to moving of the load, it also unnecessarily strains the components at the pivot point of the handle shaft, potentially creating maintenance issues in addition to potentially straining the operator's back or resulting in other soft-tissue injuries.

OPERATION MANUAL - CHARGER & BATTERY PACKS

The Quick-Charge/Quick-Change Battery Concept



The E Series operates on the principle that most of the battery capacity is 'off-machine' and is charging while only a small amount of the capacity is 'on-machine' and being used. This allows the PowerHandler to be significantly more compact and lighter than conventional materials handling machines of comparable load capacity. Therefore, it is important to locate the Charger and second Battery Pack as close as possible to the area in which the PowerHandler will be used. This will minimize the operator's battery switch-out time and improve both performance and efficiency.

How Many Battery Packs & How Many Chargers per Machine?

Depending on the duty cycle an application requires of a PowerHandler, the ratio of Chargers to machines may vary. While the typical configuration is one Charger with one Battery Pack services one PowerHandler, equipped with a Battery Pack (so in total, two Battery Packs). However, different applications may call for different ratios. For example:

- If a number of PowerHandlers are used within a region and they have a low-duty cycle, it may be possible to have one Charger and one additional Battery Pack to two or more PowerHandlers. In this case, a Battery Pack would be lasting much longer than the typical 1 hour recharge time required, so one charged Battery Pack can cycle through many PowerHandlers.

- If in the reverse situation a PowerHandler has a very high duty cycle, it may need two or more Chargers, each with an additional Battery Pack, as the application may deplete a Battery Pack before another is recharged (so multiple Packs would need to be recharging).

Installation of the Charger

The PowerHandling Charger is custom designed and built to operate only with PowerHandling's Battery Packs. Do not use a different Charger for a PowerHandling Battery Pack, nor use a different Battery Pack on the PowerHandling Charger.

- The Charger should be located such that the fan opening and the exhaust opening are located at least 2" from any surface which would restrict airflow.

- The AC input can be from any properly grounded wall outlet worldwide as shown in the "Specifications" section, including 110V/60Cycle and 240V/50 Cycle.

PLEASE NOTE: Due to the erratic electricity power supply in Australia and New Zealand, U.M.S. Pty Limited strongly advises the use of a step down transformer to alleviate the damage done to the battery charger from Electrical Surges and Spikes. This Step Down Transformer (Part # PH-SD115-250) is available from U.M.S. Pty Limited at a nominal charge.

Charger Procedures

NO POWER

- No LED's illuminated.
- The Charger is not connected to the AC Mains Power Supply or there is a major component failure in the Charger such that no LED's are illuminated.

WAITING FOR BATTERY

- The left-most LED is illuminated "solid" (i.e. not flashing) GREEN and the middle LED is "flashing" ORANGE.
- Power is coming into the Charger but no Battery Pack is mounted on the Charger.
- Alternatively, a Battery Pack is mounted on the Charger, but not making correct terminal connection.

CHARGING

- The left-most LED is illuminated solid GREEN and the middle LED is solid YELLOW.
- This means there is a Battery Pack connected to the Charger and it is in the "Rapid Charging" Phase.
- This phase should last approx 1 hour for a fully discharged Pack and will charge to approx 80% of the Battery Pack's Full-Charge capacity.

CHARGED

- Both the left-most and right-most LED's are illuminated solid GREEN.
- This means the Battery Pack is doing its "Topping Charge", where it fills the remaining 20% of the Battery Pack's Charge Capacity.
- This phase can last another hour, however this phase is not necessary to have been completed for the Battery Pack to be removed for reuse.

IDLE SHUT-DOWN

- Only the left-most LED is illuminated solid GREEN.
- This means the Battery Pack is still installed and is fully charged.
- The Battery Pack can be left indefinitely on the Charger without damaging the Battery Pack. The temperature and condition of the Battery Pack is monitored and a "Trickle Charge" is supplied as needed to keep it fully topped up.

Special Note 1:
The Charger provides REVERSE BATTERY VOLTAGE PROTECTION, meaning protection is provided to the Battery Pack via a 15 amp fuse in the in-line fuse holder in the positive output connection lead.

Special Note 2:
The ambient operating temperature for the Charger should be between 32°F and 104°F (0°C to 40°C). During charging when heat is generated, the Charger provides OVER TEMPERATURE PROTECTION such that if an over temperature condition develops in the Charger's heat sink (and FET) on the input circuitry, the output current of the charger will be proportionally reduced to reduce the heat generation at the heat sink and allow it to drop to an acceptable level. The Charger's power devices are thermally coupled to internal heat sinks, which are cooled by forced air convection by a cooling fan mounted internally in one end of the charger unit to create air movement from one end to the other.

Special Note 3:
With this style charger "Peaked" means battery is fully charged.

TROUBLE-SHOOTING GUIDE - E Series

1) The Drive Roller turns okay when not under load, but once engaged, won't move the load

Determine whether the issue is torque (drive roller stops turning when engaged with the load) or grip (drive roller spins against the load, not moving it), then read the appropriate suggestions for that problem below.

a) The Drive Roller stops turning when it engages with the load

This is typically because of insufficient torque being provided to the drive roller and can occur for a number of reasons, including:

- The battery pack is not providing enough amps (either worn out or not re-charging correctly);
- The bushing inside the Drive Roller worn out or jammed;
- The Brushes on the Motor are dirty and needing cleaning or worn out and needing replacing;
- The load being moved or lifted is too great for the capacity of this device.

b) The Drive Roller spins against the load, not moving it

This is typically because of insufficient traction between the Drive Roller and the Load being moved and can occur for a number of reasons, including:

- On a brand new machine, there is often a problem with initial grip until the drive roller becomes "worn in". This should only take a day or two, during which time the grip is not quite as good, but the machine will still work. The best way to "wear in" the drive roller is to use it - on loads that do not slip (e.g. larger diameter). Using it on rolls or other product that does slip will only delay the roller wearing in.

- The geometry may be exacerbating an existing traction problem. Reference the explanation in the 'Overview Section' describing how too small of a diameter load results in less of the inertial resistance of the load pushing downward (vertical) and instead being backward (horizontal). A small diameter can be moved if there is plenty of friction contact and a large diameter load can be moved even with very little friction contact, but the combination of a small diameter and low friction greatly increases the likelihood of slipping.

- The drive roller has oil, grease or other low viscosity material embedded into or otherwise making contact with it, reducing its ability to achieve a friction contact. Note also as the drive roller makes pressure contact with the support roller while the machine is operating, it may be oil/grease is picked up from the floor and deposited onto the drive roller.

- To address low friction issues and reduce the impact of lubricants that end up interfering with the rollers, the application of Borax (Hydrated Sodium borate - an inexpensive cleaning agent, ref http://www.borax.com/) to the drive roller is recommended. All new PowerHandlers and replacement drive rollers are sent out with Borax already applied.

2) Battery Pack is Discharging too Quickly

- If the Battery Pack has already been in service for quite some time, it may be depleted. All current battery technologies are such that they lose a percentage of their total effective capacity on each discharge-recharge cycle. In time, this reaches a point that the Pack's life becomes very low and should be replaced. If two packs are being used equally this should result in both packs becoming ineffective at around the same time. If this is not what is occurring, please return the short-life pack to PowerHandling for inspection and analysis.

- If the Battery Pack is still relatively new and has undergone few charge-discharge cycles, it is possible it is a faulty pack. If this is the case, there will likely be problems during both the charging and discharging of the pack.

Warranty/Guarantee (Machine, Parts/Materials and Labour)

U.M.S. Pty Limited/PowerHandling Inc. hereby warrants and guarantees all of its material handling machines will be free from defects in materials and workmanship for a period of six (6) months from the date the user receives same unit(s).

This Warranty is conditional upon the following:

- The unit(s) being used in a normal manner and for the purpose(s) for which the unit(s) were intended.
- The unit(s) being used in accordance with U.M.S. Pty Limited/PowerHandling Inc.'s recommended operation and maintenance instructions, as outlined in this Operation and Maintenance Manual.
- The unit(s) being fitted with replacement parts manufactured or provided by U.M.S. Pty Limited/PowerHandling Inc.only. Non-PowerHandling manufactured parts used on the unit(s) will void all warranties.
- These parts being correctly installed (either by U.M.S. Pty Limited/PowerHandling Inc., an authorized dealer provided by U.M.S. Pty Limited/PowerHandling Inc., or the customer).

Any and all defects due to improper use, negligent maintenance or as a result of normal wear and tear are not covered by this guarantee.

In the event of a claim being made under the terms of this Warranty, the customer must first obtain a Return Authorization from their sales representative. This unit(s) should then be forwarded to U.M.S. Pty Limited/PowerHandling Inc. at the address listed above for servicing and/or replacement. All spare parts and labour costs incurred for the repair and/or replacement of the warranted unit(s) will be provided at no charge to the customer.

U.M.S. Pty Limited/PowerHandling Inc. and its distributors, agents, resellers, etc assume no other responsibility beyond the scope of this Warranty. The repair or replacement of the said unit(s) will constitute the limit of PowerHandling's liability to the customer and without limitation of the forgoing; PowerHandling specifically disclaims and excludes rescission as a remedy, or the payment of compensatory or consequential damages, attorney's fees or costs of litigation.

In the event a machine or part provide by U.M.S. Pty Limited/PowerHandling Inc. is found to be defective, it is at U.M.S. Pty Limited/PowerHandling Inc.'s discretion to replace said part or machinery at U.M.S. Pty Limited/PowerHandling Inc.'s cost, or take delivery of the failed parts and refund the customer the funds originally received by it for that sale.