



## **Equipment and Automation Innovation Section**

# **Mark 4 Hot Fat Trimmer**

# **OPERATION MANUAL**

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## Introduction

The Mark 4 Hot Fat Trimmer is a hand held, hydraulically powered bandsaw designed to remove external fat from un-chilled beef carcasses. The tool has been designed and manufactured by Food Science Australia based on research and development previously carried out in the area of hot fat removal.

The tool is designed to remove subcutaneous fat from high value areas of the carcass such as the loin and rump. At present, the common practice is for these areas to be trimmed in the boning room, after chilling. The tool is capable of removing a large mass of fat in a single motion leaving a relatively flat and even finish on the carcass.

The tool would normally be used in the location where de-fatting is presently being carried out. This, for example, could be the area where workers use ring knives to remove the internal fat and de-fat some areas of the forequarter. The Mark 4 Trimmer was not designed for the removal of fat from internal surfaces or to cut meat, bone or chilled fat.

## Description

The Hot Fat Trimming Tool is a pneumatically actuated, hydraulically powered hand-held bandsaw, for removing subcutaneous fat. The unit is constructed mainly from aluminium and stainless steel; materials that possess good corrosion resistance. Generally the tool cutting mode is to start at the bottom of the loin and work up toward the rump (see the operation video as a guide to usage). The tool has a number of features as described next page and shown in figure 1.

### **Specifications:**

Overall Length: 700 mm

Width: 320 mm

Depth (including motor): 310 mm

Dry Weight: approx. 16 kg

Minimum Supply Air Pressure: 70 psi

Minimum Supply Hydraulic Pressure: 1600 psi

Minimum Supply Hydraulic Flow: 15 litres/minute

Speed Range: 1000 to 1200 rpm

Blade Type: "McDivens Pty Ltd" Mark 4 HFT blade

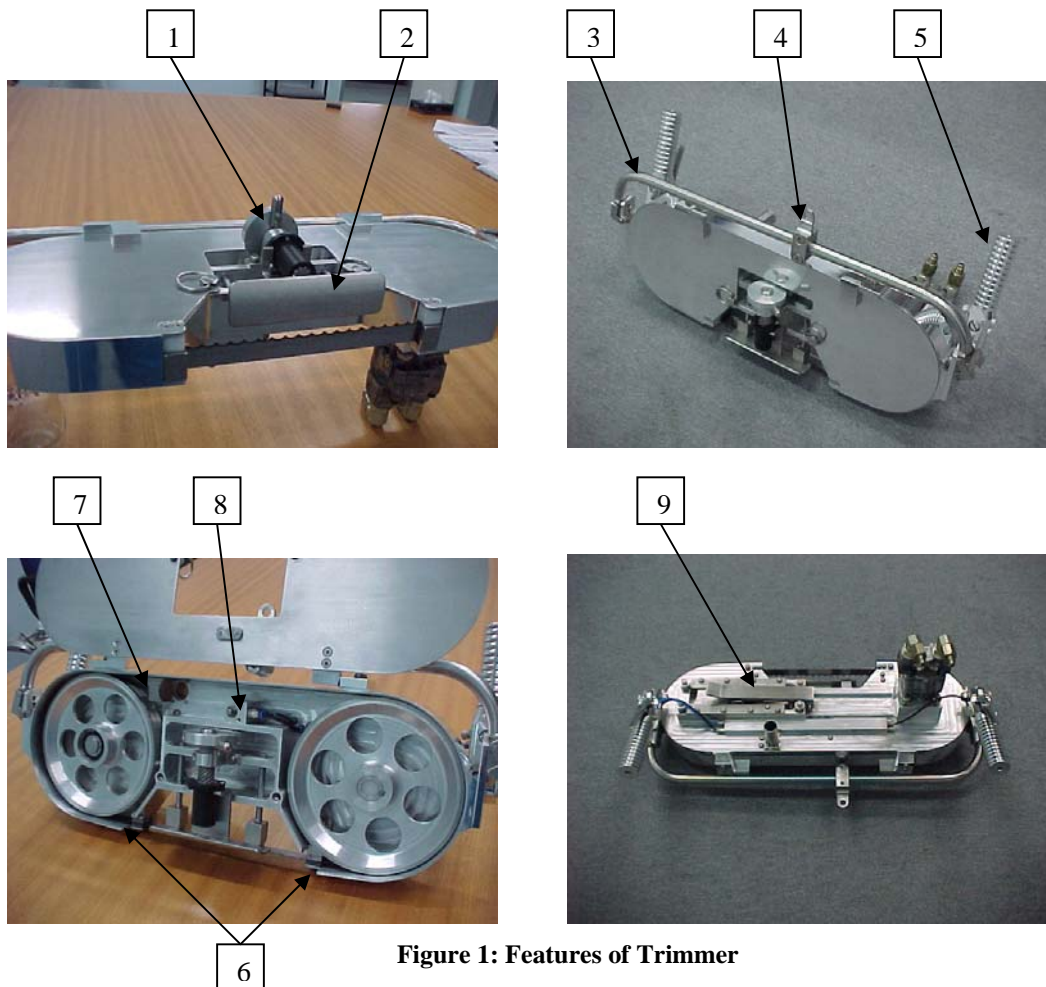
Blade Tension: Automatic, set by spring selection

Blade Rotation: Anticlockwise (as viewed from above)

Cutting Depth Adjustment: Variable – 2 mm to 20 mm in 6 steps, hand control

Blade Guide Gap (Drive end): 0.1 mm to 0.2 mm

Blade Guide Gap (Idler end): 0.2 mm to 0.3 mm.



**Figure 1: Features of Trimmer**

Trimmer features (refer numbers in figure 1):

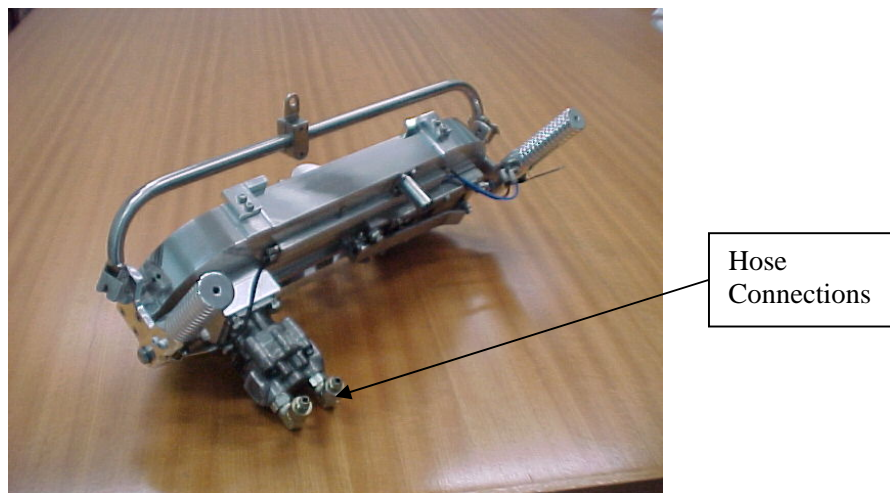
1. Fat depth adjustment wheel
2. Fat depth adjustment stop plate
3. Lockable pivoting hanger
4. Adjustable balance point (hanger bracket)
5. Adjustable operator handles (pneumatically interlocked for safety)
6. Adjustable carbide blade guide blocks
7. Internal fat scrapper block
8. Lid safety switch
9. Quick release blade tensioner

## Installation

The tool would normally be installed at the end of the slaughter floor and set up such that the operator has easy access to the carcass trimming zone. It is intended the tool be used in conjunction with a rise and fall platform for the operator. This way all intended trimming areas can be reached more comfortably. A counterbalance of the correct weight range should be selected for mounting the tool, ensuring that allowance is made for the weight of hydraulic hoses and fluid.

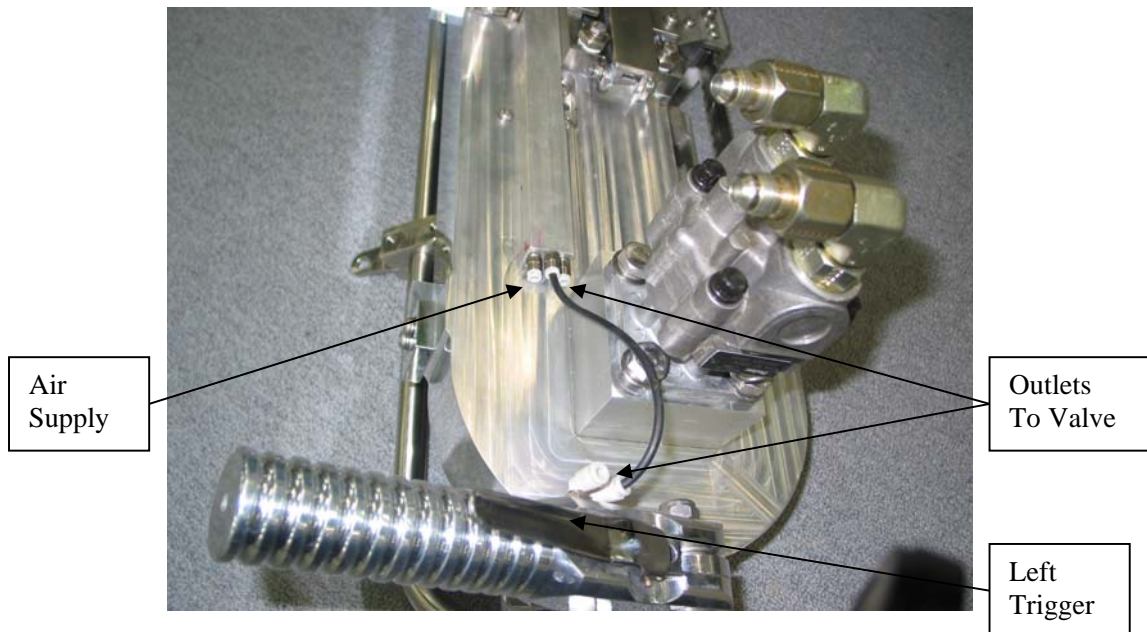
The hanger bracket can be positioned anywhere along the tool handle to achieve the desired balance and then locked in position by means of the two clamp screws (refer figure 1, #4). *Safety Note – ensure hanger bracket clamp screws are tightened firmly.*

The hydraulic hoses are connected to the two connection points of the hydraulic motor. It may be necessary to swap the hoses around to ensure the direction of rotation is correct (anticlockwise when viewed from front cover) (refer figure 2). *Safety Note – ensure all hydraulic fittings are securely tightened.*



**Figure 2: Motor connections**

Air pressure is supplied to the tool via the 4 mm press connect fitting on the air manifold (refer figure 3). The air signal outlets are also shown in figure 3; these connect to the two signal inputs on the anti-tiedown valve (Parker #PXP-A11) and provide the pilot signal for the hydraulic valve. *Safety Note – ensure correct operation of anti-tiedown valve by testing operation of the tool. The tool should only operate when both handle triggers are depressed at the same time (refer figure 3). The tool should not operate if only one trigger is depressed, similarly if either trigger is released while tool is running, the tool should stop. The tool should also stop if the front cover is opened and should not re-start if front cover remains open.*



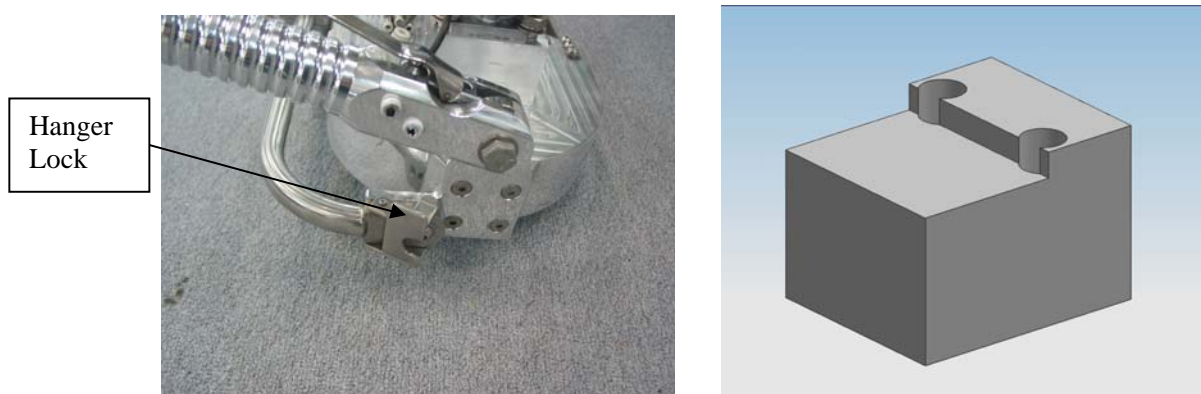
**Figure 3: Air fittings**

After connection of services to the tool, the tool should be started briefly to check for correct rotation. If necessary, swap the two hydraulic hoses to achieve correct rotation.

**Note: Do not run the tool in a dry state for periods longer than about 30 seconds as excessive heat will build up in the blade and guides and damage may result.**

The rotational speed of the tool should be set between 1000 and 1200 rpm. This can be measured using a tachometer (preferably an optical type). The flow rate at the hydraulic valve can be adjusted to alter the speed if necessary. To make these adjustments, it is necessary to run the tool with the front cover open to gain access to the drive pulley. The cutting blade should be removed. *Safety Note - this procedure should not be repeated for any other reason.* The process is as follows:

1. Isolate hydraulic supply from tool.
2. Partially rotate pivoting tool hanger and push hanger locks into service position (figure 4). Open front cover of tool, release blade tensioner and carefully remove cutting blade.
3. Fit the bypass block to the safety switch as shown in figure 4; this will allow tool to run with the front cover open.
4. Reconnect hydraulic supply to tool. *Safety Note – tool is now operable, even with front cover open.*
5. With one person operating the handle triggers, a second person can use a tachometer to carefully measure the rotational speed (an optical tachometer is preferred as this keeps hands further away from moving pulley).
6. Set the desired speed via the flow control of the hydraulic supply.
7. Isolate hydraulic supply.
8. Remove bypass block from safety switch, carefully re-fit cutting blade, apply the blade tensioner and close front cover. Release hanger locks.
9. Reconnect hydraulic supply. Trimmer is now ready to run.



**Figure 4: Hanger lock and Lid bypass block**

## Operation

Before operating the tool, loosen the handle clamping bolts and adjust the angle of the handles to a position comfortable for the operator; then retighten the bolts.

To run the tool, the operator must depress the trigger on each handle simultaneously. If the operator depresses only one trigger or if there is a certain delay between depressing one trigger and the other, the tool will not run. This is also true if the cover is open. If one trigger is released or the cover is opened during operation, the motor will stop. These safety features are incorporated to keep the operator's hands away from the cutting areas of the tool and therefore they should not be bypassed, except during servicing.

The Hot Fat Trimmer is designed to operate in the presence of fat and water, which helps keep the cutting blade and blade guides cool and lubricated. During the normal operation of cutting fat these conditions are met, however if the unit is clean and dry, the tool should not be run for periods longer than about 30 seconds as heat will build up in the blade and guides, and damage may result.

The tool is designed to be used in conjunction with a rise and fall platform and whilst not essential, this will allow the operator to reach all desired areas of the carcass more easily. Also, lower back fatigue in the operator may be reduced if the lifting force imparted by the counterbalance is increased.

The tool is designed to be used in an upward cutting mode i.e. starting at the bottom and working toward the top (see also the operation video as a guide). Generally the tool is used such that cutting is started at the lowest point of where fat is to be removed and finished at the highest point. As the fat is removed, it tends to fall away from the cutting area.

The depth adjustment of the tool can be set as required, depending upon two factors: 1, how much fat cover the carcass has, and 2, how much the operator wants left behind. The adjustment wheel has 6 pre-set positions which allow for cuts between 2mm and 20mm thick. Generally, with practice, the operator would be able to visually assess the depth of

fat on the carcass as it approaches the work area and set the adjuster accordingly before it arrives.

It may be useful to provide some form of carcass restraint system to stabilise the sides at the HFT work area so that the operator doesn't have to perform the trimming on a loosely rotating carcass.

Care should be taken when removing fat from some areas near the rump where the fat is less thick. There is a risk of cutting into the rump in these areas, but generally when the operator gains experience they will avoid this.

**IMPORTANT NOTE:**

**Occasionally the operator may cut into bone, particularly around the dorsal end of the spine where the bone is close to the surface. It is important that if the operator cuts into bone and particularly if the blade jams, the tool is stopped *before* an effort is made to pull back on the blade. If the tool is kept running while removing the blade from the cut, there is a high probability that the running blade will be forced over the ridges on the pulleys. This could damage the wear blocks and front cover, and possibly the blade.**

## **Safety**

- Always ensure operators and maintenance personnel read this manual in its entirety before installing, operating or attempting maintenance on the tool.
- Make sure appropriate personal protection equipment is used before installing, operating or attempting maintenance on the tool.
- Only use the tool for its intended purpose, i.e. cutting soft fat; not for use on chilled/frozen product or bone.
- Keep all parts of the body or any loose clothing etc. well clear of the cutting edge of the tool.
- Never attempt to bypass the anti-tiedown valve safety system, e.g. to allow one handed operation.
- Check all overhead fittings, and counterbalance, hanger bracket, hanger bar and handle connection screws on a regular basis to ensure they are secure.
- Always isolate tool from hydraulic and air supplies when not in use, before removing hydraulic or air hoses, or before attempting any maintenance.
- Tool is heavy – take care, particularly when disconnecting from counterbalance.
- Use safety gloves when handling cutting blades.

## Maintenance

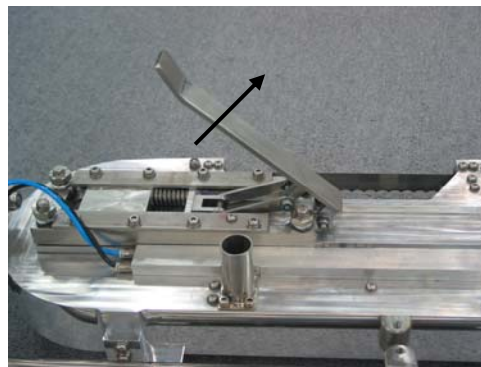
### ***Cleaning***

The tool should be kept in a clean condition when not in use. The unit can be cleaned by locking the hanger into the service position and opening the front cover by loosening the cover screws, and hosing with hot water. If necessary the blade can also be removed for a more thorough clean. Avoid using harsh detergents or corrosive cleaning agents on the trimmer.

### ***Blade replacement***

When blade replacement is required, proceed as follows;

1. Lock the handle into the service position and open the front cover by loosening the cover screws (see figure 5).
2. Lift the blade tensioner arm to the release position (see figure 5), and carefully remove old blade.
3. Insert new blade (with teeth facing toward open cover) over drive pulley first and feed the blade through the blade guides, then over the idler pulley, ensuring the blade teeth are below the lip of the pulleys.
4. Push the blade tensioner arm down fully to re-tension blade.
5. Close and screw down front cover and release handle locks.
6. Run tool briefly to check blade is in correct position and tracking properly.



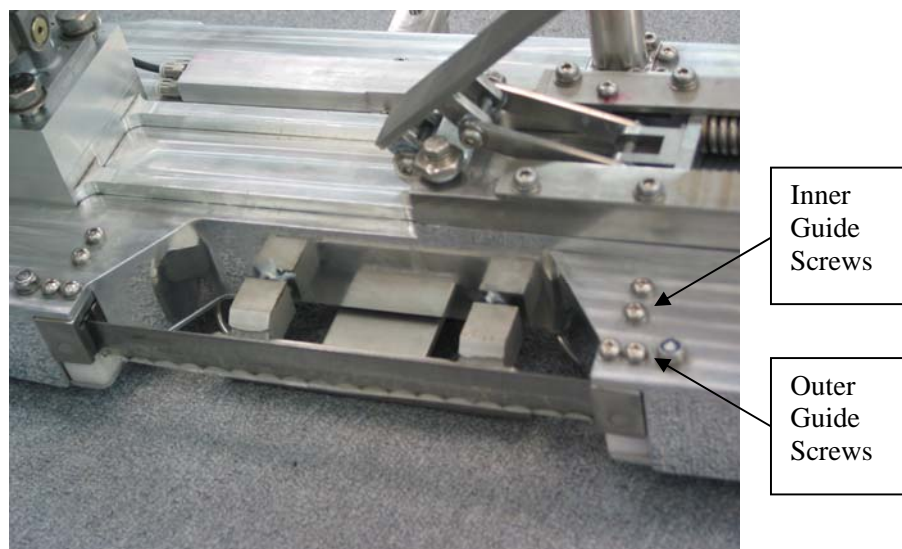
**Figure 5: Lid screws & Blade release (shown open)**

### ***Blade guide adjustment***

If blade guides need re-adjusting, proceed as follows;

1. Lock the handle into the service position and open the front cover by loosening the cover screws (figure 5).
2. Leave blade in tool with blade tension applied.
3. Loosen screws for both inner and outer guides at both ends of blade (figure 6).
4. Carefully push guides away from blade so that they are not contacting the blade; a gap should be seen between both sides of blade and faces of guides.

5. Using a soft punch, ***gently*** tap inner guides toward blade (only tap the outer stainless part of the guides) until the face of the guide just touches the blade.  
**Note: Never impact or try to lever the carbide inserts as they are brittle and may shatter.**
6. Lock the inner guides in position taking care not to move them when re-tightening screws.
7. Place a 0.15mm feeler gauge between outer guide face and blade on the **Drive end** guide assembly.
8. Again using a soft punch or small soft hammer, ***gently*** tap outer guide until a slight drag is felt on the feeler gauge.
9. Lock the outer guide in position taking care not to move it when re-tightening screws.
10. Place a 0.25mm feeler gauge between outer guide face and blade on the **Idler end** guide assembly.
11. Again using a soft punch or small soft hammer, ***gently*** tap outer guide until a slight drag is felt on the feeler gauge.
12. Lock the outer guide in position taking care not to move it when re-tightening screws.
13. Close and screw down front cover and release hanger locks.
14. Run tool briefly to ensure blade is running freely and not binding.



**Figure 6: Guide adjustment screws**

## Troubleshooting

Problem	Possible cause	Remedy	If problem persists
Tool will not run	No air pressure	Check air isolation valve is on. If valve is on, check there are no kinks or leaks in airlines. Check that front cover is fully closed. Make sure that <b>both</b> operator handle triggers are being activated at same time.	Contact FSA
	No hydraulic pressure	Check hydraulic isolation valves are on.	Contact FSA
	Blade seizure	Check blade guides and adjust if necessary (refer blade guide adjustment procedure)	Contact FSA
	Idler pulley seizure	Remove blade and check if idler pulley turns freely- if pulley is seized, contact FSA	
	Motor seizure	Purchase & fit new motor: Parker, MGG20025	
Blade not tracking correctly or cutting into plastic wear block and/or cover	Blade not fitted correctly.  Operator using tool incorrectly, forcing blade over pulley lips.  Faulty blade/blade too long.	Fit blade correctly (refer blade replacement instruction)  Check/read correct operating procedure.  Check length of blade against known 'good' blade and fit new blade if required.	Contact FSA
Excessive noise when running	Incorrect blade guide adjustment  Blade not tracking correctly.	Check blade guides and adjust if necessary (refer blade guide adjustment procedure)  See above.	Contact FSA

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<b>Problem</b>	<b>Possible Cause</b>	<b>Remedy</b>	<b>If Problem Persists</b>
Blade slippage	Incorrect size blade.  Blade tensioner arm not locked in position.	Fit correct size blade.  Push blade tensioner arm down fully to re-tension blade.	
Excessive blade wear	Operator frequently cutting into bone.	Use correct operating procedures.	
Excessive blade breakages	Faulty blades  Incorrect sized blades	Check with blade manufacturer  Check with blade manufacturer	Contact FSA