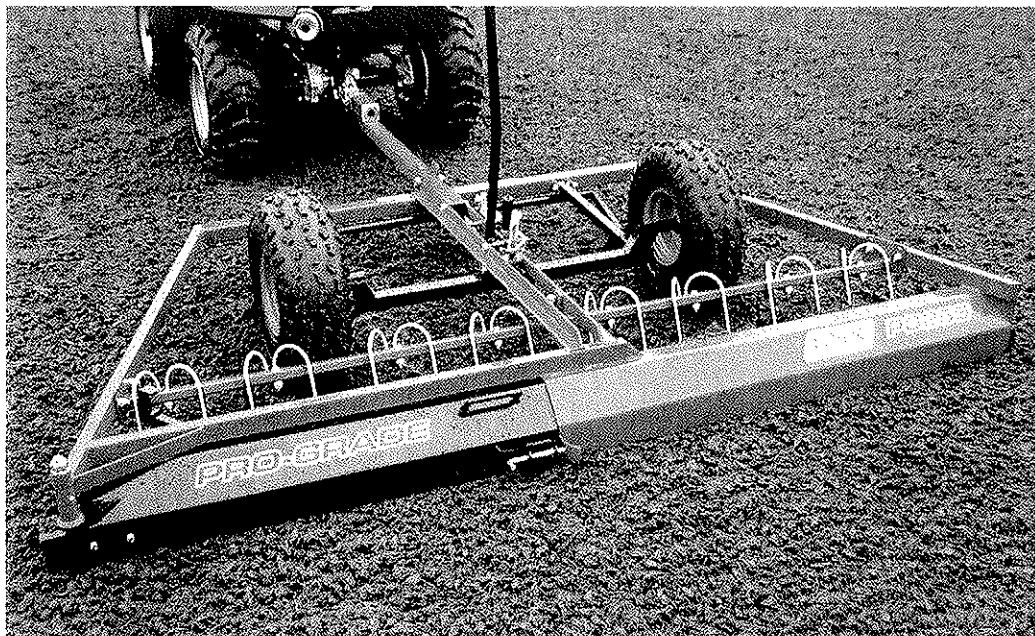


***LOGIC*** PG250 / PG250T

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# PRO GRADE – SURFACE GRADER



## OPERATORS MANUAL

WM1-PG250

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PRO-GRADE Serial Number:

Date of Purchase:

**1****INTRODUCTION**

With the purchase of your **PRO – GRADE** surface grader you have made an excellent choice.

This machine should give first class service for a long time, if used correctly, and maintained as described in this manual.

The PRO – GRADE is constructed from quality materials and components to ensure first class service for a long time when used correctly.

This manual also has important H.S.E information and guidelines.

If after reading this manual you have any queries, please get in touch we will be pleased to help.

**NORTH & EXPORT**  
**LOGIC MANUFACTURING LTD**  
Foundry Industrial Estate  
Bridge End, Hexham  
Northumberland NE46 4JL  
Tel: 01434 606661 Fax: 01434 608143  
E-mail: [sales@logic.gb.com](mailto:sales@logic.gb.com)  
[www.logic.gb.com](http://www.logic.gb.com)

**SOUTH**  
**LOGIC MH LTD - New Whiteway Works,**  
Fossecross Industrial Estate  
Chedworth, Cheltenham  
Gloucestershire GL54 4NW  
Tel: 01285 720930 Fax: 01285 720840  
E-mail: [sales@logic.gb.com](mailto:sales@logic.gb.com)  
[www.logic.gb.com](http://www.logic.gb.com)



## Safe use of all-terrain vehicles (ATVs) in agriculture and forestry

### Agriculture Information Sheet No 33

#### Introduction

This information sheet gives advice on the safe use of ATVs. It covers the two main types used in off-road working in agriculture and forestry, which are:

- sit-astride ATVs: any motorised vehicle designed to travel on four low-pressure tyres on unpaved surfaces, with a seat designed to be straddled by the operator and handlebars for steering control. They are intended to be used by a single operator with no passenger. However, this type also includes ATVs intended for use by a single operator, but with a special seat for a passenger behind the operator. These vehicles are generally called ATVs in agriculture, quad bikes in leisure use and all-terrain cycles (ATCs) in forestry;
- sit-in machines: side-by-side mini-utility vehicles, usually with a steering wheel, where the driver sits in a conventional seat and there is generally seating for one or more passengers. These are often called ATVs in both agriculture and forestry.

The ATVs covered by this sheet are those designed for off-road use only. However, agricultural, horticultural and forestry users can register an ATV as a 'Light agricultural vehicle' for limited on-road use in connection with their business (see 'Road use').

#### Accidents

Both types of machine are designed to cope with a wide variety of terrain types, including steep slopes, but if used outside their safe operating parameters they can very rapidly become unstable. This is why most ATV accidents involve overturning.

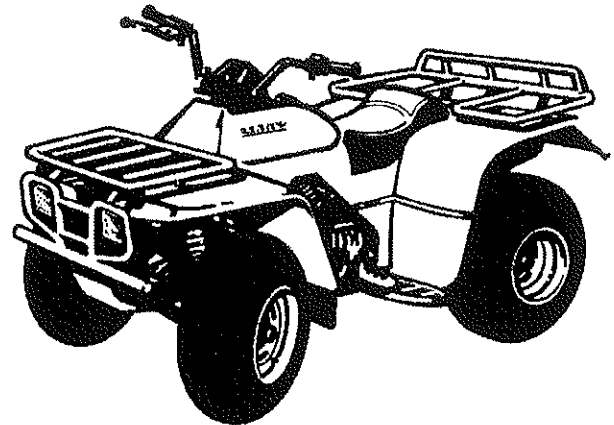
On average, two people die each year in ATV accidents. Non-fatal accidents are estimated to amount to over 1000 serious injuries per year. The underlying causes of accidents were usually one or more of the following:

- lack of structured training and/or experience;
- incorrect/lack of protective clothing;
- excessive speed;
- carrying a passenger or an unbalanced load;
- tipping on a bank, ditch, rut or bump;
- a steep slope combined with other factors, eg ground or load conditions;
- towing excessive loads with unbraked equipment.

#### Route planning and stability

Most accidents with these machines have occurred where they have either been driven on new routes over steep ground for the first time, or have been carrying or dragging destabilising loads. When travelling over rough terrain, get to know your own ground and stick to planned routes where possible. Walk new routes if necessary to check for hidden obstructions. Allow for changes in ground conditions and for the destabilising effect of loads or attachments.

#### Sit-astride ATVs (quad bikes/ATCs)



**REMEMBER - GET PROPERLY TRAINED AND ALWAYS WEAR HEAD PROTECTION**

#### Training

Under the Provision and Use of Work Equipment Regulations 1998 (PUWER), there is a legal requirement for employers to provide adequate training, and to ensure that only employees who have received appropriate training in their safe use, including the use of any towed equipment or attachments, are permitted to ride ATVs. The same requirements apply to the self-employed. HSE regards training provided by recognised training providers as being 'adequate' for the purposes of PUWER.

You can get details of suitable training courses from franchised ATV dealers, manufacturers' websites, EASI (European ATV Safety Institute), the Forestry Commission and Lantra Awards. Training is also available from agricultural trainers and colleges accredited by these bodies.

## Protective clothing

More than half of all ATV riders have been thrown off at some time. As these machines are not fitted with either a cab or roll bar, your only protection is what you wear.

- **Head protection is vital.** The majority of ATV fatalities in the UK in the last ten years have been caused by head injuries. Nobody who died from head injuries was wearing a helmet. Helmets would certainly have prevented most, if not all, the deaths. **You should always wear a helmet when riding an ATV.** Helmet types suitable for ATV operations, depending on the circumstances, are motorcycle helmets to BS 6658:1985 or UN ECE regulation 22.05, equestrian helmets to BS EN 1384:1997, including specialist ATV helmets, cycle helmets to BS EN 1078:1997 and mountaineering helmets to BS EN 12492:2000. All helmets should have a chinstrap and be capable of being used with suitable eye protection. The type of helmet chosen should be based on an assessment of the circumstances in which the ATV will be used, eg the types of surface travelled over and anticipated speeds. The harder the surface and higher the speed the greater the degree of protection needed. **NB: Forestry helmets and industrial hard hats are not acceptable for any ATV operations.**
- Wear clothing that is strong and covers your arms and legs. Gloves are useful for protection and to keep hands warm in cold weather for good control of the ATV. Wear sturdy, ankle-covering footwear, eg boots or wellingtons that are strong, supportive and have good wet grip.
- Protect your eyes from insects and branches with either a visor or goggles.

## Passengers

**Never carry a passenger on a sit-astride ATV unless it has been designed for, and is suitable for, that purpose.** The long seat is for operators to shift their body weight backwards and forwards for different slope conditions, **not** for carrying passengers. Passengers on specially adapted ATVs must wear a safety helmet. Do not carry a passenger in a trailer behind an ATV as any movement can make the machine unstable, particularly with independent rear suspension and trailers with axles wider than the ATV.

## Safety checks and maintenance

Off-road use is especially harsh on equipment so it is essential to carry out safety checks and maintenance in accordance with the manufacturer's recommendations. In particular, pre-ride safety checks should **always** include:

- tyre pressures. These are low, eg around 2-7 psi, so even a 1 psi (0.07 kg/cm<sup>2</sup>) difference in pressure can cause vehicle control problems.

Use a gauge that is designed for measuring and displaying low pressures – usually supplied with the ATV;

- brakes and throttle. Check that the brakes give a safe straight stop and that the throttle operates smoothly in all steering positions. Brakes can have a relatively short life in farming or forestry environments and need frequent cleaning, regular adjustment and proper maintenance.

## Safe driving methods

ATVs are rider-active machines, so rider positioning is vital to operate them correctly. The position of the rider on the machine needs to be changed depending on the terrain and motion. Riders must have the ability to move and balance the momentum of the ATV with their own body weight. Plan routes (and review the plan if the route is used regularly) to assess risks.

## The following advice is no substitute for formal training.

- Most ATVs have no differential and so do not handle in the same way as other machines. This means that when you turn, the ATV tries to keep going in a straight line.
- When cornering on an ATV with no differential or with the differential lock engaged, where your body weight needs to be positioned depends on how sharp the corner is and on how fast you are going. Correct body position allows you to transfer weight to the outside of the turn through the footrests while maintaining balance with the torso. This lets the inside wheels skid slightly allowing the ATV to make the turn properly.
- You must understand how the transmission system of your machine will affect engine braking for both riding, and recovery of stalled ATVs, on slopes.
- When riding across a slope, keep your weight on the uphill side of the ATV.
- When going downhill, slide your weight backwards, select a low gear and use engine braking, reducing the need to use the brakes.
- When going uphill, it is important to review the route before starting the climb. Move your weight forwards and maintain a steady speed. It is important to shift your body weight forwards as much as possible. If necessary stand up and lean forward, keeping both feet on the footrests at all times and always maintain momentum.
- Avoid sudden increases in speed, as this is a common cause of rearward overturning accidents, even from a standing start on flat ground where there is good grip.

- **Never put your foot onto the ground to stabilise an ATV when riding**, but shift your weight across the ATV away from the imbalance.
- **Always read the owner's manual.**

### **Trailed equipment and loads**

Ensure all riders know the manufacturer's recommended towing capacity and drawbar loading limit. Always operate within these requirements. Remember that your ability to control the ATV by your body movements will be considerably reduced when carrying a load or towing a trailer.

- When selecting trailed equipment look for:
  - over-run brakes;
  - a swivel hitch drawbar;
  - bead lock rims on wheels;
  - a low centre of gravity and a wide wheel track;
  - a long drawbar; and
  - attachment points for securing a load.
- Check the weight ratio between your ATV and its trailed load. This needs to be assessed for each operation. As a general guide, on level ground, braked trailed equipment can be a maximum of four times the unladen weight of the ATV. For unbraked trailed equipment the maximum should be twice the unladen weight. These loads should be reduced when working on slopes, uneven ground or poor surface conditions. Follow the manufacturer's advice for your particular machine.
- Weight transfer is also important. Stability and resistance to jack-knifing is improved if some load is transferred onto the ATV's drawbar. Approximately 10% of the gross weight of the loaded trailer is recommended, but this should not exceed the manufacturer's drawbar loading limit. Remember that weight transfer can change dramatically when you start going up or down hill.
- When selecting mounted equipment, make sure it is within the manufacturer's approved weight limit, with a low centre of gravity, and controls which are easy to operate but do not create a hazard. Where equipment is added to one end of the machine, add ballast at the other end to maintain stability.
- Loads carried on racks must be well secured, eg with ratchet straps, and be evenly balanced between the front and rear, except where they are deliberately altered to aid stability when going up or down a slope.
- Only tow a load from the hitch point. Loads towed from other points such as the rear rack have caused sudden rear overturning even on slight slopes or with slight acceleration. Ropes or chains should not be used to drag a load where they can become caught on a wheel. This may lead to entanglement with the brake cable, causing unexpected braking.

### **Using sprayers**

- Pesticides should be used in accordance with the *Code of Practice for using plant protection products* published by Defra. (Available from Defra Publications, ADMAIL 6000, London SW1A 2XX Tel: 08459 556000.)
- Sprayers should meet the requirements of BS EN 907 and be fitted with an induction hopper unless the filling point is less than 1.5 m from the ground and within 0.3 m from the edge of the sprayer. A separate clean water tank for washing must be provided containing at least 15 litres of clean water and a tap that allows the water to run without being continuously pressed.
- When buying a sprayer look for a low centre of gravity and internal baffles to reduce liquid surge to improve stability when turning on slopes.
- ATVs should only be used with rear-mounted spray booms or other equipment that reduces the risk of pesticide exposure to the operator.
- Do not hold a spraying lance while riding your ATV, as two hands are needed for safe control.

### **Accessories**

Beware of the potential dangers of accessories which are not approved by manufacturers, eg home-made gun racks and boxes. Either use accessories supplied/approved by manufacturers or seek their advice as to the suitability of those sourced elsewhere. Any weight added above the centre of gravity will decrease the ATV's stability.

### **Children**

- Never carry a child as a passenger. It is illegal and will reduce your ability to control the ATV.
- Children under 13 are prohibited from using an ATV at work. Over 13 they should only ride ATVs of an appropriate size and power, after formal training on a low-power ATV.
- **Check and adhere to the manufacturer's minimum age recommendations for your ATV.** The ratio of a child's weight to that of the ATV is significant, as weight transfer is the key to safe handling.
- Always refer to the owner's manual and warning labels on the machine.

### **Roll bars, lap straps and weather cabs**

- Roll bars are not recommended for sit-astride ATVs. Research has shown that they are more likely to increase injuries by obstructing the rider, either when thrown off or when jumping off during an overturn. This causes the rider to fall to the ground alongside the ATV and increases the likelihood of injury. PUWER does not require roll bars where they would increase the overall risk.

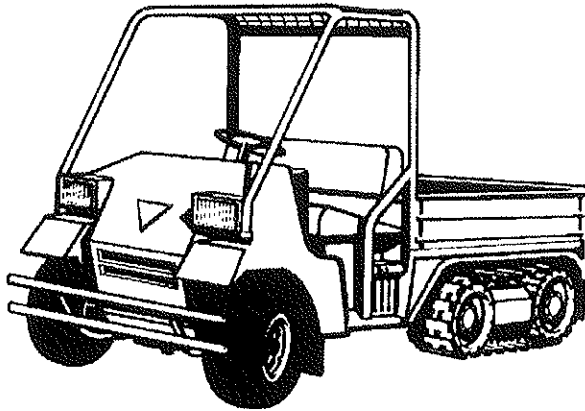
- Lap straps should not be fitted. They prevent active riding and would be potentially lethal without a full cab or roll cage.
- Weather cabs restrict a rider's ability to jump clear in an overturn. The rider is likely to be crushed within the cab unless it is strong enough to withstand the forces involved. Carefully assess the risks for your particular conditions of use before fitting any such structure and consult the manufacturer for information.

### **Road use**

For road use, ATVs and trailers have to comply with the Road Vehicles Construction and Use Regulations 1986 (as amended) and the Road Vehicles Lighting Regulations 1989 (both enforced by the police) and be licensed in the appropriate class. They do not require an MOT and the maximum permitted speed is 20 mph. The minimum age for drivers is 17 and they need a Category B licence.

### **Sit-in ATVs**

Sit-in ATVs include the Mule, Rhino, Argocat, Scot-Track, Gator, Ranger, Hiler, Goblin and other similar machines. They all have conventional sit-in seats and the driver does not use weight transfer to steer or control stability, although load balance is important in this respect. They range from machines designed for purely rough terrain to utility vehicles, which are also commonly used fully off-road.



### **Training**

The legal requirements for training are the same as for the sit-astride ATVs. You should request advice on training from your suppliers, the training providers previously mentioned or, for forestry operations, from the Forestry Commission.

### **Rollover protection and seat belts**

The requirements for these machines are quite different to those of sit-astride ATVs.

- Where there is a risk of the machine rolling over, PUWER requires an employer to fit some device to protect employees (the self-employed have the same duty to themselves). This would normally be a cab, rollover frame or roll bar. Such a structure could either be provided as part of the original machine or, if added afterwards, should be CE marked and approved by a recognised test body.
- Restraining devices such as seat belts should be fitted and worn by the driver and passengers where a roll bar or cab is fitted.
- Where a machine is amphibious and used on deep water as opposed to marshland, then the seat restraints (and possibly roll frame) could increase the overall risk rather than reduce it. In this case, do not use seat restraints while on the water. Assess the risk from the roll frame according to its design and the likelihood of trapping the occupants if the machine should sink.
- If there is a risk of overturning, employees at work who are carried in the rear of sit-in ATVs should be protected by rollover protection and seat restraints.
- Children should only be carried in these vehicles if they are in a passenger seat and wearing a properly designed and fitted seatbelt.

### **Parking**

If you have to park on a slope, always park across it unless it is too steep. Accidents have occurred where machines have run down slopes because of poor brake maintenance or application, particularly while they are being loaded, and movement or the increase in weight sets the machine into motion.

### **Further information**

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995 Website: [www.hsebooks.co.uk](http://www.hsebooks.co.uk) (HSE priced publications are also available from bookshops and free leaflets can be downloaded from HSE's website: [www.hse.gov.uk](http://www.hse.gov.uk).)

For information about health and safety ring HSE's Infoline Tel: 0845 345 0055 Fax: 0845 408 9566 Textphone: 0845 408 9577 e-mail: [hse.infoline@natbrit.com](mailto:hse.infoline@natbrit.com) or write to HSE Information Services, Caerphilly Business Park, Caerphilly CF83 3GG.

This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

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This symbol means **WARNING** or **CAUTION** Personal safety or damage will be at risk if these instructions are ignored. Most accidents are caused by neglect or carelessness; Avoid needless accidents by following the safety precautions listed below.

## 2

### IN THE INTEREST OF SAFETY: DO NOT

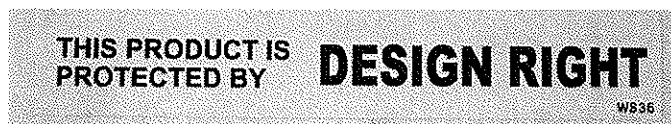
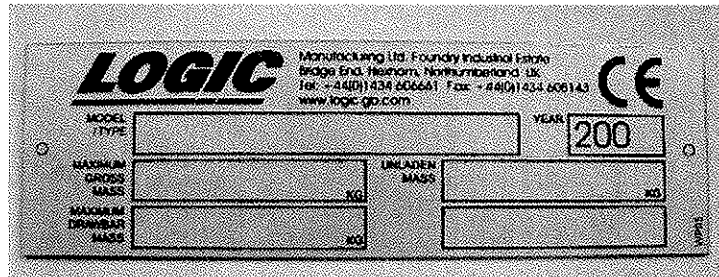
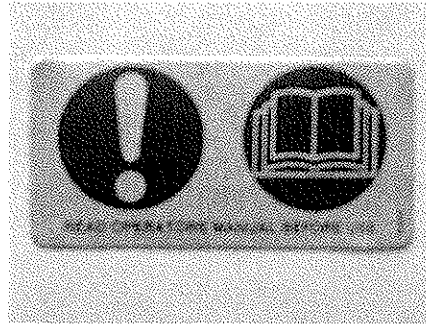
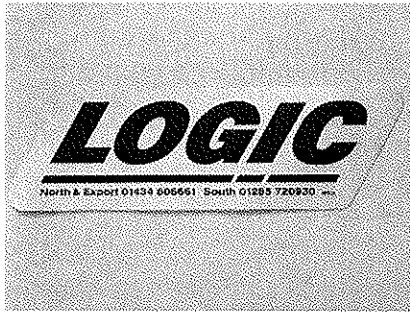
1. **DO NOT** – Operate the PRO-GRADE unless you have read this entire manual.
2. **DO NOT** - Operate the PRO-GRADE if any part of the machine is defective, replace any parts before use.
3. **DO NOT** – Touch moving parts.
4. **DO NOT** – Never carry passengers.
5. **DO NOT** – Exceed sensible towing speeds. (MAX 10mph)

## 3

### IN THE INTEREST OF SAFETY: DO

1. **DO** – Follow all manufactures guidelines.
2. **DO** – Attach a suitable towing vehicle to the PRO-GRADE.
3. **DO** - Follow all manufactures service instructions.
4. **DO** – Be aware of travelling conditions – Do not exceed sensible speeds.
5. **DO** – Slow down when turning corners
6. **DO** – Follow all safety instructions in this manual.
7. **DO** - Make sure spectators are a safe distance when operating, especially when travelling in areas used by the public or animals
8. **DO** – Make sure all nuts, bolts and fittings are secure before using, and check at regular intervals during operation.
9. **DO** – Avoid excessive steep slopes or adverse ground conditions.





The above decals should be located on your PRO-GRADE. If any of the above decals are not located on your PRO-GRADE or are damaged in any way contact Logic for some replacement decals before use.

**5****TRANSPORTING & LIFTING**

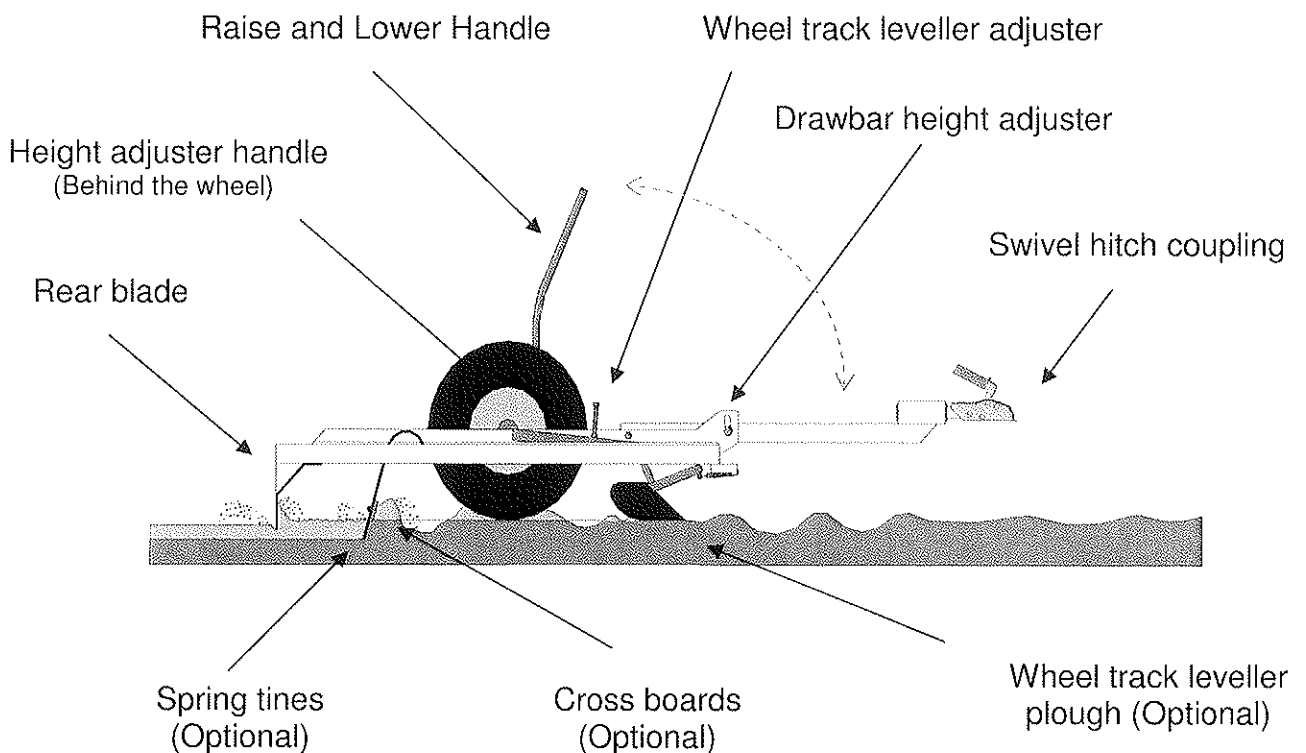
Ensure the vehicle used to lift and transport the PRO-GRADE has the necessary lifting and loading capacity. Follow all vehicle manufactures guidelines for lifting. Unladen weights are clearly marked on the Manufactures plate attached to the PRO-GRADE framework. Check the lifting weight complies with the vehicle lifting limits

When lifting the PRO-GRADE for transporting / delivery purposes always ensure to locate the lifting straps on each of the four corners ensuring the straps/chains are all the same length before lifting, or if using forklift tines ensure the grader is secure on the tines before lifting.

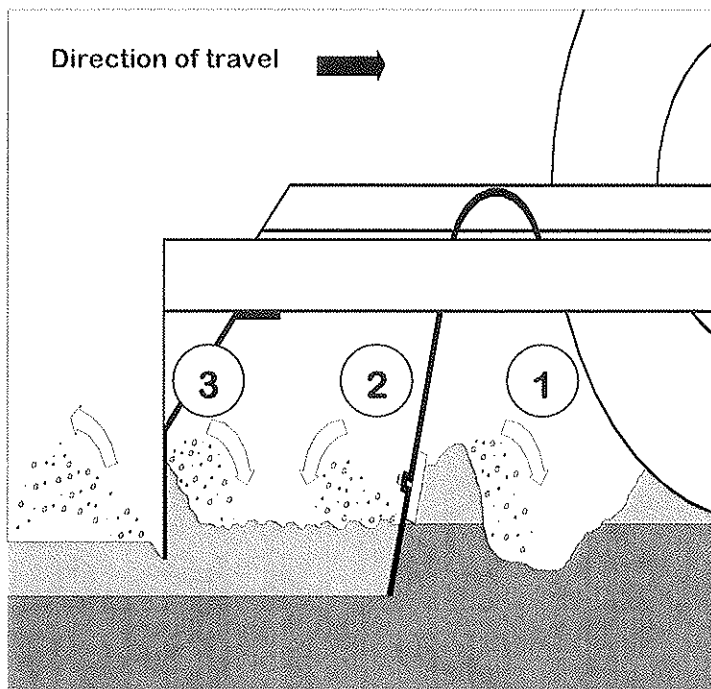
**6****OPERATING PRINCIPLES**

The below diagram shows the PRO-GRADE features which will be mentioned in more detail in this section.

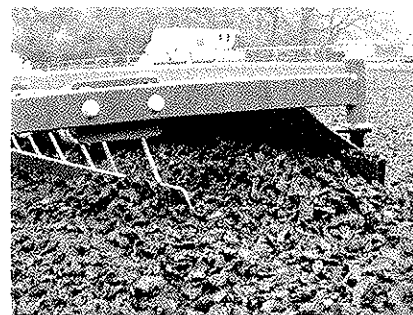
(Diagram shows PG250T)



There are three stages available to enhance the grading process, the working principles of each process are explained below.



Below picture shows the crossboards, springtines and Rear blade in working conditions:

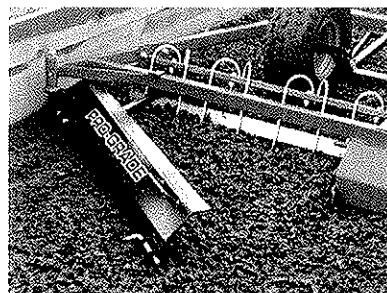


**STAGE 1:** The **CROSSBOARD** slices off the crests and fills any voids in the surface. The crossboards are acting as a primary leveller and should be set to ground level, they can be raised or lowered to suit the material size to be graded and too avoid overloading. The crossboards are attached to the springtines to enable a flicking action as the tines flex during operation. (PG250T only)

**STAGE 2:** The **SPRINGTINES** agitate the surface by stirring and mixing the surface. The springtines have a two stage depth control ranging from 0 – 65mm for shallow or deep agitation. The tines are made from spring steel and are designed to give a circular motion during work, which makes it suitable for breaking up compacted areas or mixing in large amounts of material. (PG250T only)

**STAGE 3:** The **BLADE** is designed to roll the material over and level the surface, the blades rear edge then gently firms and compresses the surface as you move forward. The blade also has a **PERIMETER PLOUGH** option which is extremely useful on equestrian all weather surfaces where a path or heap of material is deposited near the outer perimeter boards. The plough moves the material away from the boards which prevents excess build up. (This option is fitted as standard)

Picture shows **PERIMETER PLOUGH** in its work position



## 7

## SETTINGS &amp; ADJUSTMENTS

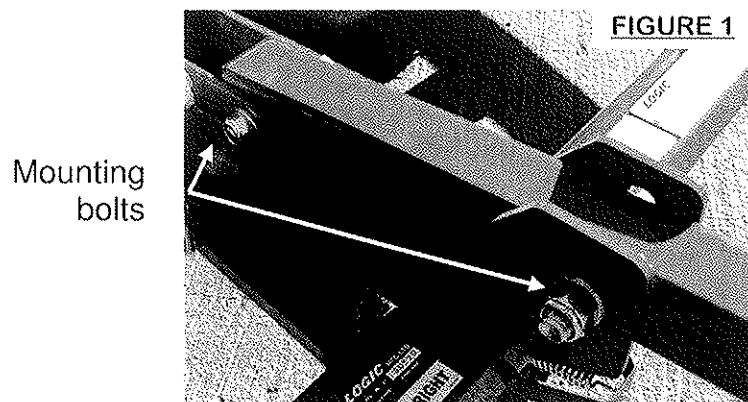
## 7.1 – PRE DELIVERY INSPECTION (PDI)

On delivery the PRO-GRADE may be incompletely assembled in a state that varies with the method of transport, etc. Use the following assembly instructions as applicable.



Read all the instructions before starting; never work under the PRO-GRADE during loading, unloading, or installation work. Ensure the machine is properly supported before carrying out any PDI work

1. Fit the drawbar using the bolts provided. (See fig 1)

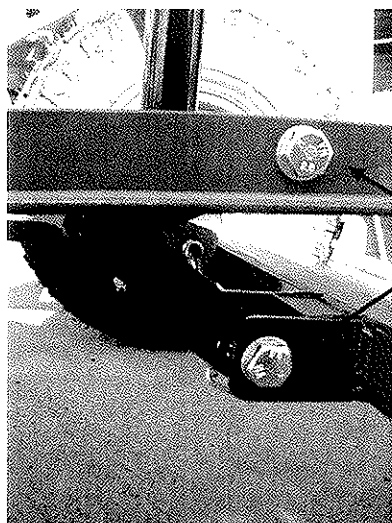


2. Fit the wheels. Ensure the tyre valve is facing outwards. Secure using the M10 bolt and washers provided. Fit the dust caps to the wheels centres and check the tyre pressures.

**CARLISLE AT 20 X 7 – 8 (Min 4 Psi Max 10 Psi)**

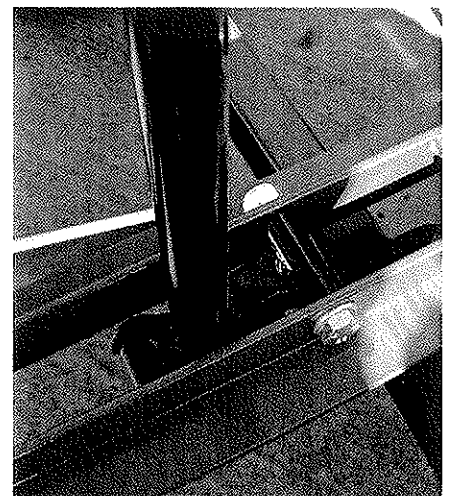
**NB: For grading horse ménages / arenas a pressure of 4-5 Psi is recommended**

3. Fit the raise and lower handle as shown in fig 2 using the fasteners provided. See parts diagram for more detail.



SIDE VIEW

FIGURE 2

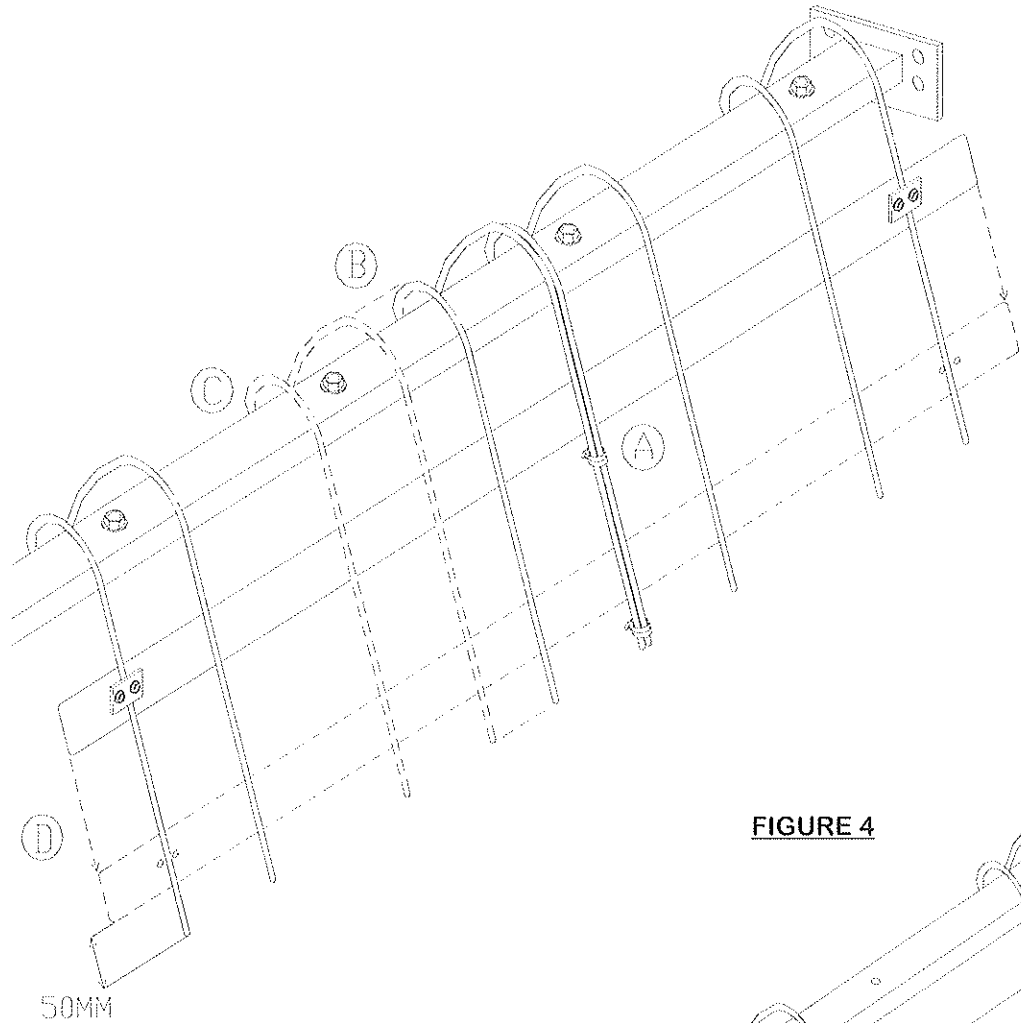


PLAN VIEW

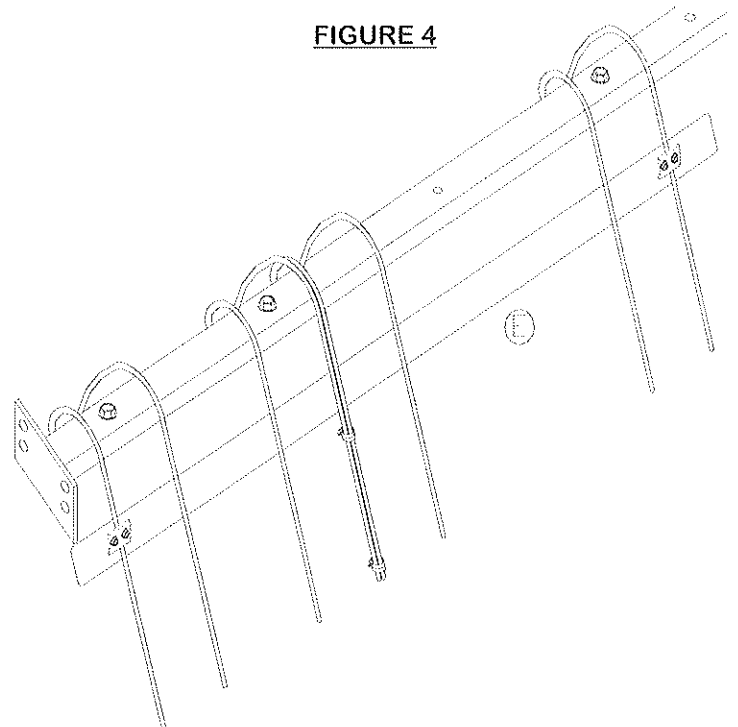
- There are two spring tines on the tinebar that have been removed to allow easier access for forklift truck tines for loading and unloading. (See fig 3) Remove the cable ties from one of the tines (A) slide the loose tine across to the spare mounting hole (B) fasten the tine using the bolt provided (C).

Slacken the crossboard mounting clamps and set the crossboard height to be 50mm from the end of the tine as shown at point (D) in the below diagram. Tighten the clamps.

**FIGURE 3**




**FIGURE 4**



- Repeat step 4 again for the opposite side (See fig 4.E)  
Ensure all crossboards are set to the same height setting and that all fasteners are tight before delivery.

## 7.2 – ATTACHMENT TO TOWING VEHICLE

Any suitable vehicle can tow the Logic PRO-GRADE normally by its 50mm swivel hitch coupling.  Ensure the hitch is securely attached to the towing vehicle and the handle indicator points to “OK” before moving the vehicle.

Use the raise and lower handle to lift the PRO-GRADE clear of the ground. Drive around for a short period of time in a wide open space to ensure you become familiar with the operating width and handling of the machine.

## 7.3 – ADJUSTING THE GRADER

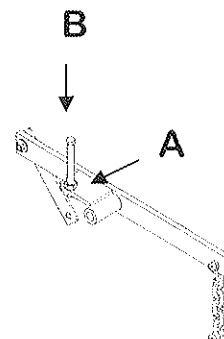
### TOOLS REQUIRED:

Tyre pressure gauge	Tape measure	2 x 10mm spanners	2 x 24mm spanners
2 x 19mm spanners	1 x 19mm socket, ratchet and extension bar		

1. Check that both tyres have the same pressure (Min 4Psi Max 10Psi)
2. Move to the site to be graded and select a test plot area for testing and adjusting the grader.
3. Ensure the rear plough is in the closed position.
4. Wind up the height adjuster handle (Anticlockwise) several turns so that it becomes inoperative. (PRO-GRADE still in raised transport position).
5. Using the raise and lower handle, lower the blade onto the ground.
6. Wind the height adjuster handle until the end of the threaded bar comes in contact with the stop on the wheel axle. Turn another two times to transfer a small amount of pressure from the blade to the wheels. This will provide a datum to start from.
7. Ensure the grader frame is parallel to the ground, adjust the drawbar so the frame is parallel by slackening the drawbar mounting bolts and level the main frame. The grader should always run level with the ground.
8. Move forward slowly to see what effect the blade is having on the surface being levelled.
9. Adjust the grader depth to suit the conditions and the surface finish.

### ADJUSTING THE WHEEL TRACK LEVELLER (IF FITTED)

To adjust the wheel track levellers simply loosen the adjuster locking nut (A) and screw the adjuster (B) in or out to raise or lower the working depth. The leveller ploughs should be working to a suitable depth to leave a flat channel for the wheels to run in. The channel should be level; this will make the wheels run consistently on a level surface this reduces the amount the grader will bounce around during work. (Working depth of 25-50mm (1"-2") is recommended, depending on how uneven the surface is).

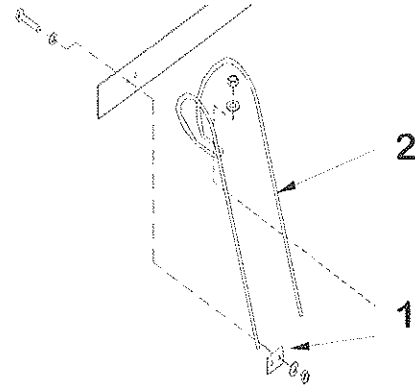


## ADJUSTING THE FRONT CROSSBOARDS (IF FITTED)

To adjust the working height of the crossboards, slacken the two clamping plates (1) by using 2 x 10mm spanners. Using a tape measure slide the crossboards up or down the springtine (2) until the desired height setting is achieved. Tighten all clamping plates.

(NB: There are two crossboards fitted and should always be set to the same height setting to ensure an even and level surface finish)

The crossboards should be set to "Ground level" or higher, they are designed to slice through any crests and fill in any voids in the surface. If the crossboards are set in too deep it will result in damage to both the crossboards and springtines.



## ADJUSTING THE SPRINGTINES (IF FITTED)

The springtine mounting bar has two height settings; this can be manually adjusted by removing the end plate mounting bolts (x4) and centre mounting bolt (x1). Lower or raise the mounting bar to the correct setting and secure in position with the original bolts and tighten.

The mounting bar should be set in the higher mounting position if deep stirring and agitation is required, or if the springtines are worn and are not penetrating the surface.

The lower mounting holes are for light agitation or when new springtines are fitted.

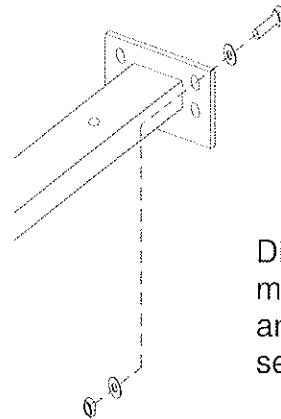


Diagram shows the mounting bar end plates and the two stage height setting.

**NB:** The above PRO-GRADE examples should be used as guides only, adjust your grader to suit the type of surface and weather conditions you have.

## 7.4 – SETTINGS CHART

SURFACE TYPE	SURFACE DESCRIPTION	MATERIAL DEPTH (MM)	CROSSBOARD DEPTH (MM)	SPRINGTINE DEPTH (MM)	BLADE DEPTH (MM)	FORWARD SPEED (Mph/Km)
SAND	Silica sand only	200mm	N/A	N/A	30mm	5 Mph 8 km/h
RUBBER SOFT TRACK	Silica sand mixed with chopped rubber (10-30mm diameter rubber)	150mm (Mixed)	Ground level	45mm	15mm	5 Mph 8 km/h
RUBBER	Chopped rubber on the surface with a silica sand base 25-130mm diameter rubber to a depth of 50mm, under the rubber is a silica sand mixture to a depth of 200mm	Rubber 50mm Sand fibre 200mm TOTAL: 250mm	Ground level	65mm	15mm	5 Mph 8 km/h

Once you have confirmed your settings, record them in the chart below for your future reference:


If you have any specific questions regarding towing or adjusting the PRO-GRADE to suit your surface please contact **Logic** on **01434 606661**



It is recommended that on equestrian all weather surfaces that the below 3 stage grading technique is applied to obtain the best grading results from the PRO-GRADE, and to maintain an even and level surface. (See figure 1)

### STAGE 1: PERIMETER PLOUGH

The Perimeter plough is extremely useful on many surfaces where the constant use of the edge of the arena results in a "Path" or heap of material deposited close the outside boards. This material can be pulled back from the edges and corners to maintain a level surface. To open the plough blade, simply raise the PRO-GRADE out of the work position using the Raise and Lower handle, then open the spring catch on the plough blade and allow the plough to swing back as far as the stop will allow. Lower the PRO-GRADE back into work, move forward and ensure the rubber buffer is located down the perimeter boards, and glides along the boards without too much pressure. Adjust the working depth of the grader if necessary to ensure the plough blade is not overloaded. Complete a circuit of the arena and review the results, it may be necessary to complete a second lap to ensure all the material has been moved from the outer boards.

The PRO-GRADE will remove material from the corners, raise the grader out of the work position and reverse the grader in to the corner. This will enable you to get the plough right in to the corner, lower the grader in to work and continue forward. Review the results, it may be necessary to repeat this action a few times to ensure the corners stay level with the rest of the surface.

### STAGE 2: PRIMARY GRADING

The first grading operation should be in one direction; (e.g. working across the arena as shown in stage 2)

Move any obstacles such as jumps to one side to ensure the entire arena is levelled.

The surface can be disturbed the most where the horse has been jumping and turning so it's vital the jump areas are graded.

### STAGE 3: SECONDARY GRADING

The second grading operation should be conducted in the same way as the Primary operation, only this time grade at 45 degrees to the grading in stage 2. (See figure 1)

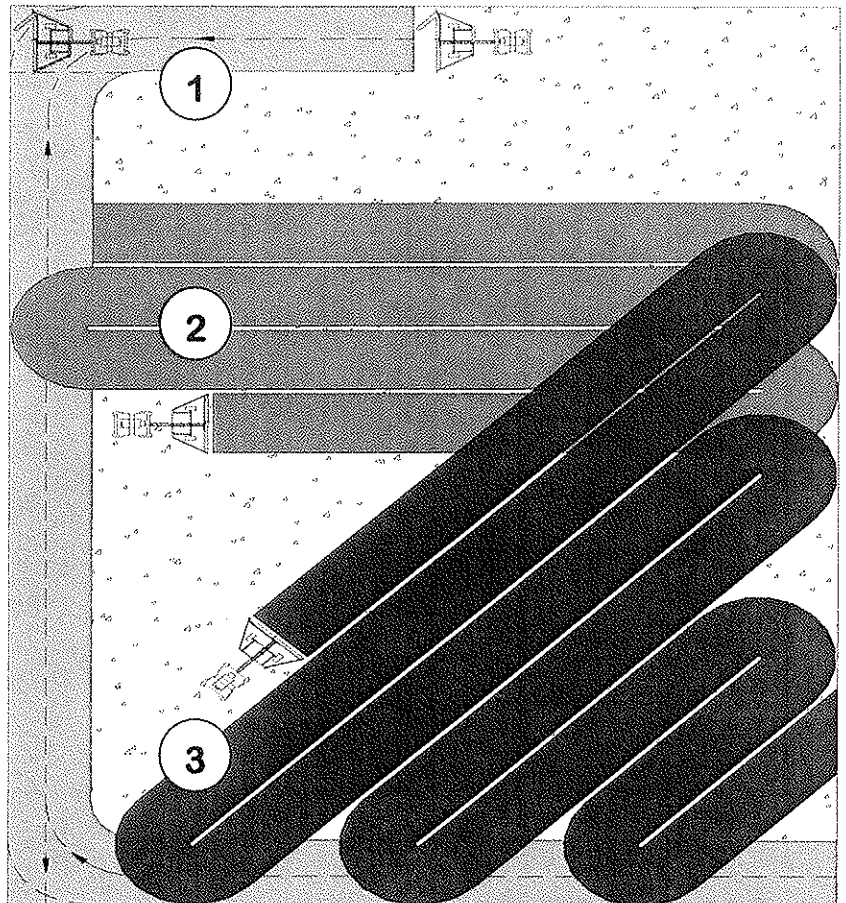


Figure 1: 3-Stage grading technique

**SERVICE SCHEDULE**

	DAILY	WEEKLY	MONTHLY
Check tyre pressures	●	●	●
Check condition of tyres	●	●	●
Visual check to ensure nothings loose	●	●	●
Check wheel nuts	●	●	●
Oil the Hitch and check for wear		●	●
Check perimeter plough buffer			●
Grease the rear perimeter door			●
Check spring tine wear			●
Check front Crossboard wear			●

**9.1 - TYRE / PRESSURES:**

Tyre pressure for: **CARLISLE AT 20 X 7 - 8 (Min 4 Psi Max 10 Psi)**



**DO NOT** exceed recommended tyre pressures.

**NB:** For grading horse ménages/arenas a pressure of 4-5Psi is recommended to give the tyres more flex and low ground pressure characteristics, this will enable a smoother ride for the grader over of the bumps and produce a better grading surface

1. Remember that temperature affects pressures: in cold weather, the pressure needs to be higher than in higher temperatures.
2. Never adjust the pressure immediately after driving, because driving heats up the tyres.

There are many individual causes of tyre troubles. However, the three abuses which will cause most problems, and the greatest costs, are under-inflation, overloading and speeding. When you check the tyre pressures also look for bumps, bulges in the side of the tyre or tread. Check the tyres for cuts, slits or cracks, nails or foreign objects embedded in the side of the tyre or tread. Check the tread for excess wear. Replace or repair any defect or fault with tyres before use.

**9.2 - SWIVEL HITCH COUPLING:**

Check coupling for signs of damage or wear, swivel the coupling 360 degrees and check that the bushes aren't too worn. Replace any worn or damaged parts.  
Oil the coupling; follow the diagrams on the hitch to ensure oil is applied correctly.

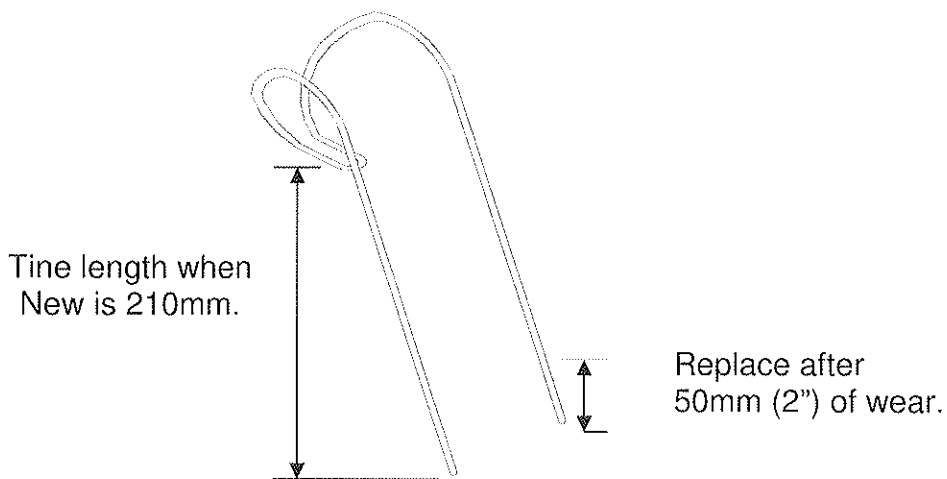
### 9.3 - PERIMETER PLOUGH BUFFER WEAR

Check the buffer by making sure the leading edge is still sticking out past the grader frame work. If the buffer has worn level, or worn past level with the frame work replace it. The buffer is to prevent damage to the outer boards on your arena; failure to replace a worn buffer could result in damage to the boards.

### 9.4 – SPRINGTINE WEAR / REPLACEMENT

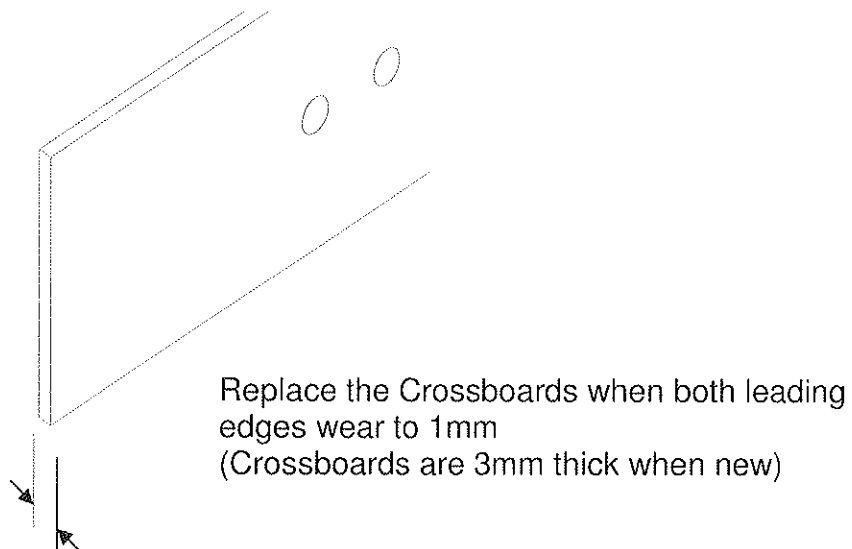
The springtines should be replaced if they are broken or damaged and should always be replaced with a Logic tine. (The tines are designed especially to suit this grader)

If the tines are worn replace them. Replace them when they start to become ineffective. Replace the tines immediately if 50mm or more has worn away.



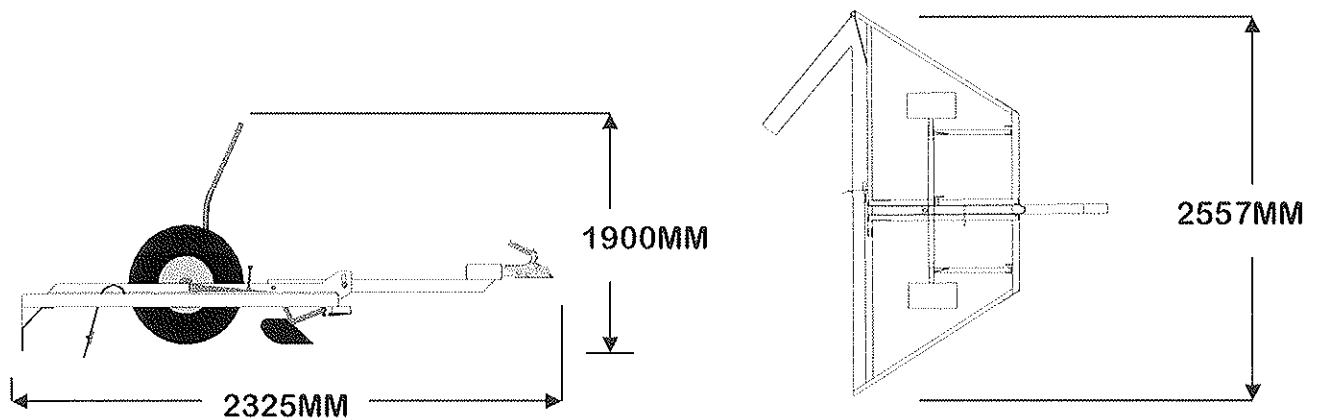
### 9.5 – CROSSBOARD

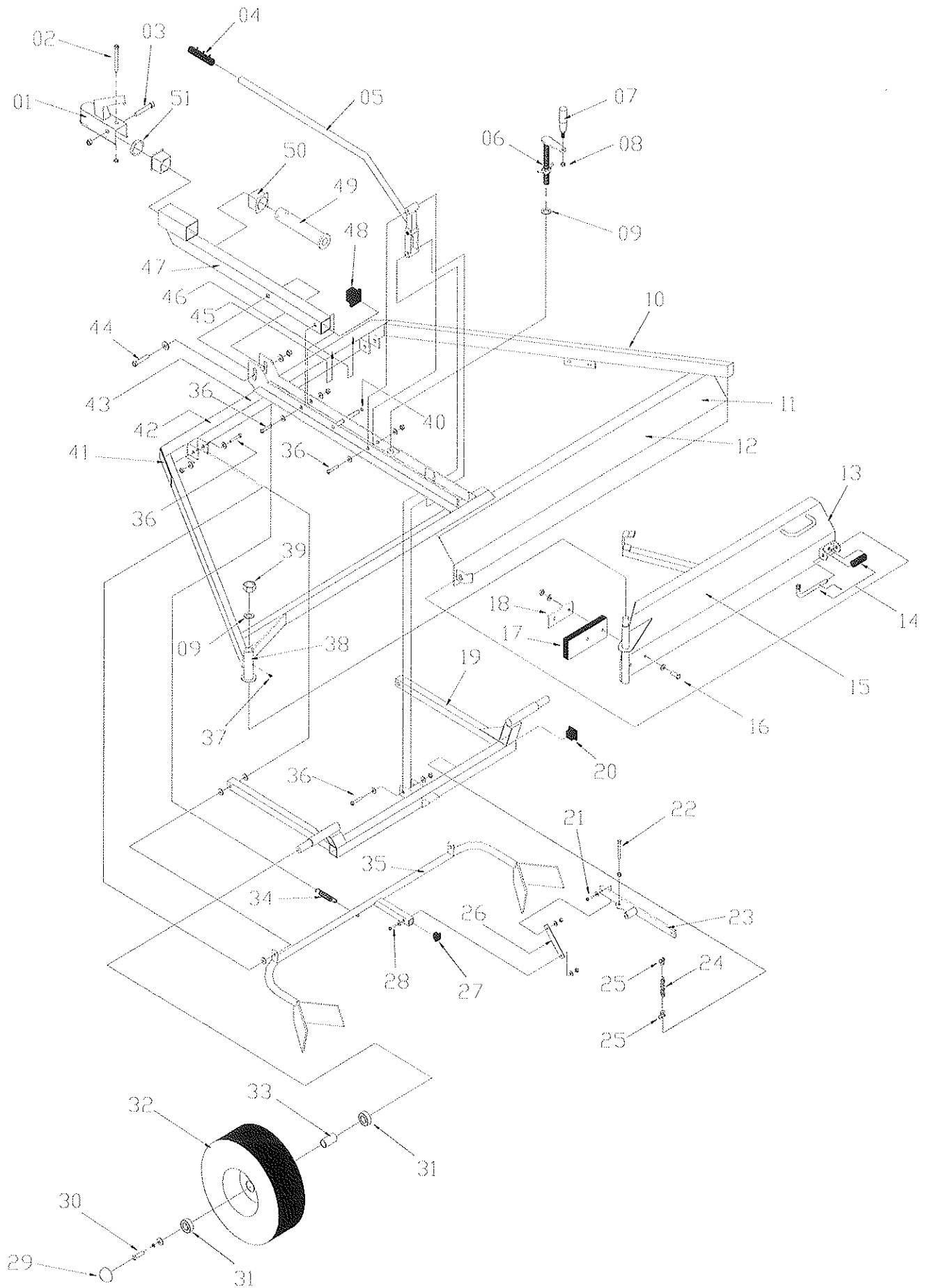
Turn the crossboards upside down when the bottom edge wears to 1mm thick. Replace the front crossboards and mountings after they have been rotated and both leading edges have worn to 1mm thick, or if the crossboards are bent or damaged in anyway.



	PG251	PG250	PG250T
Max machine width	2557MM		
Max machine Height	1900MM		
Max machine length	2325MM		
Max working width	2.5 metres (8' 2")		
Weight	*	*	*
Hitch:			
Type	50mm swivel ball hitch		
Height range	*		
Drawbar	Adjustable and reversible to suit different hitch heights		
Raise / Lower	Manual lift		
Wheel / Tyres	Carlisle AT 20 x 7 – 8 ( 4-10 Psi )		
Max speed	10mph		
Working depth	Stepless depth control dependent on surface to be graded and depth of wheel track leveller plough		
Rear blade	Standard feature		
Perimeter plough	Standard feature c/w Quick release catch		
Perimeter plough buffer	Standard feature		
Wheel track leveller		Adjustable working depth	
Springtines:			
Diameter of tine		8 mm	
Tine spacing		150 mm	
Number of tines		8	
Crossboards:			
Number per machine		2	
Max working depth		25 mm max	

## DIMENSIONS: (Maximum)





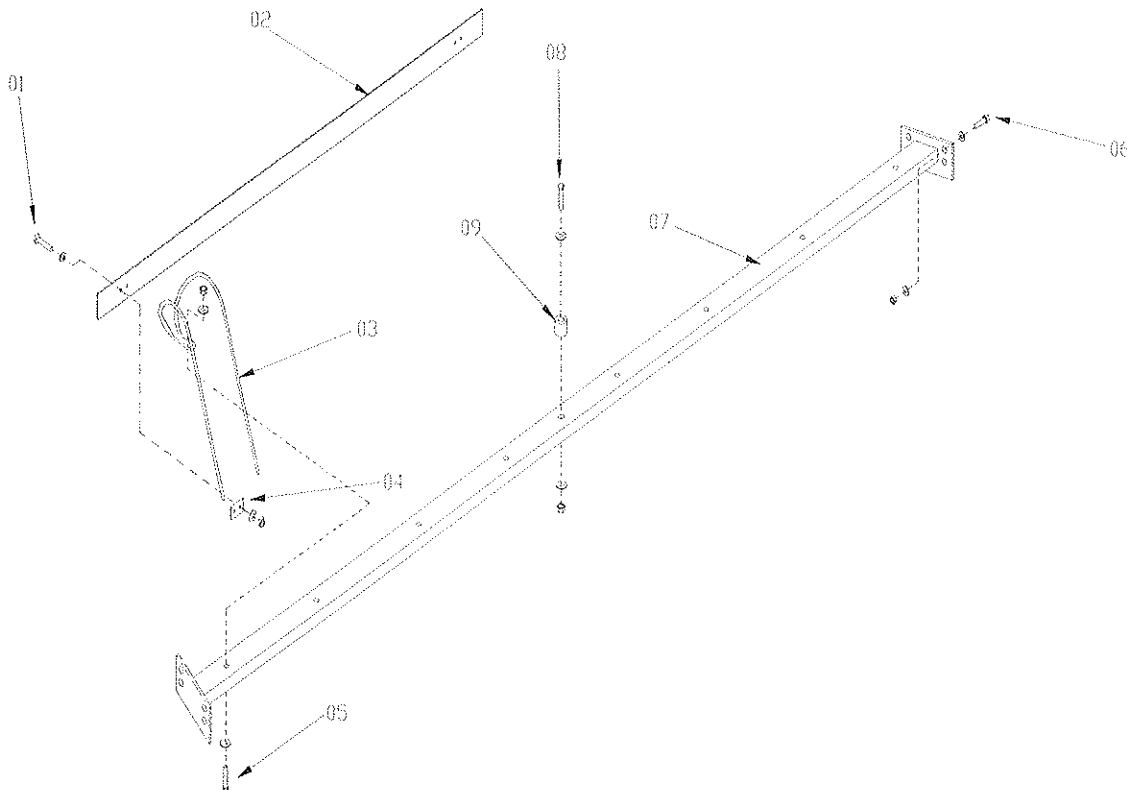
## PARTS LIST (MAIN FRAME)

Item	Part Number	Description
01	C900	Coupling 50 mm H/D Winterhoff
02	FBH12065,FNN12	Bolt M12 x 65, Nyloc Nut
03	FBH12070,FNN12	Bolt M12 x 70, Nyloc Nut
04	S201-30	Handle Grip
05	PG251-31A	Lifting Handle Assembly
06	PG251-23A	Height Adjuster Assembly
07	MSU-H001	Handle Revolving M12
08	FNN12	Nut Nyloc M12
09	FWF20	Washer Flat M20
10	PG251-01A	Main Frame Assembly
11	WS144	Sticker: PG250
12	WS01	Sticker: Logic – 240 x 75 MM
13	PG251-02A	Plough Assembly
14	MSU-S006	Spring Bolt Kit
15	WS145	Sticker: Pro - Grade
16	FBH10055,FWF10,FNN10	Bolt M10 x 55, Flat Washers, Nyloc Nut
17	SG251-49	Buffer Rubber
18	PG251-38	Buffer Rubber Clamp Plate
19	PG251-22A	Axle Assembly
20	FIP040040	Insert Plastic 40 x 40 x 26 – 4 MM
21	FSH08030,FWF08,FNN08	S/Screw M8 x 30, Flat Washers, Nyloc Nut
22	FSH12080,FNP12	S/Screw M12 x 80, Plain Nut
23	PG252-06A	W/Track Lift Lever Assembly
24	PG252-08	W/Track Lift Lever Chain
25	FSX06	Shackle D Galv 06 MM
26	PG252-05	W/Track Lift Lever Link
27	FIP025025	Insert Plastic 25 x 25 x 2 – 32 MM
28	FBH08045,FWF08,FNN08	Bolt M8 x 45, Flat Washers, Nyloc Nut
29	MF120-1054	Hub Cap 52 MM Press Fit
30	FSH10025,FWS10, FWR10030	S/Screw M10 x 25, Spring Washer, Repair Washer
31	MF120-1048	Inner/Outer Wheel Bearing
32	WT210	WL/TY 20 x 700-8 Cslc/Max 4 – W140
33	MF120-1063	Wheel Bearing Spacer
34	HS201-29	Tension Spring 56 x 18 MM
35	PG252-04A	W/Track Leveller Assembly
36	FBH12080,FWF12,FNN12	Bolt M12 x 80, Flat Washers, Nyloc Nut
37	S216-070	Grease Nipple – Straight 6 MM
38	WS118	Sticker: Grease Symbol
39	FNN20	Nut Nyloc M20
40	FCE12ZP	Circlip External 12 MM No Groove

**PARTS LIST CONT/: (MAIN FRAME)**

Item	Part Number	Description
41	WS03	Sticker: Logic – 80 x 25 MM
42	WS64	Sticker: Serno/Plate 2 x 3/4
43	WS36	Sticker: Design Right
44	FBH16090,FWF16,FNN16	Bolt M16 x 90, Flat Washers, Nyloc Nut
45	WS68	Sticker: Read Operators Manual
46	WP05,FRP03010	Manufactures Plate Universal, Rivet Pop 1/8 x 3/8
47	PG251-37A	Drawbar Assembly
48	FIP050050	Insert Plastic 50 x 50 x 32 – 5 MM
49	CM100-04	Swivel Hitch Draw tube
50	CM100-03A	Swivel Hitch Nylon Bush
51	CM100-01A	Swivel Hitch Thrust Washer

**PARTS DIAGRAM / LIST (PG253 TINEBAR)**



Item	Part Number	Description
01	FSH06025,FWF06,FNN06	S/Screw M6 X 25, Flat Washers, Nyloc Nut
02	PG253-04A	Crossboard
03	PG253-01	Spring Tine 210 MM Long 8 MM Dia
04	PG253-05	Crossboard Bar Clamp Plate
05	FBH10050,FWR10030,FWF10,FNN10	Bolt M10 X 50, Washer Repair M10 X 30, Flat Washers, Nyloc Nut
06	FSH12035,FWF12,FNN12	S/Screw M12 X 35, Flat Washers, Nyloc Nut
07	PG253-02A	Tine bar Assembly
08	FBH12065,FWF12,FNN12	Bolt M12 X 65, Flat Washers, Nyloc Nut
09	PG253-07	Tine Bar Packer

This Logic Manufacturing product is guaranteed against faulty workmanship and materials for a period of 6 months from the date of purchase.

On Engine-Powered equipment, the engine manufactures guarantee will apply, any claims being subject to their terms and conditions.

All claims must be made in writing within 28 days of the alleged failure.

All claims must be made through the dealer who originally supplied the machine.

Any defective parts must be kept for inspection and if requested, sent to the factory or dealer.

The customer must bring equipment for repair to the dealer.

This guarantee becomes void if unauthorised modifications have been made, or if parts not manufactured, supplied or approved by Logic Manufacturing have been fitted to the machine.

We accept no liability for normal wear and tear, misuse or abuse, or where recommended maintenance has not been carried out.

All guarantee work must be authorised by Logic manufacturing prior to any work being done. Work carried out without our consent may not be reimbursed.





**DECLARATION OF CONFORMITY**  
**93 / 44 EEC**

**LOGIC MANUFACTURING LTD**

Foundry Industrial Estate  
Bridge End  
HEXHAM  
Northumberland

Product Type: **PG250 – PRO-GRADE RANGE**

Covered By Technical File Number: **CE - PG250**

Serial Number:

Standards and Regulations Used:

**The Supply of Machinery (Safety) Regulations 1992**  
**HSE Guide Lines on ATV Equipment (Agric Sheet No. 11)**

Place of Issue: **United Kingdom**

Name of Authorised Representative: **P. G. RIDLEY**

Position of Authorised Representative: **RESEARCH & DEVELOPMENT MANAGER**

Declaration,

I declare that as the authorised representative, the above information in relation to the Supply / manufacture of this product, is in conformity with the stated standards and other related documents following the provisions of 93/68EEC directives

Signature of Authorised Representative

Date: **31/01/07**