EARTHQUAKER

OPERATORS MANUAL AND PARTS LIST



AITCHISON INDUSTRIES 41 Kelvin Grove Rd, P O Box 5056 PALMERSTON NORTH, 4414 Phone: (06) 357 9323 Fax: (06) 354 3155 www.reeseagri.co.nz E-mail: reese@reese.co.nz

CONTENTS

TO THE OWNER AND OPERATOR	4 4
TECHNICAL SPECIFICATIONS	5
UNDERSTANDING THE PURPOSE OF THIS MACHINE	6 7 7
 SETTING UP THE EARTHQUAKER FOR USE. 1. SETTING THE DEPTH OF THE TINE AND THE POSITION ON THE TRACTOR 2. TRACTOR HYDRAULICS MUST BE SET ON "FLOAT"	8 9 9 10
EARTHQUAKER WITH FRONT MOUNTED DEPTH WHEEL "DIVING IN" TO RISING GROUND	11 11
EARTHQUAKER FITTED WITH "TRICKLE" SEEDER	13
GENERAL MAINTENANCE DIGGING POINT. HARD FACING THE LEG AND POINT. LEG. POINT. THE SHEARBOLT. NUTS AND BOLTS GREASING.	14 14 14 15 15 17
PARTS LISTINGS	18
EARTHQUAKER FRAME ASSEMBLY	18 20

TO THE OWNER AND OPERATOR

Your Aitchison Earthquaker was carefully designed and manufactured to give you years of dependable service. To keep is running efficiently, read and follow the instructions in this operator's manual. Any questions you may have that are not covered in this manual should be referred to your dealer:-

Dealers Name:	
Address:	

Phone No.: Business:	Private:
Date of Purchase:	
Model:	Serial No:

The warranty card for your Earthquaker is included with this manual. Please ensure that the registration card is correctly filled in.

The owner must ensure that the dealer, upon delivery of the machine has completed the **WARRANTY REGISTRATION CARD**. This must be signed by the owner and returned to the factory promptly.

Failure to carry out this could nullify warranty claim opportunities against the factory in the future.

Warranty claims will only be accepted for registered products. When ordering spare parts, quote the model and serial number of the drill and use the Aitchison part number in the parts section of this manual. Reference to the right hand and left hand is taken behind the drill looking in the direction of travel.

SAFETY FIRST

All agricultural implements must be treated with respect. When working under the implement, always ensure that the implement is placed on the ground or is on an immovable stand if tines are to be removed.

It is best to ensure that two people are engaged in taking tines on and off the machine and safety boots should always be worn at all times as heavy tines and discs can cause grievous injury should it fall on someone's foot.

Do not ride on the implement when the machine is in operation or being transported.

Tighten all nuts and bolts after initial use.

TECHNICAL SPECIFICATIONS

Earthquaker Model	ST6	ST8
Frame		
Frame Width	1.83m (6ft)	2.44m (8ft)
Frame Length	1.10m	1.10m
Frame Weight	184kg	235kg
Roller		
Frame Width Including Roller	2.22m	2.90m
Frame Length Including Roller	2.27m	1.85m
Roller Weight	207kg	265kg
Tine & Disc Coulter		
No of Tines and Discs	3-4-5	5-7
Tine & Disc Weight	50kg each	50kg each
Disc Coulter	350mm (14")	350mm (14")
Accessories		
Depth Wheels	Optional	Optional
Trickle Seeder	Optional	Optional

UNDERSTANDING THE PURPOSE OF THIS MACHINE

The Earthquaker soil aerator is a purpose-built implement for <u>improving soil</u> <u>structure.</u>

The earth's soil is a wondrous compound created from the breakdown of heavier inorganic substances like rock, sand, ash and dust and organic matter like decayed wood, leaves, root, animals etc. It forms a living entity with a multitude of micro-organisms that play a vital part in hosting a partnership with plants to provide minerals and nutrients essential to good plant and atmospheric health.

Soil Types Machinery On Wet Fields Wet Fields

WHAT CAUSES A SOIL PAN TO FORM?

naturally. Heavy rain will leach minerals into impermeable zones (like ironstone) and modern farming practices are guaranteed to create pans due to passage of heavy farm vehicles, animal treading and/or too much cultivation.

An improvement in soil health will lead to an improvement in performance for plant and beast alike.

EARTHQUAKER will provide this tonic by fracturing the soils at a shallow depth allowing the entry of air into the natural root zone for plants. Air (at up to 25% of soil volume) and particularly oxygen activates the plant roots growth and stimulates exploration. A more friable soil encourages a temperature change and this in turn assists a microbial activity on minerals and organic compounds to produce humic acid, the substance most beneficial for soil nitrogen fixation. Nitrogen of course is the plants health tonic and plant vigor is often evident soon after aeration.

Look at the results of this scientific trail carried out on dairy pasture.

Effect of Soil A Total herbage accur	Aeration on Past nulation betwee	ture Production n grazing (kg D	<u>m/ha)</u>	
	CONTROL	AERATED	GAIN	
June 1997 - June 1998	9300	11760	2460	
July 1998 - July 1999	6970	8310	1340	
July 1999 - June 2000	7240	8420	1180	

The result is most effective in the first year and probably proves the fact that aeration every- 3 years is about right.

EARTHQUAKING THE SOIL TO PREVENT WATER LOGGING, PONDING ETC

Compacted soils effectively seal off the natural movement of rainwater into the subsoil strata and then away to the natural auriferous zones within the earths surface. Water lying in fields is an indication of compacted soil pans. A pass over the field with the Earthquaker results in crackage to the pans and allows surface drainage.

TIMING FOR AERATION

Aeration should be carefully planned well in advance. Sub surface tillage with Earthquaker can work against you is used at the <u>WRONG</u> time. Don't for instance aerate in the spring and then go into a hot dry summer. The aeration process has loosened and dried the soil. This is the last thing you want in hot weather.

Don't aerate with the Earthquaker when you are going into wet weather when you know that heavy grazing animals are going to be used in the field soon after aeration. The soil will be soft (and wet) and animals will soon pug it.

Go for autumn – for the following reasons;

- The field will be dry on top giving good traction for the tractor.
- The field will be going into a fallow period with farm animals in the barn or feedlot.
- Come spring it will be "settled down" and able to be grazed.
- Use the Earthquaker as a soil warmer. If soils should freeze in winter an aerated soil will have more crackages for entry of air and water. During the spring thaw, aerated soil will warm quicker than no-aerated soil leading to earlier pasture or crop re-growth. Also, fluctuations in winter temperatures can create a phenomenon call "Freeze thaw cycling" which acts to keep soils from re-compacting and aids in relation of subsurface moisture for future plant use. Soils that have been subjected to this process are better able to aid moisture transfer upwards to plants during hot summer weather.

SETTING UP THE EARTHQUAKER FOR USE

1. Setting the depth of the tine and the position on the tractor

The spacing of the tines on the frame depends on the soil type and conditions. Use these values as a guide.

<u>Soil Type</u>	Tine Spacing
Wet Clay	350mm spacing
Dry Clay	400mm spacing
Loam Soils	400mm spacing
Peat Soils	400mm spacing

The idea is to test the drill in the conditions. Pull the Earthquaker and then take a spade and see if the space between has been fully broken out.



NOT RIGHT - Bring The Tines Closer Together



CORRECT Ok To Use

The soil must be broken between the tines so that the complete section of turf can be "lifted" in one piece.

The idea is to see the soil lifted evenly so that when the roller rolls over the lifted soil it gives a lifted but total flat appearance.

2. Tractor Hydraulics MUST Be Set On "FLOAT"

It is important that the tractor hydraulics are set on float. Failure to do this may cause damage to the Earthquaker.



3. Discs Must Be In Line With The Tines

Discs must be in line with the legs. Loosening the bolt on the yoke stem support makes these adjustments. Rotate the stem to ensure that the disc comes into line with the leg. The height of the disc is set in the same way.



4. Consideration For Conditions

It is important that the tractor wheels not be allowed to slip when operating the Earthquaker. If the tractor will not pull the Earthquaker at a 300mm depth then raise the tine and operate at a lower depth or remove a tine and reposition the remaining ones.



Incorrect setting or insufficient HP can lead to tractor tyre turf damage.

EARTHQUAKER WITH FRONT MOUNTED DEPTH WHEEL



For trouble free usage of the Earthquaker and where inexperienced operators might be using the Earthquaker it's a good idea to fit the **FRONT MOUNTED DEPTH WHEEL**.

This wheel effectively sets the depth at the front of the implement while the rear roller sets the depth at the back of the implement. It protects the Earthquaker against excess down pressure created by incorrectly set Draft Control (Should be on a float), and from diving in to rising ground (see below).

"DIVING IN" RISING GROUND

If ground conditions are uneven and situations arise where small humps will cause the disc "dive in" thus burying the disc and yoke and causing excessive stress on the disc post and disc stem component. (Sometimes these could even bend or break).



Earthquaker Frame Digging In.



Earthquaker Frame Following The Terrain

EARTHQUAKER FITTED WITH "TRICKLE" SEEDER

The Trickle Seeder is designed to broadcast pasture seeds along the damaged "cut" made by the passage of the tines.

Seeding rates are set by adjustment of a bottom-opening slide on the hopper. This aperture has a "wire" that when it moves about during the movement of the Earthquaker through the soil their wires act to "trickle" seeds out through the aperture opening. It's not totally accurate but acceptable for general distribution of pasture seeds. No calibration chart is supplied, and it is a matter of trial and error until a suitable feed rate is achieved.



GENERAL MAINTENANCE

DIGGING POINT

The digging point should be sharp



HARD FACING THE LEG AND POINT

<u>LEG</u>

- 1. Grind a 2mm flat on the leading edge of the leg.
- 2. Grind any paint off the area where the hard facing will go.
- 3. Hard face the leading edge and the bevel edges.
- 4. Hard face the sides of the leg as shown in the diagram.



<u>POINT</u>

- 1. Grind the paint off the underside of the toe.
- 2. Hard face the bottom of the toe as shown in the diagram



Hard Facing Material:

Consumable Type: Consumable Group: Specifications: Hardness: GMAW Electrode Surfacing AS2576 600 Brinnel

THE SHEARBOLT

The Shear bolt on the tine leg is designed to break when the shock loading on the tine point exceeds 20 tonne.

We have available a 20mm bolt of Class 8.8 tensile strength.



This bolt gives a shear strength that protects the frame, legs, castings from damage should an immovable underground object be encountered.

ALWAYS USE THIS SHEARBOLT - NOT OTHERS

ALWAYS HAVE A FEW ON HAND AS SPARES



NUTS AND BOLTS

It is important that all nuts and bolts are kept tight. Allowing bolts to come loose can cause damage to the Earthquaker. Bolts should be checked regularly from new.

GREASING

Greasing points are labeled on the Earthquaker with the "Grease" sticker (shown above). The greasing points are shown in the following list. It is important that all points are greased regularly. Roller arm ratchet threads should also be kept corrosion free by lubricating.

Machine Grease Points:

No of Nipples	
---------------	--

Grease

every

Disc Yoke Disc Bolt Depth Wheel Roller Bearings 1 per Pod 1 per Pod 1 per Wheel 2 Nipples

20 Hours 10 Hours 10 Hours 20 Hours



Grease Points on the disc Coulter



PARTS LISTINGS

EARTHQUAKER FRAME ASSEMBLY

Ref No.	Part No.	Description
1	101011	JT122 Earthquaker Frame
2	432085	7/16" Lynch Pin
3	100004	AIL Category 2 Hand Pin
4	101028	Roller Mount
5	541013	M16 Spring Washer
6	515017	M16 x 50 Bolt & Nut
7	250155	B76 Top Link Pin
8	490007	Top Link
9	101012	Right Hand Roller Arm
10	542013	M16 Flat Washer
11	101027	Axle Washer (50 x 12.5 x 5)
12	514007	M12 x 30 Bolt
13	101013	JT122 Roller
14	541086	F208 Bearing Block
	421087	UC208 Bearing
15	541010	M12 Spring Washer
16	542011	M12 Fender Washer
17	514017	M12 x 40 Bolt & Nut
18	101014	JT122 Roller Scraper
19	101015	JT184 Earthquaker Frame
20	101016	JT184 Roller
21	101017	JT184 Roller Scraper
22	101018	Right Hand Depth Wheel Mount
	101019	Left Hand Depth Wheel Mount
23	101020	Depth Wheel Axle
24	422001	30 x 52 x 8 Oil Seal
25	421056	6005 RSR Bearing
26	101021	Bearing Spacer
27	101022	Depth Wheel Hub
28	101023	Axle Washer (32 x 16.5 x 5)
29	539504	M16 Nyloc Nut
30	101024	Dust Cap
31	101025	14" Depth Wheel
32	539702	7/16" UNF Hub Nut
33	101026	Left Hand Roller Arm
34	484016	6mm Tap in Grease Nipple



EARTHQUAKER TINE AND DISC COULTER

Ref No.	Part No.	Description
1	517041	M24 x 90 Bolt & Nut
2	515007	M16 x 40 Bolt & Nut
3	541013	M16 Spring Washer
4	541019	M24 Spring Washer
5	101000	Disc Post Clamp (Left Hand)
	101010	Disc Post Clamp (Right Hand)
6	517052	M24 x 110 ZP Bolt & Nut (8.8HT)
7	101006	M20 x 110 ZP Bolt & Nut (12mm Hole,
8.8HT)		Υ ·
8	310030	Tine Clamp
9	310031	Tine Clamp Plate
10	541016	M20 Spring Washer
11	212600	16mm Bisalloy Straight Leg
	101007	16mm Bisalloy Straight Leg Hard Faced
12	252000	Disc Post
13	252079	Disc Yoke
14	310052	Тое
15	542905	6 x 50 Roll Pin
16	212632	Wing Tab
17	310054	Body
18	514041	M12 x 65 Bolt & Nut
19	101001	Wing
20	512032	M10 x 65 Coach Bolt
21	541004	M10 Flat Washer
22	484014	M6 Tap in Grease Nipple
23	101002	Axle Bolt
24	542930	M10 x 60 Roll Pin
25	422034	Double Lip Oil Seal (2" x 13/8" x 3/8")
26	101003	Disc Hub Spacer (Outer)
27	421074	BEARING - Taper Roller & Housing
28	513002	M10 x 20 Bolt & Nut
29	101005	Disc Hub
30	541007	M10 Spring Washer
31	360001	14" Disc
32	101004	Disc Hub Spacer (Inner)
33	541826	1" Spring Washer



EARTHQUAKER

Ref No.	Part No.	Description
1	490010	Clamp
2	310032	Disc Post Clamp
3	517041	Main Clamp Bolt & Nut M24 x 90
4	518076	Set Screw 1⁄2" x 1 1⁄2"
5	541019	Washer Spring M24
6	541013	Washer Spring M20
7	310032	Yoke Clamp Plate
8	515041	Yoke Clamp Bolt & Nut M16 x 75
9	252000	Disc Post
10	542930	Roll Pin M10 x 60
11	484014	6mm Grease Nipple
12	252079	Disc Yoke
13	541016	Washer Spring M20
14	210960	Disc Support Plate
15	484014	6mm Grease Nipple
16	360001	Disc 14"
17	210961	Disc Coulter Support Casting
18	422508	Bronze Bush 30 x 20 x 50
19	511011	Screws 6 x 20
20	516051	Axle Bolt 20 x 100
21		
22	517046	Clamp Bolt M24 x 100
23	310030	Tine Clamp
24	514074	Shear Bolt M12 x 110 (10.9 HT)
25	310060	Parabolic Leg
26	310031	Tine Clamp Plate
27	212598	Shear Bolt Bush
28	212632	Wing Tab
29	310054	Body
30	514041	Bolt & Nut M12 x 65
31	310053	Wing
32	542905	Roll Pin M6 x 50
33	310052	Тое
34	512032	Coach Bolt 10 x 65
35	541004	Washer M10
36	519009	Plough Bolt 7/16" x 2 ½"
37	470050	Chisel Plow Lo-Draft Point
38	310061	Blade Adaptor
39	470044	12mm Straight Leg EW45A
39A	212600	16mm Bisalloy Straight Leg
40	310033	Standard Point

