

Gillard Advanced Cutting Systems

Operating Instructions

Econo-Cut Rotary Cutting System

Issue 01/97/EC
Econo-Cut Cutting System

E n g l i s h

Operating Instructions

E c o n o - C u t R o t a r y C u t t e r s

Construction date

Serial No

Warning!

Ensure that all personnel involved in the installation, operation and maintenance of this machine, as well as those persons who will act as supervisory personnel for this listed above, have read and understood fully these instructions and those contained in the accompanying supplier's instruction manuals and instruction sheets, before attempting to install, operate or perform maintenance on this machine.

Should any questions arise regarding the safe and proper installation, operation or maintenance of this machine, contact the manufacturer at the address listed below before proceeding. No modifications or alterations are to be made to this product without the prior express written consent of Peter Gillard & Co Ltd.

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Warning!

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GENERAL INFORMATION

1 Introduction

Your machine has been carefully inspected, both mechanically and electrically, prior to shipment.

It should be free from scratches and in perfect mechanical and electrical order upon receipt. Check the machine for any physical damage, which may have occurred in transit.

If there is any indication of damage, inform us, so that we can take prompt action to remedy the problem.

If the machine appears to be in good condition proceed with the following instructions. Make sure to familiarise yourself with the power, safety and control requirements of the Econo-Cut before starting the machine.

2 General purpose and use of the machine

The Econo-Cut is an extrusion cutting system. It utilises a 'flying knife' action for cutting. By rotating an ultra-thin knife blade in an arc at high speed, the Econo-Cut can slice through extrudate with minimal product interruption.

A compressed air clutch/brake is used to control the operation of the blade. It ensures that the torque generated by the cutter motor is separated from the blade until a signal-to cut is given. In this way the Econo-Cut operates 'on-demand'.

All machines are tested and calibrated to give a repeat accuracy from signal-to-cut to knife penetrating the extrudate of 3 milliseconds (0.003 seconds). This figure should be maintained throughout the operating life of the Econo-Cut compressed air clutch/brake.

The type of accuracy achieved by your machine will depend upon a number of factors:

- Linespeed
- Material type
- Feeding method
- Length measuring system
- Blade/guide bush configuration

Your particular application will have been discussed prior to placing an order. If you feel that your machine is not achieving the performance specified please contact us.

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Introduction

When cut accuracy problems do occur, they are rarely due to the Econo-Cut itself. We have paid particular attention in these operating instructions to explaining the Influence of non-cutter factors on cut length accuracy.

If you have any problems please telephone us or fax us. We can usually solve a problem quickly, avoiding hours of frustration.

3 Products to be cut or handled

The Econo-Cut is designed to be used in an extrusion line, cutting flexible and rigid plastic and rubber extrusions. The maximum capacity of the machine varies according to the model. However, actual cutting capacity will depend upon product type and wall thickness.

4. Model numbers and specifications

This manual covers the following model numbers:

Econo-Cut EC-GP/50A	-	50mm Dia. 1.1 kw motor
Econo-Cut EC-GP/50B	-	50mm Dia. 1.5kw motor
Econo-Cut EC-HD/50C	-	50mm Dia. 2.2kw motor
Econo-Cut EC-HD/75C	-	75mm Dia. 2.2kw motor
Econo-Cut EC-HD/100C	-	100mm Dia. 2.2kw motor

6 STANDARDS TO WHICH THIS MACHINE COMPLIES

The machine is supplied in accordance with the Supply of Machinery (Safety) Regulations 1992 (EU Machinery Directive 89/392).

A CE mark will have been affixed to the machine to signify compliance with the above mentioned Directive. Either a Declaration of Conformity or a Declaration of Incorporation will have been completed and filed after this page.

The following European Standards have been applied to the machine design.

EN 292-1:1991	Safety of Machinery, - Basic Concepts - General Principles for Design, Part 1 Basic Terminology, Methodology.
EN 292-2:1991	Safety of Machinery - Basic Concepts - General Principles for Design, Part 2 Technical Principles and Specifications.
EN 294:1992	Safety of Machinery - Safety Distances to prevent danger zones being reached by the upper limbs.
EN 418:1992	Safety of Machinery - Emergency Stop equipment - functional aspects, Principles for design.
EN 60 204-1: 199	Electrical Equipment of Machines Part 1 - Specification for General Requirements.

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Deceleration of conformity

93/44/EU

Manufacturer's name:

Peter Gillard & Co Ltd

Product description:

Econo-Cut rotary cutter and infeeder

Declaration:

I declare, as the authorised representative, the above machinery is in conformity with the provisions of 93/44/EU Directives.

Name of authorised

representative:

Mr C.N. Gillard

Position of authorised

representative:

Director

Signature of authorised

representative:

Place: Tewkesbury
England

Date:

B SAFETY CONSIDERATIONS

Please refer to drawing No. 001 page 15. This shows the location of danger areas, guarding and emergency stop push button.

1. Hazards in case of non-compliance with safety guarding

UNDER NO CIRCUMSTANCES SHOULD GUARDING BE MODIFIED OR REMOVED. MODIFICATION OR REMOVAL OF GUARDING CAN RESULT IN THE FOLLOWING HAZARDS:

- 1.1 Loss of fingers, thumbs and severe cuts to hands, caused by rotation of knife blade.
- 1.2 Fatal electrical shock - Contact with 400 Volts **WILL KILL**

2 Safety conscious work practices

Cutting machines are potentially extremely dangerous. The knives used in the Econo-Cut are of the highest sharpness. They can easily cut through fingers, thumbs and cause severe cuts.

Although the Econo-Cut is fully safety protected, it is strongly recommended that the following additional safety guidelines be followed:

- 2.1 **Never** attempt to change cutter blades when the electrical supply is connected to the machine.

Always turn the isolator switch **off** before changing blades.

- 2.2 **Never** open the safety cutter guard or remove cutter bushes without first turning off the cutter motor.

For absolute safety it is recommended that the isolator switch be turned **off** to disconnect electrical supply.

- 2.3 **Never** use cutter bushes whose inner bore is considerably larger than the extrudate size being cut. **Always** match extrudate size to cutter bush bore.

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- 2.4 **Never** attempt to use fingers to remove cut pieces from the cutter bush bore.

The cutting action of the Econo-Cut could be engaged, causing the blade to rotate, slicing through whatever was in the bush bore.

Always use another object to clear the bore. Better a bent blade than a lost finger.

- 2.5 **Never** leave knife blades lying around where they could be used for purposes for which they were not intended.

Always keep your spare blades in a safe place and allow only trained personnel to change blades.

- 2.6 **Never** allow an unskilled operator to change blades, bushes or generally handle the Econo-Cut.

Always brief your staff, including part-timers, of the potential danger of the equipment.

Be Careful - Keep Your Fingers!

3 Safety protection

The Econo-Cut is fitted with a number of features designed to minimise the possibility of damage to either operators or the machine. Please refer to drawing number 001 (page 15) to illustrate the danger areas of the Econo-Cut. Please ensure that all staff have seen this and are aware of potential danger points.

3.1 Cutter Clam-shell guard (1)

The machine will not operate unless the clamshell guard covering the knife blade is in its down position.

3.2 Inlet and Outlet Guide Bushes (2 & 3)

Under no circumstances attempt to operate the machine without the inlet and outlet guide bushes in place.

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Safety Considerations

4. Noise emissions

This machine conforms to the following regulations:

The Supply of Machinery (Safety) Regulations 1992 (SI 1992/3073).

Equivalent continuous A weighted sound pressure level at workstations	70dB
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Peak C weighted instantaneous sound pressure level at workstations	94dB
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Sound power level emissions	less than 85dB
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5. Prohibition of non-authorized modifications.

No modification or alterations are to be made to this product without the prior express written consent of Peter Gillard & Co Ltd. Failure to do this will void all legal obligations from Peter Gillard & Co Ltd regarding this product.

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Safety Considerations

INSTALLATION

1. Weight and dimensions of machine

Weight	-	250Kgs unpacked
Dimensions	-	1180mm Long 820mm wide 1340mm high

2. Lifting and handling instructions

The Econo Cut should be lifted using a fork lift truck with a lifting capacity of at least 350 KGs. The forks should be introduced between the castors of the machine, equal distant around the centre-line (see drawing 0002 page 18).

THE ECONO-CUT WEIGHS 250 KGs. IF DROPPED IT MAY CAUSE SEVERE INJURY. TAKE CARE!

Although the Econo-Cut is equipped with castors, these should only be used to move over long distances if the floor is totally smooth and free from obstructions.

3 Unpacking instructions

- 3.1 Carefully check that all crating, packing and transportation strapping has been removed from the machine.
- 3.2 Check that all loose items have been removed from within the top cabinet and electrical cabinet of the Econo-Cut.
- 3.3 Unpack these items - what is supplied is dependent upon individual customer's requirements. As a minimum, 2 knife blades, .46mm/8.6mm thick, a selection of fuses 1 rotary shaft encoder, measuring wheel and encoder support bracket will have been supplied.

4 Cutter location

The Econo-Cut machine is designed to be operated in an extrusion line. The optimum location of the cutter in the line will depend to a large extent on which type of extrudate is being produced. For Flexible materials, the inlet guide bush should be as close as possible to the discharge point of the caterpillar infeeders/haul-off.

For rigid materials, the cutter may need to be located some distance from the caterpillar to allow the extrudate to flex as each cut occurs

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Installation

Some degree of trial and error may be required to obtain the ideal cutter location for your particular extrudate.

Once the correct distance between the cutter and caterpillar has been established, position the cutter so that the vertical centre-line through the guide bushes is absolutely in-line with the vertical centre-line of the extrusion line.

Fix the cutter in place by lifting the casters approximately 10mm off the floor using the floor jacks (5) provided. (see drawing 002 page 18). Adjust until the cutter is stable, with weight shared between each of the four jacks.

5 Encoder Position

The rotary shaft encoder provides the measured length signal, which activates the cutter. It is vital that the encoder is located in such a way so as to provide a steady, even length signal.

A support bracket is provided to enable the encoder to be installed so that the measure wheel is wary on the caterpillar belts (see drawing no 004 page 24).

The optimum position for locating the encoder is where the wheel is reading from the belt directly above the top drive roller of the caterpillar. If this is impossible, place it above a top-boom idler roller. Under no circumstances place it above an unsupported area of the belt. Always position the encoder on a flat part of the belt. Positioning the encoder on the radius will cause inaccurate measurement.

6 Electrical supply

A standard 400 Volt, three phase, 50Hz supply is required. A neutral and earth connection is also required.

If requested, your machine will have been supplied with a different electrical specification.

The electrical specification for your machine will be noted on the serial number plate. Please check this before connecting an electrical supply.

WE CANNOT BE HELD RESPONSIBLE FOR ANY DAMAGE CAUSED TO THE MACHINE BY BEING CONNECTED TO AN INCORRECT ELECTRICAL SUPPLY.

CHECK THE SUPPLY REQUIRED BEFORE MAKING A CONNECTION.

A suitably qualified electrician should undertake all electrical installations. See drawing 002 (page 18) for location of electrical cabinet (6)

It is important that the motor phase location is correct. Open the top cutter cabinet (4) so that the motor and drive belts are visible. Refer to drawing 002 (page 18) to ensure that the motor rotation is correct.

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Installation

7 Air supply

Factory compressed air supply 10 bar maximum. The machine has its own regulator. This should be set to 3.0 bar maximum. See drawing 002 (page 18) for the location of the connections (7).

The Econo-Cut can be operated from .5 bar to 3 bar. However, it is recommended that the pressure should be set to 3 bar. This will improve clutch/brake performance. Do not exceed 3 bar as this will not improve the performance of the machine and will only cause the clutch to lock up.

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D MACHINE CONTROLS AND THEIR FUNCTION

1 Control panel details

See control panel drawing 003 (page 23)

- 1.1 **Power on lamp (1).** (White) This illuminates when the electrical isolation switch located on the side of the machine has been turned on.
- 1.2 **Guard lamp (2).** (Blue) To enable the machine to run, this lamp must be illuminated. If it is not, check that the emergency stop button has been reset and that all guards are closed.
- 1.3 **Safety circuit reset button (4).** This resets the fail-safe guard circuit to enable the machine to operate. A blue lamp within the button illuminates when the button is pressed. If the lamp does not illuminate when pressed re-check from section 1.2.
- 1.4 **Emergency stop button (3).** When pressed the complete machine will stop immediately. The switch must be reset before operations can recommence.

This switch is only to be used in emergencies.
- 1.5 **Cut length counter (5).** Determines the cut length of product.
- 1.6 **Cutter start/stop button (6)** This starts and stops the cutter motor. A Yellow lamp below the button illuminates when the motor is on.
- 1.7 **Cut cycle selector switch (8).** This sets the clutch into either cut mode or brake mode (position 0). Position 1 is used to activate cutting, It can also be used as a test cut switch.
- 1.8 **Total Cuts counter (9).** Optional. When activated, this keeps a record of the total cuts produced.
- 1.9 **Total cuts on/off switch (10).** Optional. This starts/stops the total cuts counter

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Control panel

E OPERATION

1 Cutter start-up

- 1.1 Please familiarise yourself with all controls located on the main control panel (see section D and drawing no. 003 page 23).

Some of the controls fitted to your cutter may not be identified. This is because these controls concern optional extras or special functions. Separate instructions will explain their operation. See section G for details of these options.

- 1.2 Ensure that a factory compressed air supply has been connected to the inlet point located on the base of the machine. A maximum pressure of 10 bar should be connected.
- 1.3 A regulator is provided to control the air pressure into the cutter. This should be set to 3 bar maximum.

The Econo-Cut can be operated from .5 bar to 3 bar. However, it is recommended that the pressure should be set to 3 bar. This will improve clutch/brake performance. Do not exceed 3 bar as this will not improve the performance of the machine and will only cause the clutch to lock up.

- 1.4 Ensure that the electrical supply is **off** at the isolator switch and that the clutch switch (8) is at '0'.
- 1.5 Open the knife guards cover and check that a blade has not been fitted. If there is a blade fitted it is recommended that this be removed during initial start-up. This is achieved by removing the blade clamp bolt.

To assist in releasing the clamp bolt there is a Tommy bar hole in the hub.

Check that the cutter guide bushes are fitted.

- 1.6 Close the knife guards cover which has inlet and exit guards attached. The cutter will not run with this guard open.
- 1.7 Turn the electrical supply on at the isolator switch. The 'Power on' lamp (1) will illuminate.
- 1.8 When all guards and emergency stop switches are closed blue lamp (2) will illuminate.
- 1.10 Press the 'Safety circuit reset' illuminated push button (4). If the knife guard cover is closed, this lamp will now illuminate.

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The machine main motor will not run until the knife guard cover is closed and the emergency stop switch pulled out. The 'safety circuit reset' button can then be

pressed. If the lamp will not illuminate recheck that the guard is closed. See section B.2 for assistance.

- 1.11 Press the 'cutter start' push button (6). The cutter motor will start and the lamp will illuminate.
- 1.12 If this is the first time the machine has been connected to the power supply at this stage remove top cover and check rotation of motor and refer to drawing 002.(page 18)
- 1.12 Turn the 'cut cycle' selector switch (8) to position 'I'. It will spring back automatically to position 'II'

When the caterpillar is running, the cutter will cut automatically, producing cut lengths which are entered into by the length counter (5). To stop cutting, turn the 'cut cycle' selector switch (8) to position '0'.

To test the operation of the set length counter (5) it is necessary to enter a cut length. Any figure will do, but a convenient figure is 200mm. See section 2 below for details how to operate this counter.

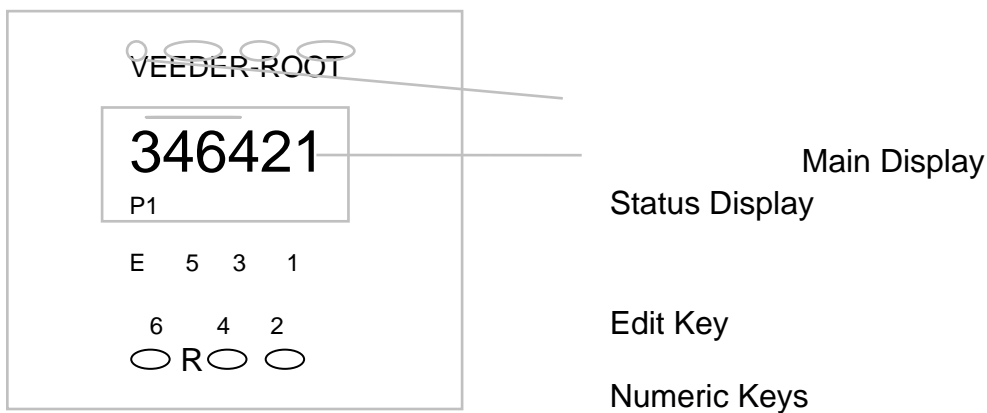
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2 How to operate the cut length counter Type Veeder Root C346

2.1 The display has a 6 digit LED display. The resolution of the counter represents one pulse per mm of product travel.

2.2 To set the counter cut length preset.

2.3 Front panel.



1. Main display indicates the present count as it counts up to the pre-set value
2. Status displays indicates pre-set 1 (P1), pre-set 2 (P2), prescale (Psc) program (Prg)
The status display has the following control
P1 - Cut Length
P2 - Batch Counter
Psc - Encoder Factor (factory set)
Prog - Program (factory set)
3. Edit key is used with numeric keys 1,2,3 to display pre-set 1, pre-set 2 and prescale value respectively
4. Numeric keys each increment there respective digit of the pre-set. When simultaneously pressed keys "6" an "4" act as a reset to zero

2.4 To change the pre-set value

2.5 The cut length pre-set is stored in pre-set 1. To select and display setting press "E" and "1" simultaneously once to show status "P1".

2.6 The display will now show the pre-set value. If a button is not pressed within 15 seconds the display will reset to the default screen.

Operation

2.7 The numeric keys can now be used to individually scroll each digit to the required value.

2.8 Press button "E" to confirm entry and counter will change back to default display.

2.8 To reset counter default screen to zero press button "6" and "4" simultaneously.

To change the batch pre-set value (option)

- 1) The batch pre-set value is stored in pre-set 1. (The cut length is stored in pre-set 2)
To select and display setting press "E" and "1" simultaneously twice to show status "P1".
- 2) The display will now show the pre-set value. If a button is not pressed within 15 seconds the display will reset to the default screen.
- 3) The numeric keys can now be used to individually scroll each digit to the required value.
- 4) Press button "E" to confirm entry and counter will change back to default display. To reset batch counter screen to zero press button's "6" and "4" simultaneously.

3. Stopping the machine

3.1 To stop the machine when the cutter is running, turn the 'clutch stop/run selector' switch to '0' and press the cutter motor stop button (10).

3.2 To remove power from the machine, turn off the main isolator switch.

Once you have completed sections 1 to 3 move onto section F 'Setting up procedure'.

F SETTING UP PROCEDURE

- 1 Check that the machine is switched off at the mains isolator.
- 2 Fit a knife blade. Refer to diagrams 005A, 005B, and 006 (pages 30,31 and 32) attached. These diagrams show the 3 main types of blades that will have been supplied with your machine (please note: the razor and chip blade holders are options). Follow the instructions below for information on fitting the blades and holders.

TAKE CARE! BEFORE CONTINUING MAKE SURE YOU HAVE READ SECTION B, SAFETY CONSIDERATIONS, IN THIS MANUAL.

BLADES ARE DANGEROUS - KEEP YOUR FINGERS!

- 2.1 Remove the blade cap clamp bolt. To assist in releasing the bolt there is a Tommy bar hole in the hub.
- 2.2 Remove the blade cap. Rotate the knife shaft until the slot on the edge of the blade head is visible. This score line should be uppermost when you attach the blade.
- 2.3 For standard blades (not razor or chip blades) fit the clamp bolt through the cap and then through the hole in the knife blade. Then attach both blade and cap to the blade head.
- 2.4 For the razor and the chip blades, the blades must be fitted to the holder provided before the holder itself is attached to the blade head.

With the blade in the holder, fit the clamp bolt through the hole in the holder and attach to the blade head. The blade cap is not required for these types of blades.

It is essential that the blade is correctly located as shown in the diagrams

- 3 Select the correct cutter bushes to suit section or tube to be cut.
- 4 Insert the cutter bushes into the cutter block.
- 5 Rotate the blade by hand (take care) until it lies across the centre line of the bushes.
- 6 Slide the bushes in towards the blade until they are just in contact with it (see diagram 008 page 34).

It is recommended that the blade is allowed to just 'brush' the faces of the bushes.

It is vital that the clearance between the blade and the bushes is kept to an absolute minimum to prevent the extrudate - particularly flexibles - from being pushed down between the bushes by the blade. In addition, the bushes act as guides for the blade during the cutting sequence.

Setting Up

- 7 Tighten bush clamping bolts and check that the bushes have not moved.
- 8 Rotate blade by hand two or three times to ensure that it moves freely.
- 9 Close all guards. The machine will not operate until all guards are closed.
- 10 Switch on mains isolator.

Press the safety circuit reset button (4). Until this button is pressed and illuminated, the machine will not work.
- 11 Press main cutter motor start button (9).
- 12 Set the desired length into the cut length counter (5). See section E.2 details of how to enter a length.
- 13 Check that total cuts counter on-off switch (14) is in the off position. Zero the total cuts counter (13) by pressing reset button.
- 14 Pass the extrudate through the caterpillar infeed and the cutter bushes and set up line to produce extrudate to specification.
- 15 Once extrudate is passing smoothly rotate clutch brake rotary switch (11) from '0' to '1'. To initialise the clutch by performing a test cut by moving switch to position 11 and allowing it to spring return to position 1. The machine will not run in automatic until the test cut has been completed, this will cause the knife blade to operate once and then carry on in automatic mode on signal from the length counter.
- 16 Check cut length and adjust length setting accordingly (see section E.2 for details on how to adjust the counter).
- 17 Once the desired length is achieved switch on the total cuts indicator (14). (Optional)

ECONO-CUT OPTIONAL ITEMS

This section describes the optional items that may be fitted to your Econo-Cut machine.

Cutter options

- | | | |
|----|-----|---|
| 1. | A-1 | Blade lubrication |
| 2. | E-1 | Speed cut continuous rotation cutting |
| 3. | F-1 | Batch counter with buzzer |
| 4. | F-2 | Batch counter with beacon |
| 5. | F-3 | Automatic stop of infeeders at end of batch |
| 6. | F-3 | Total cuts counter |

1 Blade lubrication option A-1

- 1.1 When cutting cured or uncured rubber, silicone or latex rubber, or medical grade plastics, it has been found that cut quality can be vastly improved by lubricating the blade as it passes through the extrudate.

This has led to the development of our blade lubrication system for use with the Econo Cut.

- 1.2 The system consists of the following:

- 1.2.1 A fabricated aluminium cutter block with a stainless steel tank and lid.
- 1.2.2 The bottom half of the cutter block forms a chamber, into which a suitable lubricant should be poured. A drain is provided at the rear of the machine to allow easy removal of liquid after use.
- 1.2.3 The knife blade passes through the lubricant on every rotation. The speed of the knife is such that all excess lubricant is thrown off as it accelerates to cut the extrudate.

It has been found that the minimal amount of lubricant adhering to the surface of the blade is sufficient to allow clean cutting.

- 1.3 The type of lubrication recommended depends upon extrudate type:

3.1 Cured and uncured rubber

Either plain water or striate solution. A 2% solution of liquid soap may be added to plain water to act as a surface agent.

1.3.2 Medical extrusions

Due to the possibility of contamination, it is not recommended that normal mains water be used.

In its place one of the following is suggested:

- Spirit/alcohol, e.g. white spirit
- Distilled water
- Silicone based lubricant, e.g. Pentaerythritol Mono Oleate

A lubricant, which quickly evaporates from the cut face, is often the best choice.

1.3.3 In some cases a degree of trial-and-error may be required to determine the optimum lubricant.

2. Continuous Rotation E-1

2.1 This option is designed for cutting at very high-speed rates. The knife blade is continuously rotated at a speed between 400 and 1200 cuts/minute. A variable speed DC motor with Tachogenerator replaces the standard Econo-Cut A/C motor.

2.2 A ten-turn potentiometer and a digital LED cuts/minute indicator provide control. A change over switch allows either on-demand (clutch/brake) or continuous rotation operation to be selected.

2.3 Cut length is determined by the relationship between blade rotation speed and linespeed, e.g.

$$13.5 \text{ m/min linespeed divided by } 900 \text{ cuts minute}$$
$$13.5/900 = 0.015 \text{ metre (15mm) cut length}$$

2.4 Since linespeed is normally fixed, the operator must adjust the blade speed to achieve the cut length required. The cuts/minute indicator is provided to assist this function. The cut/minute indicator has a dual function of total cuts and rate and the display toggles between the two by pressing buttons marked "SEL".

2.5 It is recommended that the operator estimates the blade speed required using the above calculation. Check the actual cut length produced and trim the blade speed up or down to adjust.

2.6 When the selector switch is used to select on-demand operation, the cutter motor speed is automatically set to a fixed speed, which gives optimum performance in on-demand mode. When switching the continuous rotation mode, the motor will set itself to whatever speed has been set on the ten-turn potentiometer.

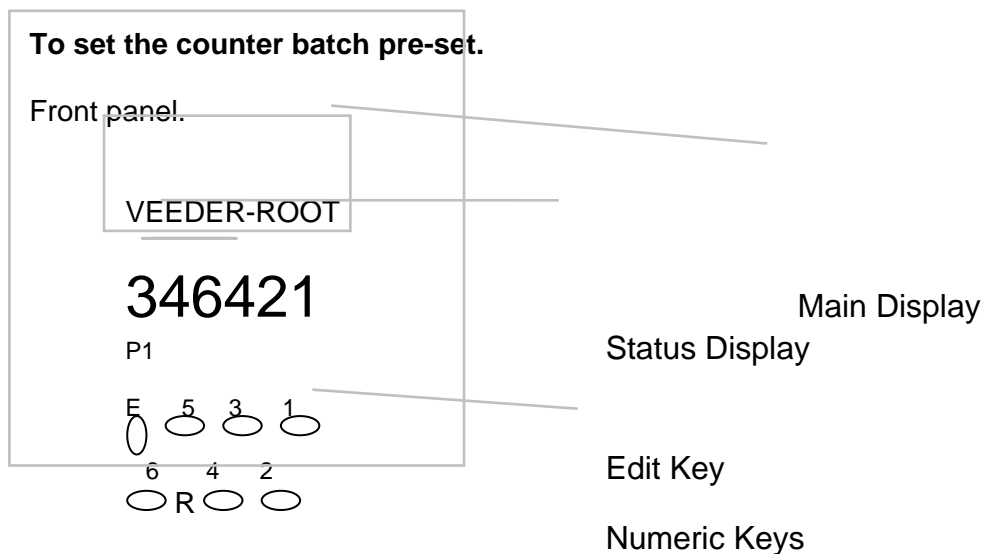
- 7 Because of this, it is strongly recommended that the potentiometer always be set to the estimated cut rate (see section G.2.5 above).

3 How to operate the batch counter Type Veeder Root C346

- 3.1 The display has a 6-digit LED display. The resolution of the counter represents one pulse per mm of product travel. On machines fitted with the batch counter option, the batch pre-set is stored in PR1 and the length pre-set is stored in PR2.

3.2 To set the counter batch pre-set.

3.3 Front panel.



1. Main display indicates the pre-set count as it counts up to the pre-set value
2. Status displays indicate pre-set 1 (P1), pre-set 2 (P2), pre-scale (Psc), program (Prg).
3. Edit key is used with numeric keys 1,2,3 to display pre-set 1, pre-set 2 and pre-scale value respectively
4. Numeric keys each increment there respective digit of the pre-set. When simultaneously pressed keys "6" and "4" act as a reset to zero

3.4 To change the batch pre-set value

- 3.5 The cut length pre-set is stored in pre-set 1. To select and display setting press "E" and "1" simultaneously twice.
- 3.6 The display will now show the pre-set value along with status displays "P1". If a button is not pressed within 15 seconds the display will not reset to the default screen.
- 3.7 The numeric keys can now be used to individually scroll each digit to the required value.

- 3.8 Press button “E” to confirm entry and counter will change back to default display.
- 3.9 To reset counter default screen to zero press button “6” and “4” simultaneously.
- 3.10 On coincidence of the pre-set number and the count number, a signal will be sent to a buzzer located on top of the electrical cabinet. This buzzer will emit a sound to warn the operator that the batch is complete. The sound will cease automatically after 3 seconds.
- 3.11 Adjusting the dipswitches inside the buzzer itself can control the buzzer tone. To access the dipswitches twist the top part of the buzzer until it becomes loose from the base.
- 3.12 The dip switches can be set as follows:

Tone	Code 12345	Sound output dBA at 1m
Fast sweep	11110	105
Medium sweep	11101	105
Fast sweep	11011	114
Slow whoop	11001	103

A small potentiometer is provided to adjust the volume of the buzzer.

4. Batch counter with beacon option - F-2

- 4.1 The batch counter is designed as a fully automatic 'reminder' to warn operators that a pre-determined batch of cut pieces have been cut.
- 4.2 The operation of the batch counter is identical to that described in section G.3.1 to G.3.2.12. Please refer to these instructions for information on how to use the counter.
- 4.3 On coincidence of the pre-set number and the count number, a signal will be sent to a beacon located on top of the electrical cabinet.
- 4.4 The beacon will flash to warn the operator that the batch is complete. The flashing will cease automatically after a short period of time.

H OBTAINING THE BEST RESULTS FROM YOUR ECONO-CUT

1 Introduction

1.0 This section is intended to help you to get the optimum performance from your Econo-Cut rotary cutter. It runs through the main causes of poor cut quality and accuracy and suggest correct procedures to overcome these problems. A checklist is provided at the end of this section to help you quickly pinpoint possible causes of poor performance.

1.1 Advice is always readily available from experienced personnel at GILLARD should you require it.

Customer Services Telephone Number: 01684 290243
Fax Number 01684 290330

1.2 Cut quality and accuracy are principally affected by the following:

- a. Cutter positioning
- b. Cutter bushes
- c. Knife blades
- d. Type of cutting action

2 Cutter positioning

The material to be cut should be fed into the cutter from a similar operating height. It is not recommended that the material be pulled off the floor.

For very flexible extrudate, which is easily stretched, it is strongly recommended that a relaxing loop of material be allowed to form before the infeed. This will ensure that the extrudate is not stretched as it enters the infeed.

It is also important to ensure that any pre-coiled material is allowed to un-twist before it goes into the cutter. A un-wind table or stand should be used to remove any twist.

3. Cutter bushes

3.1 Product support

Cutting plastic, rubber or other material with a flying knife type cutter, such as the Econo-Cut, requires a device to support the material while the cut is in progress.

The cutter dies or bushes are cylindrical metal devices, which have been bored or otherwise machined to match the cross-sections profile of the material to be cut.

Optimum Results

They serve the following functions:

- a. Guide the product to the cut point.
- b. Provide support for the material as it is cut.
- c. Guide and support the knife.

Although frequently overlooked, cutter bushes are extremely important in obtaining a clean cut on extruded tubes, pipes and profile.

3.2 Boring the bushes

Have the cutter bushes machined or bored to suit the product cross-sectional profile. Clearance must be provided to permit the material to freely slide through the opening. However, the clearance must not be great enough to permit excessive movement of the product material. This may cause irregular or angular cuts.

Excessive clearance will allow the material to move laterally and may cause irregular or angular cuts.

The opening in the pair of bushes should be continuous. Any misalignment will cause feeding problems.

Do not enlarge the entrance of the down-stream bush unless the product is being held-up on the edge at each cut. The more square the entrance, the better the cut quality.

3.3 Positioning the bushes

The upstream (inlet) side of the cutter guide bush should be as close as practicable to the discharge point of the caterpillar infeed, which precedes cutter.

This reduces the tendency for flexible extrudates to snag or droop as they leave the infeed and enter the cutter bush.

For the optimum results the inlet end of the inlet cutter bush should be coned so that it can fit in between the upper and lower belts of the infeed. This ensures that it reaches right into the exit of the caterpillar nip giving the product no opportunity to snag or jam.

Generally, the more flexible the extrudate the nearer the cutter guide bush has to be to the caterpillar belt.

4. Knife Blades

The most significant factor to successful cuts is a sharp knife.

Different products will require different knife blade thicknesses.

Optimum Results

As a general rule -

The thinnest knife blade possible should be selected when cutting flexible extrudates. The more rigid the product, the greater the thickness of blade required.

Despite the first statement in this section, it is sometimes found that when cutting rigid materials a better cut quality is achieved with a blade which has had its edge taken off.

The following thickness blades are available from the Factory -

0.25 mm	(0.010")
0.38 mm	(0.015")
0.46 mm	(0.018")
0.60 mm	(0.024")
0.80 mm	(0.031")

Please see the parts list section J.4 for details on ordering blades.

5. Type of cutting action

Possibly the most difficult selection concerning knife blades is whether the cutting action should be chopping or slicing.

Chopping directly through a product with a straight edged blade causes the least amount of engagement time and, therefore, the least interruption to the extrudate as it is continuously pushed forward by the caterpillar infeeders.

Slicing through the product with a curved blade tends to give a better-cut quality, but can considerably increase extrudate interruption time. Using a static cutter, such as the Econo-Cut, with a continuously moving product demands a compromise between slicing angle and engagement time.

The type of blade you should use will obviously depend upon your application. However, in our experience, approximately 90% of products can be cut adequately with a straight edged 'chopping' blade.

The remaining 10% are best served with a curved 'slicing' blade. Typical products would be thin-wall tubes or profiles, or profiles with an intricate shape where a chopping action might cause material distortion or collapse. We can offer you a selection of straight or curved blades, or produce a custom blade design especially for your product.

Additional advice is always available from the factory. Experienced staff would be pleased to share their knowledge to help you achieve the best possible results from your Econo-Cut.

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Econo-Cut Cutting System

Optimum Results

6. PROBLEM IDENTIFICATION CHART - ECONO-CUT SYSTEM

PROBLEM

a Poor length accuracy

POSSIBLE CAUSE

RECOMMENDED ACTION

- | | |
|---------------------------------|---|
| 1. Extrudate Slippage in belts. | The extrudate must be firmly clamped between the upper and lower caterpillar belts. When setting up the machine, check that it is not possible to pull the extrudate out from between the belts. If it is, increase the nip pressure. In addition, check that the extrudate is not wet or slippery. Finally, make sure that the caterpillar belts are in good condition. Worn belts should be replaced. |
| 2. Extrudate tension varying. | The extrudate must be under constant tension as it enters the caterpillar belts. This is particularly critical for materials, which easily stretch, e.g. foam rubber, silicone and very small diameter flexible plastics. Ideally, the tension on the material should be as low as possible. |
| 3. Extrudate speed verifying | The machine must be operated at a constant linespeed to achieve best results. Do not adjust the caterpillar speed unnecessarily. Leave it locked onto constant speed. Similarly, do not adjust the nip pressure during a run. Any changes in infeed speed or nip pressure will immediately influence cut length accuracy. |
| 4. Cutter bush set-up incorrect | The guide bush bore should be a reasonable tight fit to the product diameter. If too tight, it may cause a product hold-up as the extrudate is pushed through by the infeed. If too loose, it may allow the product to move from side-to-side. For very flexible extrudates, the distance between the ends of the caterpillar belt lead-in is kept to a minimum. It is also important that the knife blade brushes the bush faces during cutting. |
| 5. Material not exiting bush. | Any material hold-up in the exit bush may cause compression of the on-coming extrudate end. This will affect the accuracy of the oncoming length. Making sure cut lengths are free to exit the bush. Do this by reducing the length of the exit bush, by putting an internal cone into the bush or using to blow the cut pieces out of the bush. |

Issue 01/97/EC
Econo-Cut Cutting System

Optimum Results

a. Poor length accuracy

POSSIBLE CAUSE

- | | |
|---------------------------------|---|
| 6. Shaft encoder Wheel Slipping | The encoder is fitted with a wheel which runs on the belt as diagram M-EC-004. Ensure no slippage is occurring between wheel and belt |
| 7. Infeeder drive defective. | The infeeder motor controller should provide an accurate speed holding condition. If variation is present, check controller settings and condition of unit. |
| 8. Worn clutch/brake. | Although the clutch/brake fitted to this cutter is rated for many millions of cuts, it will eventually wear out. If you have been using the cutter for a considerable length of time or you have been using it for high cut rates over a long period, this might be the cause of the inaccuracy. If you think you have a worn clutch, a friction ring is available as a spare part (see recommended spare parts list attached to these instructions). |

b. Poor cut quality

- | | |
|-------------------------|---|
| 1. Blade gap too large. | It is critical that the knife blade actually brushes each cutter guide bush face during the cut. The bushes should be as tight as possible to the blade, whilst still to pass through the gap when the blade head is turned by hand. |
| 2. Bush edge not sharp. | The bush faces that are in contact with the blade should be straight and clean. The 90° angle between the bush face and the product bore should be as sharp no circumstances should there be a bevel or radius on this edge. Check for wear on this edge from time-to-time. |
| 3. Blade not sharp | Check the cutting edge. Check the double bevel is even. Replace the blade if appropriate. |
| 4. Blade gap too large. | Check that the blade is touching both bush faces as it passes through the gap between them. reset the bushes if necessary. If the gap is too wide, the material can be pushed down into the gap by the blade, causing a jam. |

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Optimum Results

5. Blade stuck.

For many products, particularly rubbers and flexible PVC, lubricating the blade greatly assists the cutting action and eases the passage of the blade through the material. Fill the integral blade lubrication system with a lubricant. e.g. water with a dash of dish washing liquid.

6. Worn clutch/brake

If the clutch/brake is badly worn, the friction disc will not engage, causing the clutch to slip and the blade to stall in the product. This problem will only occur after the machine has completed many thousands of cuts. Try cutting products that you know the machine can cut. If the stalling problem continues, replace the friction disc inside the clutch, a friction disc replacement kit is available as a spare part (see recommended spare parts list attached to these instructions).

d. Feed difficulties

1. Inlet bush too short.

For very flexible extrudates, make sure that the distance between the end of the caterpillar belt nip & the bush lead-in is kept to a minimum. It may be necessary to turn the end of the inlet bush into a cone, so that it can fit in between the caterpillar rollers. In extreme cases, use a small tube to fit right into the nip point & guide the material into the inlet bush.

2. Exit bush too long.

When cut short lengths or very flexible materials, make sure that the exit bush is not over long. If too long, material will have to be pushed an excessive distance through the bush, causing drag and product hold-up.

3. Bush bore rough.

Make sure that the internal bush bore is smooth and free from machining rings and other potential drag points.

d. Feed difficulties

If possible, polish the bore or use a very low friction material (e.g. Teflon) as an insert in the bush.

Alternatively, use low-pressure air, blown down the bush, to create an air cushion around the extrudate to minimised drag.

Optimum Results

4. Infeed guide-in not straight.

Check that the extrudate is straight as it enters the caterpillar. If the material has been coiled before it is cut, it may have a tendency to try to twist as it passes through the inlet guide rollers. If this is a problem, add additional guide in rollers to hold the infeder. In very bad cases, use a tube guide to direct the extrudate right to the caterpillar inlet belt nip.

5. Incorrect blade shape.

Because the material is trying to move forward continuously during the cutting during the cutting action, a wide blade may cause excessive product hold-up, resulting in a jam. Check that you are using the narrowest blade possible. If necessary grind away the back of the blade to reduce hold-up.

MAINTENANCE AND INSPECTION

Please refer to diagram 010 (page 49) for location of items mentioned in these instructions.

1. Monitoring during operation - Consumables

Consumables items such as knife blades and caterpillar infeeders should be visually checked on a regular basis for wear. If these items are not kept in a reasonably condition, the machine performance will almost certainly deteriorate over time.

1.1 Knife blades

It is difficult to define when a blade requires replacing. However for the efficiency of the cutter it is essential that a sharp cutting edge be maintained on the blade. This ensures that:

1.1.1 A clean, swarf-free, cut edge is maintained on the extrudate.

1.1.2 Undue stress is not placed on the clutch.

If in doubt as to the sharpness of the blade, fit a new blade by following the instructions in section F.1.

FOR SAFETY, IT IS ESSENTIAL THAT THE MAINS POWER-IN ISOLATOR SHOULD BE TURNED OFF DURING THE BLADE CHANGING OPERATION.

2. Monitoring during operation - non-Consumables

2.1 Lamp bulbs

Although these bulbs have a rated life of many hundreds of hours operation, they will eventually fail. When they have failed, they should be replaced immediately.

DO NOT USE THE MACHINE WHEN LAMPS WILL NOT ILLUMINATE. REPLACE BULBS IMMEDIATELY TO AVOID CONFUSION AS TO WHETHER THE MACHINE IS OPERATING CORRECTLY OR NOT.

2.2.1 To replace a lamp bulb

Unscrew the lens, and remove bulb from the indicator housing. Replace bulb and refit lens.

This machine uses 24vdc bulbs in the indicator units.

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Maintenance

2.2 Brake Sensor Position

The SRC 1501 brake sensor determines the position the blade stops at after each cut. The sensor is located in an enclosure positioned adjacent to the knife shaft, at the opposite end from the knife blade. A slotted disc is fitted to the end of the knife shaft and runs through a slot in the face of the brake sensor. (See diagram 011 page 51).

The position of this slotted disc relative to the knife blade has been factory set and should not be adjusted under normal circumstances.

If, for some reason, the relative blade or disc positioning requires adjustment, follow the steps below

- 2.2.1 Loosen the screw, which clamps the slotted disc onto the knife shaft so that the disc can be rotated by hand without moving the shaft.

With a blade fitted, rotate the knife shaft so that the blade is positioned at approximately 2 o'clock when looking from the end (see diagram 0011 page 51).

IMPORTANT: TURN-OFF THE MAINS ISOLATOR BEFORE FITTING A BLADE OR ROTATING THE SHAFT WITH THE BLADE FITTED.

- 2.2.3 Once the blade is in the 2 o'clock position, move the slotted disc so that the back face of the slot is vertical. Take care not to rotate the knife when this adjustment is being made.

- 2.2.4 Check that the disc runs through the central slot of the SRC1501 photocell without brushing against either face. If it does hit the photocell, damage might occur to the photocell.

- 2.2.5 Tighten the screw holding the disc onto the knife shaft. Check once again that the disc does not hit the photocell. If it does, readjust.

2.3 Clutch/brake maintenance

The Econo-Cut's clutch/brake has been designed to give a long operating life with minimum maintenance. As the clutch/brake is self-adjusting, there is no regular maintenance requirement.

However, the clutch plate will eventually wear. This wear will probably become apparent due to a decline in clutch/brake accuracy. However, before you take any steps regarding the clutch/brake, check that you have not changed any other factor which might effect cut length accuracy:

- a) Have you changed the material you are cutting?
- b) Have you altered your method of feeding?

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Maintenance

Check through the problem list in section H.7 to check for non-clutch causes of length accuracy problems.

If you feel that the clutch is worn, please replace the friction disc set using the service kit listed in the spare parts list (section 3.4.4).

3. Preventative measures

Regular maintenance inspection is vital if unscheduled breakdowns are to be avoided. Please follow the maintenance schedule listed in section 4 below. It is designed to identify problems before they cause production downtime.

4. Planned maintenance schedule

Once per day	-	1.	Check knife blade condition
		2.	Check caterpillar belt condition
		3.	Check safety guard operation
		4.	Check emergency stop operation
		5.	Drain air filters
Once per week	-	1.	Clean wet block if being used
Once per month	-	1.	Check drive belt tension
		2.	Check drive belt wear
Once per six months	-	1.	Visually check for loose wires
		2.	Visually check for loose bolts
		3.	Check hinges and lids for damage
		4.	Check that the blade head is square to cutter bush holder block.
		5.	Check that brake sensor disc is not rubbing against brake sensor enclosure
As necessary	-	1.	Replace any blown lamp bulbs.

5. Functional checking of safety devices

The functional checking of all safety devices occurs each time that the machine is started. This is done automatically.

When all guards are closed and the emergency stop push-button is reset, the guard lamp should illuminate (see diagram 003 page 23). As all switches are 'fail to safe' type switches, the guard lamp will not illuminate until all circuits have been checked as being safe. When the safety circuit reset button is pressed the following actions take place:

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- 5.1 Safety relay energised. This re-checks that all guards are closed.
- 5.2 The main motor contactor and relays are checked to ensure that they have returned to a De-energised (safe) conditions since the machine was last used. As contactors are of a 'positive guided' type, you cannot start a motor if there is a fault in a contactor.

The safety circuit reset button will not illuminate if there is a fault in any motor contactor guard switch or emergency stop switch.

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J. CONTROL PANEL - Refer to drawing number M-EC-003

DESCRIPTION	QTY	PART NUMBER	ITEM NO
Light assy. – White	1	ZB2 BV6	01
Light assy. – Blue	1	ZB2 BV6	02
Emergency stop button	1	XB2 542	03
Push button – Black	1	ZB2 BW36	04
Cut length counter 1 preset	1	C346 413	05
Dual push button	1	ZB2 BW84354	06
Selector switch	1	ZB2 BJ9	07
Total cuts counter	1	0731 101	08
Selector switch	1	198 501	09
Cut length counter 2 preset	1	C346 423	10

MECHANICAL PARTS - Refer to drawing number M-ECGP-010

Part Code: ECGP.50A

DESCRIPTION	QTY	PART NUMBER	ITEM NO
Cutter motor 1.1Kw	1	Frame 90L	01
Clutch/brake	1	Rota 1010	02
Brake sensor	1	SRC 1501	03
Motor pulley	1	16H100	04
Clutch input pulley	1	48H100	05
Clutch output pulley	1	C750161	06
Cutter shaft pulley	1	D750250	07
Drive belt (input)	1	360H100	08
Drive belt (output)	1	300H100	09
Shaft bearing	2	SNP30	10
Filter regulator	1	AW2000 01	11
Micro filter	1	AFD 2000-01	11
Gauge	1	G36 10 01	11
Castor	4	72835	12
Adjustable catch	4	65 655	13
Catch plate	1	01 655	13
Bush clamping screw	2	Mr63p M8 x 25	14
Safety sensor	1	FRS9	15
Blade holder	1	D750230	16
Cap	1	D750240	16
Brake sensor disc	1	C750260	17
Inlet & outlet bushes	1 set	D704xxx	18

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J MECHANICAL PARTS - Refer to drawing number M-ECGP-010
Part Code: ECGP.50B

DESCRIPTION	QTY	PART NUMBER	ITEM NO
Cutter motor 1.5Kq	1	Frame 100L	01
Clutch/brake	1	Rota 1210	02
Brake sensor	1	SRC 1501	03
Motor pulley	1	16H100	04
Clutch input pulley	1	48H100	05
Clutch output pulley	1	C750161	06
Cutter shaft pulley	1	D750250	07
Drive belt (input)	1	360H100	08
Drive belt (output)	1	300H100	09
Shaft bearing	2	SNP 30	10
Fitter regulator 1		AW2000-01 11	
Separator	1	AFD2000-01	11
Gauge	1	G36 10 01	11
Castor	4	72835	12
Adjustable catch	1	65 655	13
Catch plate	1	01 655	13
Bush clamping screw 2		Mr 63P M8 x 25	14
Safety sensor	1	FRS9	15
Blade holder	1	D750230	16
Cap	1	D750240	16
Brake sensor disc	1	C750260	17
Inlet & Outlet bushes	1 set	D704xxx	18

MECHANICAL PARTS - Refer to drawing Number M-ECHD-010

DESCRIPTION	QTY	PART NUMBER	ITEM NO
Cutter model 2.2Kw	1	Frame 112M	01
Clutch/brake	1	Rota 1510	02
Brake sensor	1	SRC 1501	03
Motor pulley	1	16H150	04
Clutch input pulley	1	16H150	04
Clutch input pulley	1	48H150	05
Clutch output pulley	1	C770103	06
Cutter shaft pulley	1	18H150	07
Drive belt (input)	1	420H150	08
Drive belt (output)	1	360H150	09
Shaft bearing	2	SNP 30	10
Fitter regulator 1		AW3000 01 11	
Separator	1	AFD3000 01	11
Gauge	1	G36 10 01	11
Castor	4	72835	12

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DESCRIPTION	QTY	PART NUMBER	ITEM NO
Adjustable catch	1	65 655	13
Catch plate	1	01 655	13
Bush clamping screw	2	Mr63pM8 x 25	14
Safety sensor	1	FRS9	15
Blade holder	1	D750230	16
Cap	1	D750240	16
Brake sensor disc	1	C750260	17
Inlet & outlet bushes	1 set	D704xxx	18

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WARRANTY

Standard products manufactured by **Peter Gillard & Co Ltd**, hereinafter referred to as the "Company", are warranted to be free from defect in workmanship and material for a period of one year from the date of shipment, and products which are defective in workmanship or material will be repaired or replaced at the option of the Company at no charge to the Buyer. Final determination as to whether a product is actually defective rests with the Company.

The obligation of the Company hereunder shall be limited solely to repair or replacement of products that fall within the foregoing limitations, and shall be conditioned upon receipt by the Company of written notice of any alleged defects or deficiency promptly after discovery within the warranty period and, in the case of components or units purchased by the Company. The obligation of the Company shall not exceed the settlement that the Company is able to obtain from the supplier thereof.

No products shall be returned to the Company without its prior consent. Products which the Company consents to have returned shall be shipped CIF to the Company's factory. The Company cannot assume responsibility or accept invoices for unauthorised repairs to its components, even though defective.

The life of the products of the Company depends, to a large extent, upon type of usage thereof.

The Company makes no warranty as to fitness of its products for specific applications by the buyer nor as to period of service unless the company specifically agrees otherwise in writing after the proposed usage has been made known to it.

The foregoing warranty is exclusive and in lieu of all other warranties expressed or implied, including, but not limited, to any warranty of merchantability or of fitness for a particular purpose.

This Warranty does not apply to experimental or development products.

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Warranty