

# Clarke® WOODWORKER



**400mm (16") SCROLL SAW**

**Model No. CSS 400**

Part No. 6460100



**Operating and Maintenance  
Instructions**

1200



Thank you for purchasing this CLARKE 400mm (16") Scroll Saw, designed for use by both professional and DIY enthusiast.

Before operating this machine, please read this leaflet thoroughly and follow the instructions carefully. In doing so you will ensure the safety of yourself and that of others around you, and you can look forward to the Scroll Saw giving you long and satisfactory service.

## **GUARANTEE**

This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase.

This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission.

This guarantee does not effect your statutory rights.

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## SAFETY PRECAUTIONS

### GENERAL SAFETY RULES FOR OPERATING MACHINERY

#### **WARNING:**

*As with all machinery, there are certain hazards involved with their operation and use. Exercising respect and caution will considerably lessen the risk of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result.*

- ✓ **ALWAYS** read and become familiar with the entire operating manual. Learn the machines' applications and limitations as well as the specific potential hazards peculiar to it.
- ✓ **ALWAYS** ensure that adequate lighting is available. A minimum intensity of 300 lux should be provided. Ensure that lighting is placed so that you will not be working in your own shadow.
- ✓ **ALWAYS** check for damage. Before using the machine, any damaged part, such as a guard etc., should be checked to ensure that it will operate properly, and perform its intended function. Check for alignment of moving parts, breakage of parts, mountings, and any other condition that may affect the machines' operation. Any damage should be properly repaired or the part replaced. If in doubt, do not use the machine. consult your local dealer.
- ✓ **ALWAYS** disconnect the machine from the power supply before servicing and when changing accessories such as blades, etc.
- ✓ **ALWAYS** keep guards in place and in working order.
- ✓ **ALWAYS** wear safety goggles, manufactured to the latest european safety standards and also use face or dust mask if cutting operation is dusty. Everyday eyeglasses do not have impact resistant lenses, they are not safety glasses.
- ✓ **ALWAYS** keep work area clean. Cluttered areas and benches invite accidents.
- ✓ **ALWAYS** wear ear protectors/defenders.
- ✓ **ALWAYS** remove adjusting keys and wrenches. Form the habit of checking to see that keys and adjusting wrenches are removed from the machine before switching on.
- ✓ **ALWAYS** use recommended accessories. The use of improper accessories could be hazardous.
- ✓ **ALWAYS** remove plug from the electrical outlet when adjusting, changing parts, or working on machine.
- ✓ **ALWAYS** earth all machines. If the machine is equipped with three-pin plug, it should be plugged into a three-pin electrical socket. **NEVER** remove the earth pin.
- ✓ **ALWAYS** avoid dangerous environment. Don't use power machines in damp or wet locations or expose them to rain. Keep your work area well illuminated. Do not use in explosive atmosphere (around paint, flammable liquids etc).
- ✓ **ALWAYS** keep children away. All visitors should be kept a safe distance from the work area, especially whilst operating the unit.
- ✓ **ALWAYS** maintain machine in top condition. Keep tools sharp and clean for the best and safest performance. Follow maintenance instructions.
- ✓ **ALWAYS** wear proper apparel. Loose clothing or jewellery may get caught in moving parts. Wear protective hair covering to contain long hair.
- ✓ **ALWAYS** make workshop childproof. cover the saw adequately when not in use, to prevent children from damaging themselves by tampering with it.
- ✓ **ALWAYS** handle with extreme care whenever transporting or installing machinery, and always use a lifting tool.
- ✓ **ALWAYS** avoid accidental starting. ensure the switch is off before plugging in to mains.
- ✓ **ALWAYS** be aware that accidents are caused by carelessness due to familiarity. Always concentrate on the job in hand, no matter how trivial it may seem.

- ✗ NEVER force the machine. It will do a better and safer job at the rate for which it was designed.
- ✗ NEVER operate machine while under the influence of drugs, alcohol or any medication.
- ✗ NEVER leave machine running unattended. Turn power off. Do not leave machine until it comes to a complete stop.
- ✗ NEVER overreach. Keep your proper footing and balance at all times. For best footing, wear rubber soled footwear. Keep floor clear of oil, scrap wood, etc.
- ✗ NEVER stand on the machine. Serious injury could occur if the machine is tipped or if a cutting tool is accidentally contacted. Do not store materials above or near a machine, such that it is necessary to stand on the machine to reach them.

### **ADDITIONAL SAFETY INSTRUCTIONS FOR SCROLL SAWS**

1. Wear safety goggles as protection against flying wood chips and saw dust. In many cases, a full face shield is even better protection. A dust mask is also recommended to keep saw dust out of your lungs.
2. The scroll saw must be bolted securely to a stand or workbench. If the saw has a tendency to move during certain operations, bolt the stand or workbench to the floor.
3. A solid wood workbench is stronger and more stable than a workbench with a plywood table.
4. This scroll saw is for indoor use only.
5. Do not cut pieces of material which are too small to be held by hand.
6. Clear the work table of all objects except the workpiece (tools, scraps, rulers etc.) before turning the saw on.
7. Make sure the blades' teeth are pointing down, toward the table, and that the blade tension is correct.
8. When cutting a large piece of material, support it at the height of the table.
9. Do not feed the workpiece through the blade too fast. Feed only as fast as the blade will cut.
10. Keep your fingers away from the blade. Use a push stick as you near the end of the cut.
11. Take care when cutting a workpiece which is irregular in cross section. Moulding for example must lie flat, and not 'rock' on the table as it is being cut. A suitable support must be used.
12. Take care when 'backing off' a workpiece from the blade, as the blade may bind in the 'kerf'. In this event, switch OFF the machine and disconnect from the supply. Wedge open the kerf, and withdraw the workpiece.
13. Switch off the saw, and make sure the blade has come to a complete stop before clearing sawdust or off-cuts from the table.
14. Make sure there are no nails or foreign objects in the part of the workpiece to be sawn.
15. Be extra cautious with very large or small, or irregularly shaped workpieces.
16. Set up the machine and make all adjustments with the power OFF, and disconnected from the supply.
17. **DO NOT** operate the machine with the covers off. They must all be in place and securely fastened when performing any operation.
18. Be sure to use the correct blade size and type.
19. Use **ONLY** approved replacement saw blades. Contact your local CLARKE dealer for advice. The use of inferior blades may increase the risk of injury.

## ELECTRICAL CONNECTIONS

Connect the mains lead to a standard, 230 Volt (50Hz) electrical supply through an approved 13 amp BS 1363 plug, or a suitably fused isolator switch.



**WARNING! THIS APPLIANCE MUST BE EARTHED**

IMPORTANT: The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow	-	Earth
Blue	-	Neutral
Brown	-	Live

As the colours of the flexible lead of this appliance may not correspond with the coloured markings identifying terminals in your plug proceed as follows:

- Connect GREEN & YELLOW coloured cord to plug terminal marked with a letter "E" or Earth symbol "⏏" or coloured GREEN or GREEN & YELLOW.
- Connect BROWN coloured cord to plug terminal marked with a letter "L" or coloured RED.
- Connect BLUE coloured cord to plug terminal marked with a letter "N" or coloured BLACK.

If this appliance is fitted with a plug which is moulded onto the electric cable (i.e. non-rewirable) please note:

1. The plug must be thrown away if it is cut from the electric cable. There is a danger of electric shock if it is subsequently inserted into a socket outlet.
2. Never use the plug without the fuse cover fitted.
3. Should you wish to replace a detachable fuse carrier, ensure that the correct replacement is used (as indicated by marking or colour code).
4. Replacement fuse covers can be obtained from your local dealer or most electrical stockists.

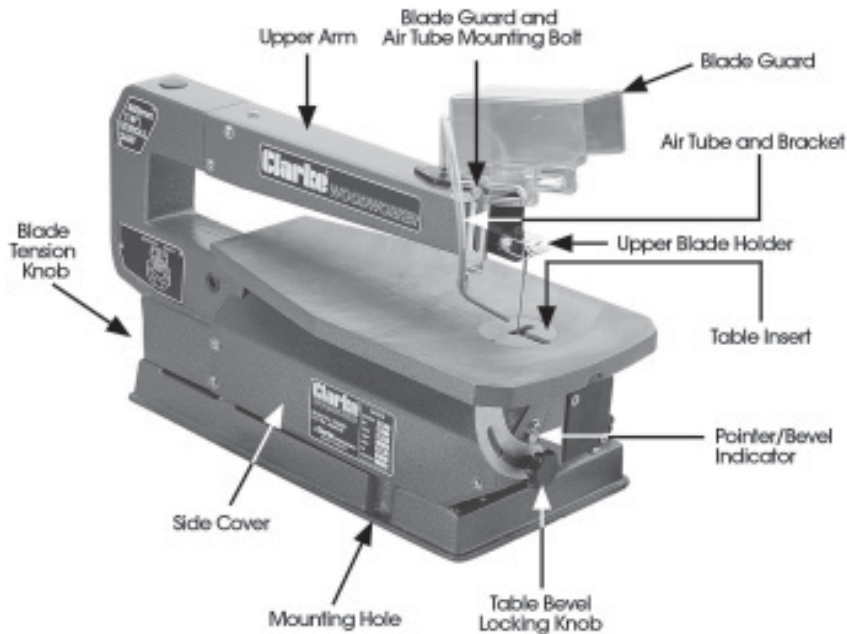
### FUSE RATING

The fuse in the plug must be replaced with one of the same rating (**5 amps**) and this replacement must be ASTA approved to BS1362.

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## PRINCIPAL PARTS OF THE SCROLL SAW

Fig. 1



## ASSEMBLY (Numbers in brackets refer to the item numbers in the Parts List)

Your Scroll Saw is fully assembled, except for the Blade Guard, and the Air tube. To attach these components, proceed as follows:

Line up the holes in the blade guard (33) and that in the air tube bracket (83), with the hole in the end of the upper arm, and insert the bolt (90). Note that the air tube bracket should lie between the blade guard and the upper arm. Thread on the washer and nut and tighten sufficiently so that the guard is firm but capable of pivoting. Do not over tighten.

## INSTALLATION

Plan your installation. Ensure adequate space is available, with good lighting and ventilation, and an adequate electrical supply is close at hand.

### 1. MOUNTING

Your Scroll Saw is provided with 3 mounting holes, and it is strongly recommended that you mount the machine on a solid surface. A pad between the saw and the workbench is further recommended. The best dimensions being - 24" x 12" x 1/2". Ensure you use flat washers between the bolt head and the mounting hole, and do not over tighten the bolts.

## 2. BLADE HOLDER ALIGNMENT

It is important that the blade holders are checked for alignment before use. Misaligned holders will cause the blade to wander, and reduce the blades' life expectancy.

To check the alignment,

- 2.1 Loosen the tension on the blade by turning the blade tension knob (17), two full turns anticlockwise.
- 2.2 Prise out the table insert (79), by pushing it from beneath the table with your fingers.
- 2.3 Apply a slight downward pressure on the upper arm whilst holding the blade firmly, allowing the pins at the top of the blade to be disengaged from the recesses in the upper blade holder (26) - see fig 2. It is now a simple matter to disengage the blade pins from the lower blade holder and lift the blade out through the access hole in the table.
- 2.4 Remove the side cover (2), by unscrewing the three retaining screws, to give access to the lower holder.
- 2.5 Slacken off the single hex. socket head screws securing the upper and lower blade holders, (see fig 3), so that the holders move freely, using the hex socket wrench supplied.
- 2.6 A metal strip is provided which should be inserted into the blade slots in both holders, thereby replacing the blade as shown in fig. 3.

Turn the strip, and therefore the blade holders, in unison, so that it is in line with the table axis. Carefully tighten each holder in turn, taking great care not to alter their positions as you do so.

On completion, replace the side cover, table insert and blade by reversing the procedure above.

**NOTE: If the blade tends to wander during use, re-check this adjustment as it may take one or two attempts to get it right. Also see page 11 - Straight Line Cutting, for other causes of blade wander.**

## 3. BEVEL ALIGNMENT (see fig. 4)

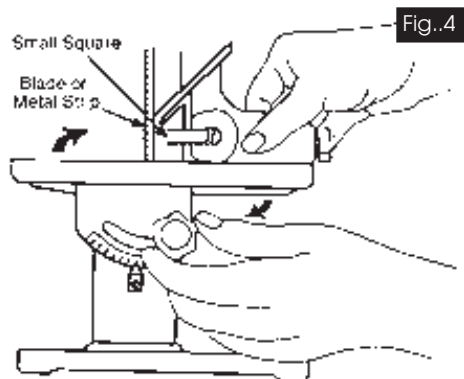
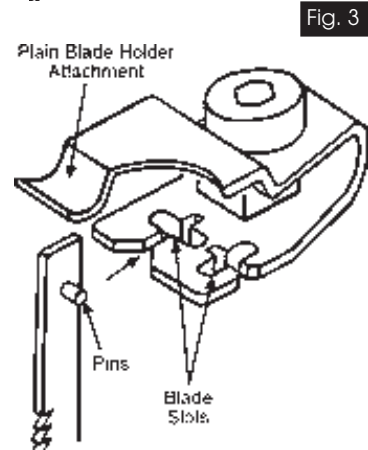
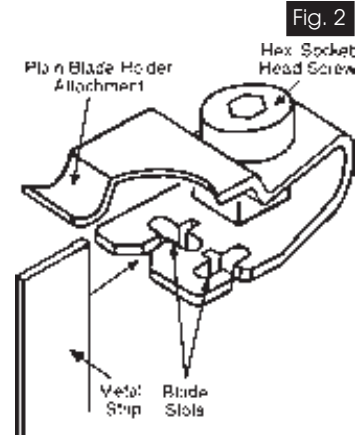
To align the bevel indicator, loosen the table bevel lock knob (57), and level the table until it is at right angles to the blade. Use a small square to be sure that the angle between blade and table is 90°.

**NOTE: The metal strip may be used, in place of the blade, if desired.**

When the table is perpendicular to the blade, or metal strip, tighten the bevel lock knob (57).

Loosen the screw holding the pointer (62), adjust the pointer to 0°, then retighten the screw.

The bevel scale is a convenient indicator, but it is not guaranteed to be 100% accurate. Where absolute accuracy is required, always double check with a protractor before starting a cut.



## 4. BLADE INSTALLATION / RENEWAL

### 4.1 Standard Blade (with end pins)

- 4.1.1 Before installing or removing blades, turn OFF the saw and disconnect it from the supply. Remove the blade as described in 2. Blade Holder Alignment, above.

**NOTE:**

*Whilst the blade is out of the housings, look at the blade housings closely. You will observe that the blade slots and pin recesses are made so you can position the blade for cutting from the front, or from the side (see figs. 2 & 3). Cutting from the side is necessary when your workpiece is over 16" long.*

**IMPORTANT:** Side cutting can only be performed when the bevel is set at 0°.

- 4.1.2 With the blade teeth pointing DOWNWARDS, slot the new blade into the lower housing so that the pins on the end of the blade, engage in the recess in the housing. Holding the blade firmly, apply downward pressure to the upper arm, whilst slotting the upper end of the blade into the slot in the upper housing, again, making sure the blade pins correctly engage in the recess in the housing.
- 4.1.3 Replace the Table Insert, and re-tension to the blade, by turning the tension knob (17) clockwise until you feel the blade is firm. Check to ensure that the blade pins are properly seated, top and bottom.

### 4.2 Plain Blades

A pair of holders is provided allowing the use of plain blades (see fig 5).

In order to install the blades with holders on to the machine, the holders must first be attached, as follows.

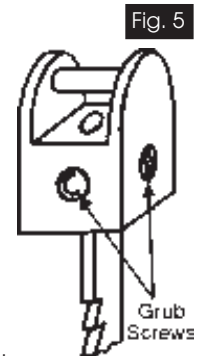
- 4.2.1 Establish which direction of cut is required. (Normal in-line or cross cut) This will determine which slots in the holder, the ends of the blades are to be inserted.

The holder is provided with two slots, at right angles to each other, and one, hex. socket head grub screw, used for securing the end of the blade in the slot. It will be necessary to remove the grub screw from the tapped hole in one slot, and replace it in the tapped hole in the slot you intend to use. (Fig. 5 shows a blade prepared for normal 'in line' cutting).

- 4.2.2 Remove the side cover (2) by removing the 3 screws securing it
- 4.2.3 With the two blade holders secured to the blade, and the table insert removed, lower one end of the blade through the access hole in the table.
- Ensure the blades' teeth point DOWNWARDS and FORWARDS. Slot the holder over the lip on the end of the lower housing, and, applying downward pressure on the upper arm, slot the upper holder over the lip on the upper housing.

**NOTE:** Easy access to the lower housing is provided when the side cover is removed.

- 4.2.4. Replace the table insert, and the side cover, and re-tension the blade by turning the blade tension knob (17) two full turns clockwise.





## NOTES ON SAW BLADES

**IMPORTANT: ALWAYS USE GOOD QUALITY BLADES**

### BLADES BREAK FOR FIVE PRINCIPAL REASONS:

1. Too much tension or too little tension on the blade.
2. Overworking the blade by feeding the workpiece too fast.
3. Twisting or bending the blade by feeding the workpiece off-centre.
4. Over use - the blade has reached the end of its useful life.
5. Feeding too much material into the saw, - more than the maximum 2" depth for which it was designed.

### HOW TO DETERMINE THE RIGHT BLADE FOR THE JOB

This scroll saw accepts a wide variety of blade widths and thicknesses. The width of the blade, the thickness of the blade, and the number of teeth per inch (TPI) are determined by the type of material and size of the radius being cut. Here are several examples:

TPI	WIDTH	THICKNESS	MATERIAL
10	2.8mm 0.11"	0.5mm 0.020"	Medium curves on 1/4" to 1-3/4" wood, wallboard, hardboard.
15	2.8mm 0.11"	0.5mm 0.020"	Same as above, plus wood 1/8" to 1-1/2" thick
18	2.4mm 0.095"	0.25mm 0.011"	Extra thin cuts on soft woods to 1/4" and parquetry

As a general rule, select the narrowest blades recommended for intricate curve cutting and widest blades for straight and large curve operations.

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## SCROLL SAW OPERATING CHARACTERISTICS

The scroll saw's unique ability is cutting intricate curves which other saws cannot do. A scroll saw can also be used for straight line cutting such as cross cuts, ripping and bevels,

The following is a list of points to remember when using a Scroll Saw.

1. The saw does not cut wood by itself. You feed the workpiece into the blade, letting the blade cut the wood as you move the piece ahead.
2. You must guide the wood into the blade **SLOWLY**, because the teeth are very small, and cut **ONLY** on the down stroke. If you push the wood into the blade too rapidly, you can easily break the blade.
3. Although the capacity of the saw accepts wood up to 2" thick, better results are obtained with wood no more than 1" thick. For wood thicker than 1", you must guide the wood into the blade **very slowly**, taking care not to bend or twist the blade.
4. The teeth on the blade will wear out sooner or later. The blade must therefore be replaced often to obtain the best cutting results. A blade will stay sharp for ½ hour to 2 hours of continuous running, depending on the material being cut.
5. Be aware that the blade has a tendency to follow the grain of the wood - the line of least resistance. You can compensate for this by watching the grain carefully and **guiding** the wood past the saw blade.
6. If you are not familiar with scroll saws, there will naturally be a learning period - a period to learn the saw itself, and a period to learn how the wood and saw work together. Expect some blade breakages, Scroll Saw blades are fairly fragile - not the same types of blade you find on a handsaw or circular saw.

## STRAIGHT LINE CUTTING

A little practice will be necessary in order to create a straight line cut. This is due to the very design and nature of the machine itself. The saw blade is quite fragile and due to several different influences, will tend to wander off line. These influences include the following:

1. Blade tension. A slack blade will naturally wander off line.
2. Condition of the blade. A dull blade requires a greater effort to guide it through the work, thereby tending to force it off line.
3. Blade holders misaligned. The holders are secured with a single hex. socket head screw. Slacken the screw and adjust the holder so as to align correctly. The blade should be in line with the table, and not twisted.

## CUTTING INTRICATE PATTERNS

One capability a scroll saw has that other saws do not, is cutting intricate patterns **inside** a workpiece. To do this, you should adopt the following procedure.

1. Drill a 1/4" hole in the middle of the workpiece, in a area which will not be a part of the finished object.
2. Switch off and unplug the machine from the supply.
3. Remove the blade from the machine.
4. Place the workpiece on the table, with the 1/4" hole over the access hole in the table.
5. Replace the blade, through the hole in the workpiece, (teeth downwards), and Re-tension the blade.
6. Plug the saw back in. Check to ensure that the workpiece is not touching the blade before switching ON.

When you are finished doing the work inside the workpiece, turn the saw off, unplug it, remove the blade, remove the workpiece, reinstall the blade, and plug the saw back in.

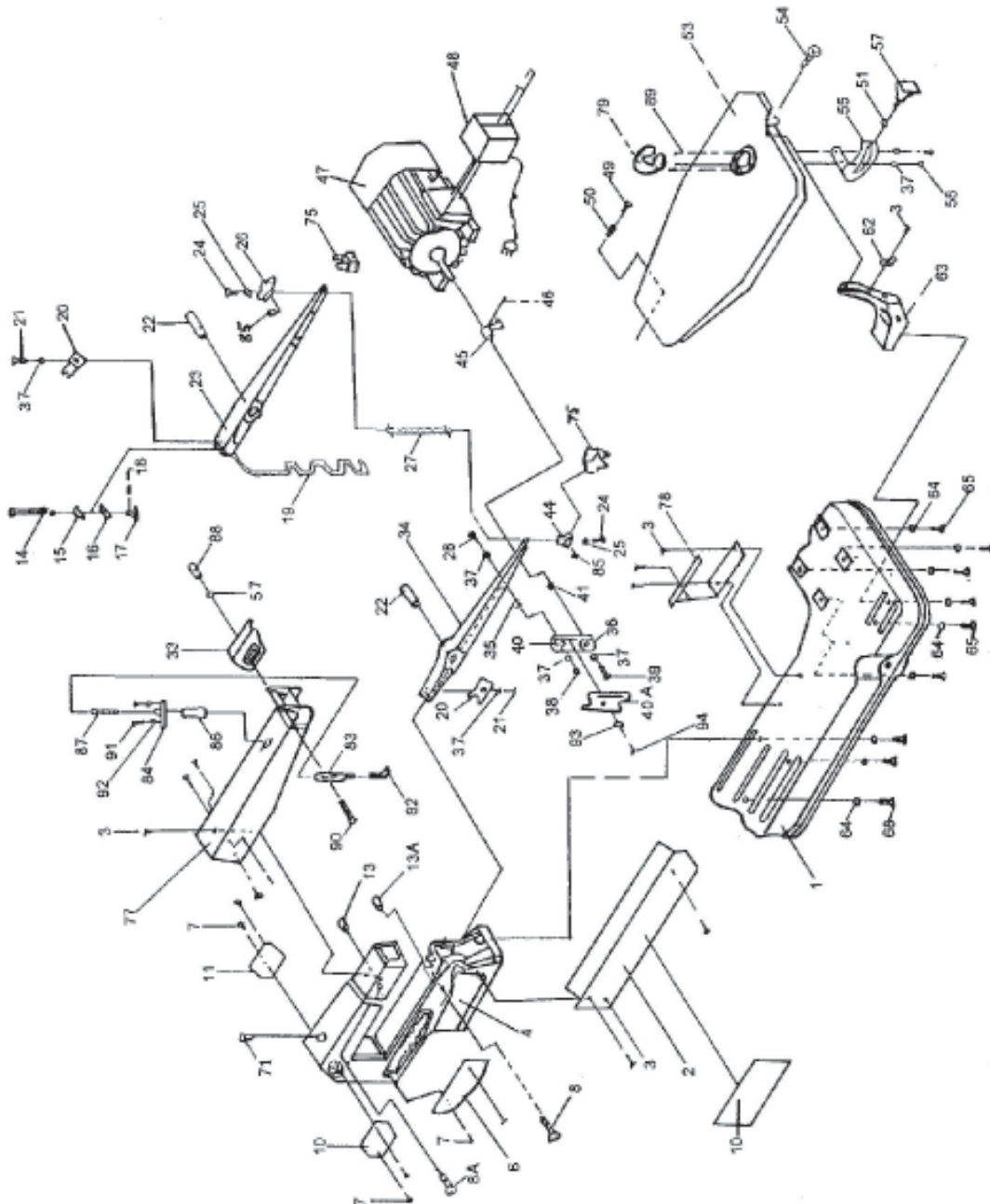
## MAINTENANCE

- A. Apply a thin coat of paste wax on the work table from time to time. This will help the wood glide across the table more smoothly.
- B. After every 50 hours of use, lubricate the upper and lower arm bushes with SAE 20 oil, by removing the hex. socket head screws (item 8)
- C. The motor is permanently lubricated. Do not try to oil the motor bearings or service any internal parts of the motor. If the power cord is worn, frayed, cut or damaged, replace it. Do not try to patch it up with electrical tape this could lead to more trouble.

## TROUBLESHOOTING

PROBLEM	PROBABLE CAUSES	SUGGESTED REMEDY
Breaking Blades.	<ol style="list-style-type: none"> <li>1. Incorrect tension.</li> <li>2. Overworked (worn out) blade.</li> <li>3. Wrong blade being used.</li> <li>4. Twisting blade in wood.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust blade tension.</li> <li>2. Reduce feed rate or replace blade.</li> <li>3. Use narrow blades for thin wood, wider blades for thicker wood.</li> <li>4. Avoid side pressure on blade.</li> </ol>
Motor Will Not Run.	<ol style="list-style-type: none"> <li>1. Defective cord, plug or outlet.</li> <li>2. Defective motor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Unplug saw, replace defective parts.</li> <li>2. Repairs MUST be made by a qualified technician. Call Clarke Service dept. for advice.</li> </ol>
Excessive Vibration  (Some vibration is inevitable when the saw and motor are running)	<ol style="list-style-type: none"> <li>1. Improper mounting of saw.</li> <li>2. Unsuitable mounting surface.</li> <li>3. Loose table or table rubbing against motor.</li> <li>4. Motor mount is loose.</li> </ol>	<ol style="list-style-type: none"> <li>1. See proper mounting instructions (p5)</li> <li>2. Replace plywood workbench surface with solid lumber surface.</li> <li>3. Tighten table adjuster knob.</li> <li>4. Tighten motor mount screws.</li> </ol>
Blade Runout	<ol style="list-style-type: none"> <li>1. Blade holders not aligned.</li> <li>2. Insufficient Blade tension</li> <li>3. Dull Blade causing excessive force to be used at workpiece</li> </ol>	<ol style="list-style-type: none"> <li>1. Loosen screws holding blade holder to rocker arms. Adjust position of blade holders. Use metal strip to verify alignment. Retighten holder screws</li> <li>2. Increase Blade tension</li> <li>3. Renew Blade and correctly tension.</li> </ol>

# PARTS DIAGRAM



## PARTS LIST

No.	Description	Qty	Part No.	No.	Description	Qty	Part No.
1	Base	1	SD40001	45	Eccentric	1	SD40045
2	Side cover	1	SD40002	46	Hex. socket set screw	1	SD40046
3	Cap head screw	11	SD40003	47	Motor	1	SD40047
4	Body	1	SD40004	48	Switch	1	SD40048
6	Label	1	SD40006	49	Hex. socket head bolt	1	SD40049
7	Cap head screw	6	SD40007	50	spring compression	1	SD40050
8	Socket head screw	1	SD40008	51	Flat washer	2	SD40051
8A	Socket head screw	1	SD40008A	53	Table	1	SD40053
10	Label	1	SD40010	54	Hex. socket head bolt	1	SD40054
11	Label	1	SD40011	55	Bracket-tilt	1	SD40055
13	Bush	1	SD40013	57	Knob	1	SD40057
13A	Bush	1	SD40013A	58	Cap. head screw	2	SD40058
14	Bolt tensioning	1	SD40014	62	Indicator	1	SD40062
15	Bolster threaded	1	SD40015	63	Support table	1	SD40063
16	Bolster	1	SD40016	64	Spring washer	9	SD40064
17	Blade tension knob	1	SD40017	65	Hex. head bolt	4	SD40065
18	Spring pin	1	SD40018	66	Hex. head bolt	2	SD40066
19	Spring	1	SD40019	68	Hex. head bolt	3	SD40068
20	Retainer	2	SD40020	70	Label warning	1	SD40070
21	Hex. socket head bolt	2	SD40021	71	Plug	1	SD40071
22	Spring bushing	2	SD40022	75	Plain blade holder	2	SD40075
23	Upper arm	1	SD40023	77	Steel housing	1	SD40077
24	Hex. socket head bolt	2	SD40024	78	Right housing	1	SD40078
25	Star washer	2	SD40025	79	Table insert	1	SD40079
26	Upper blade holder	1	SD40026	82	Windpipe	1	SD40082
27	Blade	1	SD40027	83	Windpipe clamp	1	SD40083
28	Hex. soc. head bolt	1	SD40028	84	Balloon seat	1	SD40084
33	Blade guard	1	SD40033	85	Bushing	2	SD40085
34	Lower arm	1	SD40034	86	Bellows	1	SD40086
35	Spring washer	1	SD40035	87	Plastic tube	1	SD40087
36	Ball bearing	2	SD40036	88	Nut	1	SD40088
37	Spring washer	7	SD40037	89	Spring bolt	3	SD40089
38	Hex. nut.	1	SD40038	90	Hex. head bolt	1	SD40090
39	Hex.socket head bolt	1	SD40039	91	Cap. head screw	1	SD40091
40	Link	1	SD40040	92	Flat washer	2	SD40092
40A	Link cover	1	SD40040A	93	Spring washer	1	SD40093
41	Bushing	1	SD40041	94	Tapping screw	1	SD40094
44	Lower blade holder	1	SD40044				

## PARTS AND SERVICE



For Spare Parts and Servicing, please contact your nearest dealer, or  
CLARKE International, on one of the following numbers.

**PARTS - 0181 558 6696      SERVICE - 0181 556 4443**

**PARTS & SERVICE FAX - 0181 558 3622**

## SPECIFICATIONS

Motor	Voltage: .....	230V, 50Hz, 1 phase.
	Rating: .....	90 Watts
Maximum thickness of cut: .....		50mm (2")
Throat: .....		400mm (16")
Blade length: .....		125mm (5")
Strokes per minute: .....		1400
Stroke length: .....		20mm (3/4")
Table size: .....		375 x 200mm
Machine dimensions: .....		540x265x360mm
Table tilt: .....		0° - 45° left
Base size: .....		400 x 215mm
Blade Type: .....		Pin (plain type optional)
Gross / Net weight: .....		22 / 20kg

Please note that the details and specifications contained herein, are correct at the time of going to print. However, CLARKE International reserve the right to change specifications at any time without prior notice. Always consult the machine's data plate

## PARTS & SERVICE CONTACTS

For Spare Parts and Service, please contact your nearest dealer,  
or CLARKE International, on one of the following numbers.

**PARTS & SERVICE TEL: 020 8988 7400**

**PARTS & SERVICE FAX: 020 8558 3622**

or e-mail as follows:

**PARTS: [Parts@clarkeinternational.com](mailto:Parts@clarkeinternational.com)**

**SERVICE: [Service@clarkeinternational.com](mailto:Service@clarkeinternational.com)**