

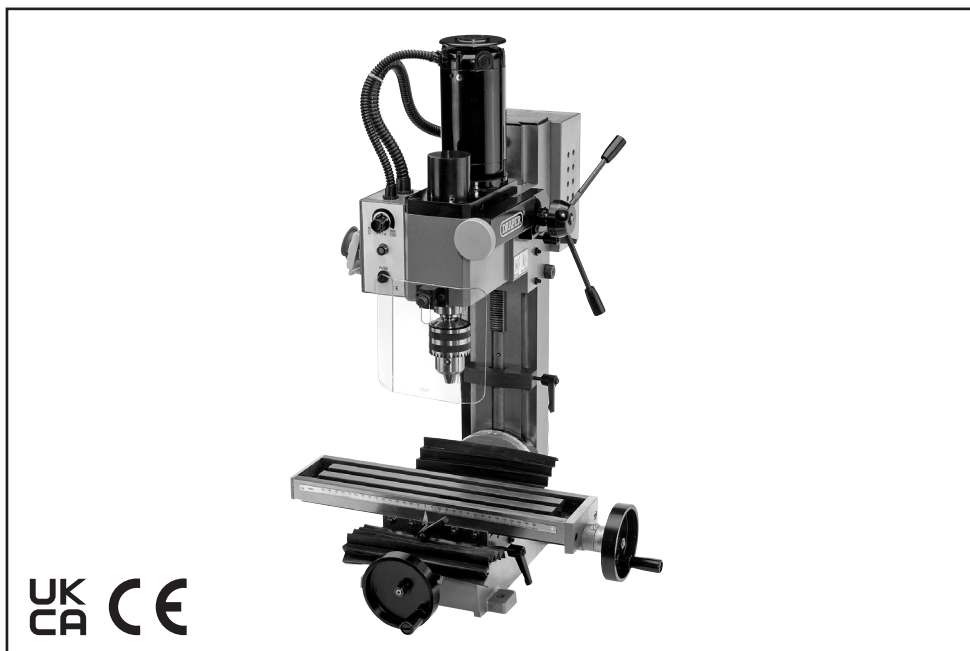


**DRAPER**<sup>®</sup>

230V

# MILLING MACHINE

34023



These instructions accompanying the product are the original instructions. This document is part of the product, keep it for the life of the product passing it on to any subsequent holder of the product. Read all these instructions before assembling, operating or maintaining this product.

This manual has been compiled by Draper Tools describing the purpose for which the product has been designed, and contains all the necessary information to ensure its correct and safe use. By following all the general safety instructions contained in this manual, it will ensure both product and operator safety, together with longer life of the product itself.

All photographs and drawings in this manual are supplied by Draper Tools to help illustrate the operation of the product.

Whilst every effort has been made to ensure the accuracy of information contained in this manual, the Draper Tools policy of continuous improvement determines the right to make modifications without prior warning.

# 1. TITLE PAGE

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## 1.1 INTRODUCTION:

**USER MANUAL FOR: 230V Milling Machine**

**Stock Nos: 34023**

**Part No: MILL-170A**

## 1.2 REVISION HISTORY:

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**Date first published May 2020.**

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**Revised version September 2022.**

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As our user manuals are continually updated, users should make sure that they use the very latest version.

**Downloads are available from:** <http://drapertools.com/manuals>

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## 1.3 UNDERSTANDING THIS MANUAL'S SAFETY CONTENT:

**Warning!** – Information that draws attention to the risk of injury or death.

**Important** – Information that draws attention to the risk of damage to the product or surroundings.

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## 3. WARRANTY

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### 3.1 WARRANTY

Draper tools have been carefully tested and inspected before shipment and are guaranteed to be free from defective materials and workmanship.

Should the tool develop a fault, please return the complete tool to your nearest distributor or contact:

**Draper Tools Limited, Chandler's Ford, Eastleigh, Hampshire, SO53 1YF. England.**

**Telephone Sales Desk: (023) 8049 4333 or Product Help Line (023) 8049 4344.**

A proof of purchase **must** be provided with the tool.

If upon inspection it is found that the fault occurring is due to defective materials or workmanship, repairs will be carried out free of charge. This warranty period covering parts and labour is 12 months from the date of purchase except where tools are hired out when the warranty period is 90 days from the date of purchase. This warranty does not apply to any consumable parts, any type of battery or normal wear and tear, nor does it cover any damage caused by misuse, careless or unsafe handling, alterations, accidents, or repairs attempted or made by any personnel other than the authorised Draper warranty repair agent.

**Note:** If the tool is found not to be within the terms of warranty, repairs and carriage charges will be quoted and made accordingly.

This warranty applies in lieu of any other warranty expressed or implied and variations of its terms are not authorised.

Your Draper warranty is not effective unless you can produce upon request a dated receipt or invoice to verify your proof of purchase within the warranty period.

Please note that this warranty is an additional benefit and does not affect your statutory rights.

**Draper Tools Limited.**

## 4. INTRODUCTION

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### 4.1 SCOPE

This machine type is classed as a mini vertical mill which is capable of performing face milling and boring operations intended to shape cold metal by the use of a rotating cutting tool. Any application other than that it was designed for is considered misuse.

### 4.2 SPECIFICATION

Stock no.....	34023
Part no. ....	MILL-170A
Rated voltage .....	230V
Rated frequency .....	50Hz
Rated input .....	500W
Speed settings.....	2(low/high)
Revolutions per minute (no load).....	0-1100/0-2500min-1
Drilling capacity .....	13mm
End milling capacity.....	16mm
Face milling capacity .....	30mm
Spindle taper .....	MT3
Throat .....	170mm
Headstock travel.....	180mm
Face milling capacity:	
Cross axis travel.....	100mm
Longitude axis travel .....	220mm
T slot.....	12mm
Headstock tilt .....	±45°
Table dimensions.....	390 x 92mm
Sound power level.....	78dB(A)
Weight (gross) .....	60kg

### 4.3 HANDLING AND STORAGE

- Care must be taken when handling this product. Dropping this power tool could have an effect on its accuracy and could also result in personal injury. This product is not a toy and must be respected.
- Environmental conditions can have a detrimental effect on this product if neglected. Exposure to damp air can gradually corrode components. If the product is unprotected from dust and debris, components will become clogged. If not cleaned and maintained correctly or regularly, the machine will not perform at its best.

## 5. HEALTH AND SAFETY INFORMATION

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### 5.1 GENERAL SAFETY INSTRUCTIONS FOR POWER TOOL USE

When using any type of power tool there are steps that should be taken to make sure that you, as the user, remain safe.

Common sense and a respect for the tool will help reduce the risk of injury.

**Read the instruction manual fully.** Do not attempt any operation until you have read and understood this manual.

Most important you must know how to safely start and stop this machine, especially in an emergency.

**Keep the work area tidy and clean.** Attempting to clear clutter from around the machine during use will reduce your concentration. Mess on the floor creates a trip hazard. Any liquid spilled on the floor could result in you slipping.

**Find a suitable location.** If the machine is bench mounted, the location should provide good natural light or artificial lighting as a replacement. Avoid damp and dust locations as it will have a negative effect on the machine's performance. If the machine is portable do not expose the tool to rain. In all cases do not operate power tools near any flammable materials.

**Keep bystanders away.** Children, onlookers and passers by must be restricted from entering the work area for their own protection. The barrier must extend a suitable distance from the tool user.

Unplug and house all power tools that are not in use. A power tool should never be left unattended while connected to the power supply. They must be housed in a suitable location, away locked up and from children. This includes battery chargers.

**Do not overload or misuse the tool.** All tools are designed for a purpose and are limited to what they are capable of doing. Do not attempt to use a power tool (or adapt it in any way) for an application it is not designed for. Select a tool appropriate for the size of the job. Overloading a tool will result in tool failure and user injury. This covers the use of accessories.

**Dress properly.** Loose clothing, long hair and jewellery are all dangerous because they can become entangled in moving machinery. This can also result in parts of body being pulled into the machine. Clothing should be close fitted, with any long hair tied back and jewellery and neck ties removed. Footwear must be fully enclosed and have a non-slip sole.

**Wear personal protective equipment (PPE).** Dust, noise, vibration and swarf can all be dangerous if not suitably protected against. If the work involving the power tool creates dust or fumes wear a dust mask. Vibration to the hand, caused by operating some tools for longer periods must be protected against. Wear vibration reducing gloves and allow long breaks between uses. Protect against dust and swarf by wearing approved safety goggles or a face shield. These are some of the more common hazards and preventions, however, always find out what hazards are associated with the machine/work process and wear the most suitable protective equipment available.

**Do not breathe contaminated air.** If the work creates dust or fumes connect the machine (if possible) to an extraction system either locally or remotely. Working outdoors can also help if possible.

**Move the machine as instructed.** If the machine is hand held, do not carry it by the power supply cable. If the product is heavy, employ a second or third person to help move it safely or use a mechanical device. Always refer to the instructions for the correct method.

**Do not overreach.** Extending your body too far can result in a loss of balance and you falling. This could be from a height or onto a machine and will result in injury.

**Maintain your tools correctly.** A well maintained tool will do the job safely. Replace any damaged or missing parts immediately with original parts from the manufacturer. As applicable, keep blades sharp, moving parts clean, oiled or greased, handles clean, and emergency devices working.

**Wait for the machine to stop.** Unless the machine is fitted with a safety brake, some parts may continue to move due to momentum. Wait for all parts to stop, then unplug it from the power supply

## 5. HEALTH AND SAFETY INFORMATION

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before making any adjustments, carrying out maintenance operations or just finishing using the tool.

**Remove and check setting tools.** Some machinery requires the use of additional tools or keys to set, load or adjust the power tool. Before starting the power tool always check to make certain they have been removed and are safely away from the machine.

**Prevent unintentional starting.** Before plugging any machine in to the power supply, make sure the switch is in the OFF position. If the machine is portable, do not hold the machine near the switch and take care when putting the machine down, that nothing can operate the switch.

**Carefully select an extension lead.** Some machines are not suitable for use with extension leads. If the tool is designed for use outdoors, use an extension lead also suitable for that environment. When using an extended lead, select one capable of handling the current (amps) drawn by the machine in use. Fully extend the lead regardless of the distance between the power supply and the tool. Excess current (amps) and a coiled extension lead will both cause the cable to heat up and can result in fire.

**Concentrate and stay alert.** Distractions are likely to cause an accident. Never operate a power tool if you are under the influence of drugs (prescription or otherwise), including alcohol or if you are feeling tired. Being disorientated will result in an accident.

**Have this tool repaired by a qualified person.** This tool is designed to conform to the relevant international and local standards and as such should be maintained and repaired by someone qualified, using only original parts supplied by the manufacturer. This will ensure the tool remains safe to use.

### 5.2 ADDITIONAL SAFETY INSTRUCTIONS FOR BENCH DRILLS

#### **Mechanical hazards:**

**Crushing.** When setting/changing a tool or maintaining the machine avoid crushing injuries sustained between fixed and moving elements of the machine.

**Cutting or severing.** At all times the workpiece shall be clamped as manual support will lead to injury.

**Entanglement.** Switch off the machine for maintenance, workpiece loading/unloading, swarf/chip removal, cutting/lubrication fluid application as contact with rotating spindle or tool will cause entanglement and possibly lead to injury and entrapment.

**Impact.** Ensure the workpiece is securely clamped at all times to avoid sudden movement (rotation) or ejection causing injury. Ensure any special tools associated with tool exchange, i.e. chuck key are removed prior to attempting to start the machine.

**Stabbing, cutting or puncture wounds.** Take care when handling the tools and avoid contact with swarf and burrs created during drilling as they are extremely sharp.

#### **Electrical hazards:**

**Contact with live parts.** During commissioning, maintenance and trouble shooting operations do not remove, open or expose any electrical, terminal and control boxes due to the danger of electrocution. If the main cable is damaged, unplug the machine immediately and have the cable replaced before continuing.

#### **Audible hazards:**

**Hearing loss.** Wear ear defenders during operation to avoid damage to hearing, however ensure this does not interfere with speech communications or audible warnings.

#### **Material hazards:**

**Contact and inhalation.** Wear personal protective equipment to avoid contact from harmful fluids, gases or dust thrown or created during the drilling process.

**Fire or explosion.** Do not drill or drill in the vicinity of flammable or combustable materials.



## 5. HEALTH AND SAFETY INFORMATION

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### **Location:**

**Posture.** Ensure when mounting the machine that the chosen location does not lead to unhealthy posture or repetitive strain during normal operation.

**Lighting.** Adequate lighting must be provided to ensure no operations are light impaired possibly leading to injury.

**Reach.** Do not reach over or around the machine at any time.

### **Unexpected start-up:**

**Remove the plug.** Remove the plug from the socket before carrying out adjustment, servicing or maintenance.

### **Errors of fitting:**

**Tools.** Ensure a suitable tool for the job in hand is securely and correctly fitted prior to starting the machine. **Guards shall be fitted and in place at all times.**

### **Stability:**

**Toppling.** The drill shall be securely bolted down to a suitable and level surface to prevent the machine from overturning and leading to injury.

**Slipping.** Ensure the area is clean of any residue cutting/lubrication fluid and any other materials which may lead to a slip, trip or other such hazard.

### **General:**

**Limits.** This machine is designed for milling and drilling work pieces up to 300 x 200 x 200mm.

**Training.** Only persons trained in the procedures involved with milling and drilling are permitted to operate this machine.

Always wear the appropriate safety goggles when operating this machine.

Never leave this machine unattended.

### **5.3 RESIDUAL RISK**

**Important:** Although the safety instructions and operating manuals for our tools contain extensive instructions of safe working with power tools, every power tool involves a certain residual risk which can not be completely excluded by safety mechanisms. Power tools must therefore always be operated with caution!

## 5. HEALTH AND SAFETY INFORMATION

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### 5.4 CONNECTION TO THE POWER SUPPLY

**Caution:** Risk of electric shock. Do not open.

This appliance is supplied with a moulded 3 pin mains plug for your safety. The value of the fuse fitted is marked on the pin face of the plug. Should the fuse need replacing, ensure the substitute is of the correct rating, approved to BS1362 and ASTA or BS Kite marked.

ASTA 

BSI 


The fuse cover is removable with a small plain slot screwdriver. Ensure the fuse cover is replaced before attempting to connect the plug to an electrical outlet. If the cover is missing, a replacement must be obtained or the plug replaced with a suitable type.

If a replacement plug is to be fitted this must be carried out by a qualified electrician.

The damaged or incomplete plug, when cut from the cable should be disabled to prevent connection to a live electrical outlet.

This appliance is Class I<sup>†</sup> and is designed for connection to a power supply matching that detailed on the rating label and compatible with the plug fitted.

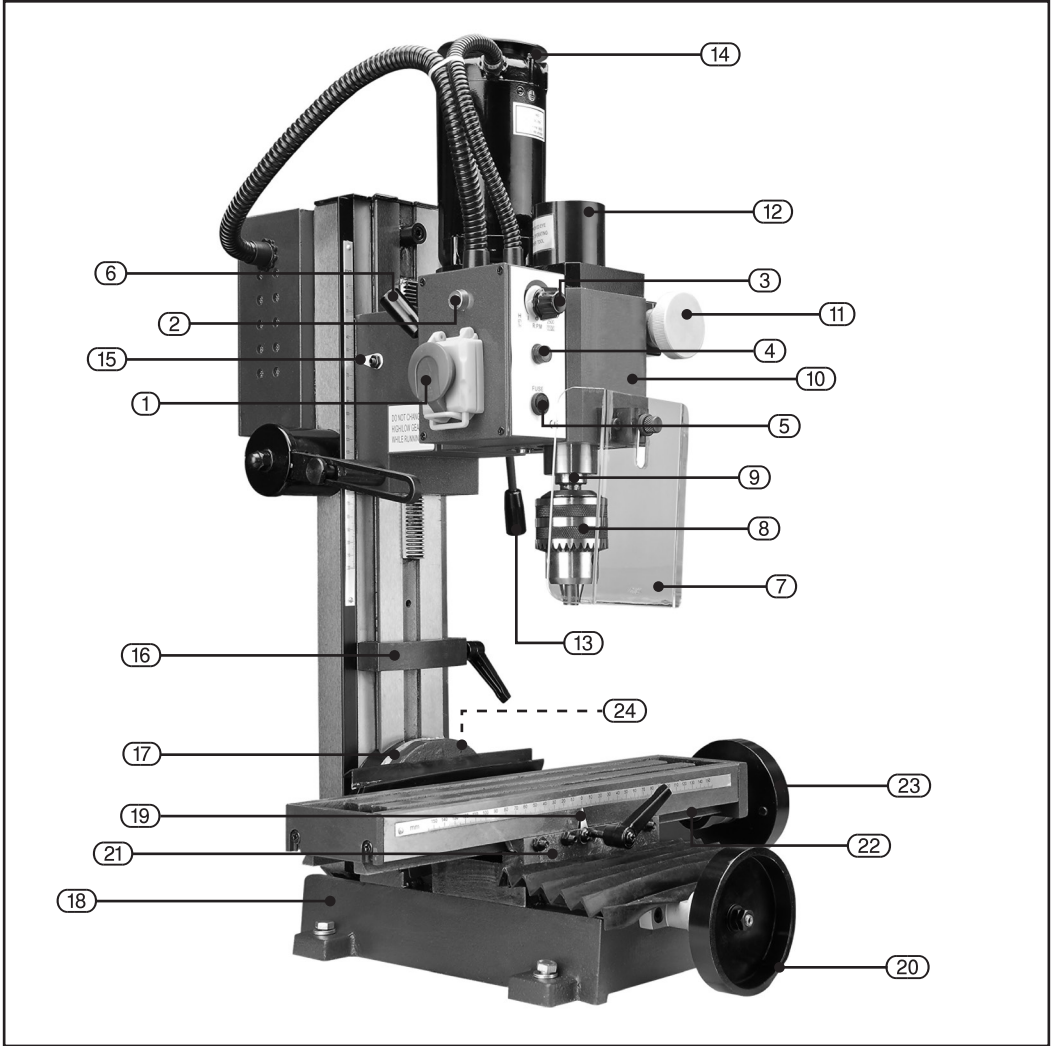
If an extension lead is required, use an approved and compatible lead rated for this appliance. Follow all the instructions supplied with the extension lead.

<sup>†</sup>Earthed : This product requires an earth connection to protect against electric shock from accessible conductive parts in the event of failure of the basic insulation.

**Important: On products exceeding 2000W it is recommended that the power cable and/or extension cable are fully unwound before a connection is made to the power supply. However, ensure the residual cable does not pose a trip hazard.**

# 6. TECHNICAL DESCRIPTION

## 6.1 IDENTIFICATION



- |   |                        |                               |
|---|------------------------|-------------------------------|
| ① Emergency stop switch.                | (8) 13mm geared chuck. | (17) Scale (angle).           |
| (2) Amber light (protection indicator). | (9) Arbor.             | (18) Base.                    |
| (3) Variable speed dial.                | (10) Headstock.        | (19) Scale (longitude).       |
| (4) Green light (power indicator).      | (11) Fine feed wheel.  | (20) Cross feed handle.       |
| (5) Fuse compartment.                   | (12) Spindle cover.    | (21) Saddle.                  |
| (6) Speed selection lever.              | (13) Feed handle.      | (22) Work table.              |
| (7) Guard.                              | (14) Motor.            | (23) Longitudinal feed.       |
|   | (15) Scale (feed).     | (24) Headstock angle locknut. |
|   | (16) Feed limit block. |                               |

## 7. UNPACKING AND CHECKING

### 7.1 PACKAGING

Carefully remove the product from the packaging and examine it for any sign of damage that may have happened during shipping. Lay the contents out and check them against the parts shown below. If any part is damaged or missing, please contact the Draper Help Line (the telephone number appears on the Title page) and do not attempt to use the product.

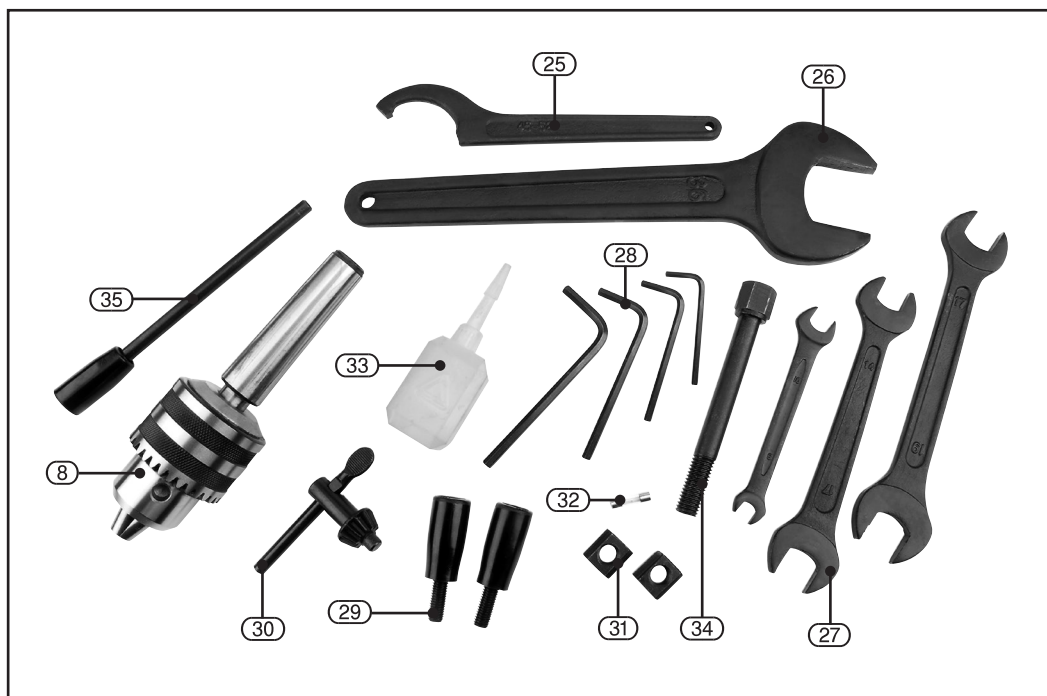
The packaging material should be retained at least during the warranty period, in case the machine needs to be returned for repair.

#### Warning!

- Some of the packaging materials used may be harmful to children. Do not leave any of these materials in the reach of children.
- If any of the packaging is to be thrown away, make sure they are disposed of correctly, according to local regulations.

### 7.2 WHAT'S IN THE BOX

As well as the main product, there are several parts not fitted or attached to it.



(8) 13mm geared chuck.

(25) Service spanner.

(26) 36mm spanner.

(27) D.O.E. spanners: 8-10mm, 14-17mm, 17-19mm.

(28) Hexagon keys: 3, 4, 5, 6mm.

(29) Handle.

(30) Chuck key.

(31) T-nut.

(32) 5A glass fuse.

(33) Oil bottle.

(34) Draw bar.

(35) Fixing pin.

## 8. ASSEMBLY INSTRUCTIONS

**Note:** With the exception of some minor assembly, this machine comes “ready to run” straight from the packaging.

### 8.1 HANDLE ATTACHMENTS – FIG.1

Both the longitudinal and cross feed wheels require the handle to be fitted.

- Pass bolt (A) through the handle (B) and thread on nut (C).
- Screw the bolt (A) into the threaded hole in wheel (D).
- When enough of the thread from bolt (A) is screwed into handle (D), hold bolt (A) firmly with a flat blade screwdriver while tightening nut (C) back onto wheel (D). This locks the thread preventing bolt (A) coming loose while making adjustments.

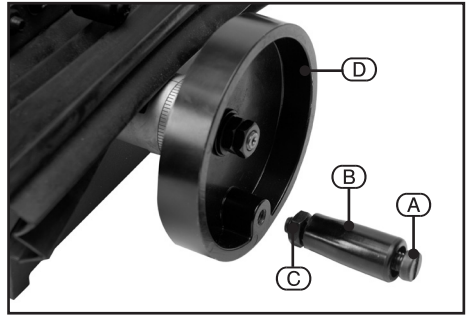


FIG.1



FIG.2

### 8.2 INSTALLATION – FIG.2

Before the machine can be used, a suitable location must be found. The area must be flat, level and be able to comfortably accommodate the weight of this machine and any workpieces.

The area must also be well lit and provide adequate space around the machine to allow for odd shape workpieces.

**Warning!** Any manual lifting or transportation of this machine must be carried out by more than one person.

With a suitable location chosen, mark and drill mounting holes in the workbench. As fixings are not supplied, suitable ones must be found.

This type of machine should be mounted on a rubber mat specifically designed to absorb and reduce the transfer of vibration.

Areas liable to excess dust, moisture and direct sunlight should be avoided.

**Note:** Before first use - follow the initial starting instruction and remove any anti-rust protection which have been applied for transportation.

## 9. OPERATION & USE

**Attention:** Before using this machine each time, the following checks must be carried out:

- Make sure all tools required for maintenance and cutter change over have been removed.
- Remove all obstacles from around the machine.
- Make sure the headstock angle is correctly adjusted and locked tight.
- Check the chuck and spindle turn freely (with the power disconnected).
- Make sure the appropriate gear ratio is selected.
- Turn on the machine to check the direction of spindle rotation is clockwise.
- Adjust the longitudinal feed, cross feed and headstock feed to check they move freely.

### 9.1 GEAR SELECTION – FIG.3

**Warning!** This machine must be operated by trained persons only.

Select the appropriate gear ratio, depending on the intended operation, the material type and the material size.

**Attention:** Do not attempt to change gear while the machine is running.

- With the motor stationary move the gear lever (E) to the left to select low gear (0-1,100min<sup>-1</sup>) or the right to select high gear (0-2,500min<sup>-1</sup>).

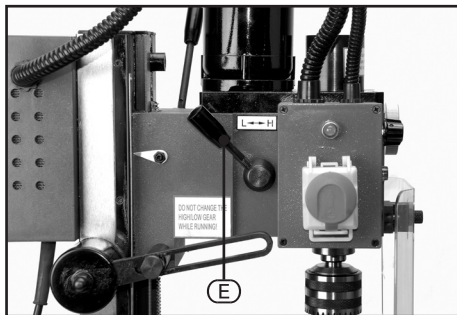


FIG.3

# 9. OPERATION & USE

## 9.2 STARTING AND STOPPING – FIG.4

Make sure the power is on.

### Starting:

- Slide the red button (F) upward and hold to unlock the switch cover.
- Lift up the switch cover to release the emergency stop switch. The green light (G) will come on.
- Turn the speed dial (H) clockwise to start the motor.

**Note:** If the amber light (I) is lit. This indicates the protection circuit is active preventing the motor from starting.

This occurs when the power supply was interrupted while the machine was still running. It is designed to prevent accident and injuries caused by the machine unintentionally restarting.

To reset the amber light, turn the speed dial anti-clockwise until it clicks.

The amber light will go out and the machine can be started normally.

**Note:** If no lights appear remove the plug from the power supply before checking the glass fuse (J) is installed and still intact.

### Stopping:

- In an emergency striking the switch cover (F) will operate the stop button.

**Note:** Under normal conditions turn the speed dial (H) anti-clockwise until it clicks.

When leaving the machine unattended, push the stop button cover closed and remove the plug from the power supply.

**Warning!** Before attempting adjustment, servicing or maintenance, remove the plug from the power supply.

## 9.3 HEADSTOCK ANGLE ADJUSTMENT – FIG.5

The headstock angle indicator can be used as a guide; however, to make sure exact angle is set, an engineers protractor is recommended.

- Support the headstock to prevent it falling.
- With the 36mm spanner (K) loosen nut (L).
- Adjust the headstock to desired angle.
- Fully tighten nut (L).

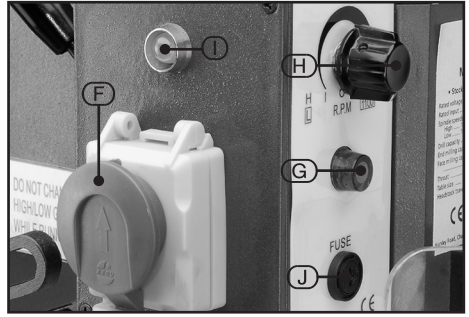


FIG.4

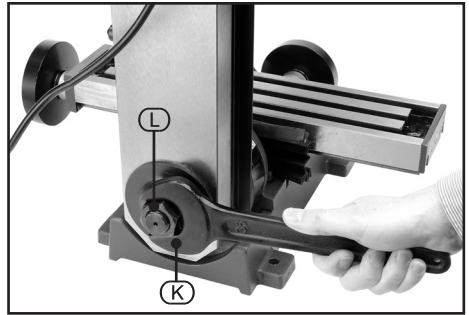


FIG.5

## 9. OPERATION & USE

### 9.4 PLUNGE AND PLUNGE STOP – FIGS.6-8

The manual feed action on this machine has two settings:

1. Micro adjustment for milling operations.
2. Unrestricted which allows quicker feeding over a larger distance. This is for drilling and setting up for milling.

- For unrestricted feed movement, pull the hub (M) of the feed handles out, away from the machine body.
- For micro adjustment - make sure the teeth mate correctly, then push the hub (M) inward.
- To adjust the feed while the machine is setup like this, simply rotate dial (N).

If necessary it is possible to limit the depth of the feed.

- Adjust the block (O) to the desired height and lock in place with the handle (P).

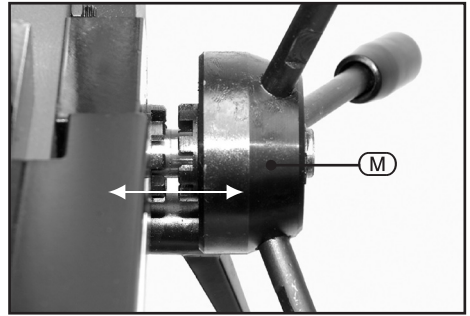


FIG.6

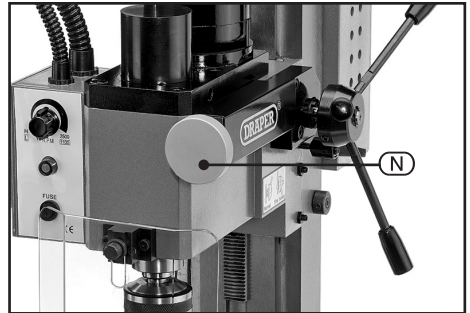


FIG.7

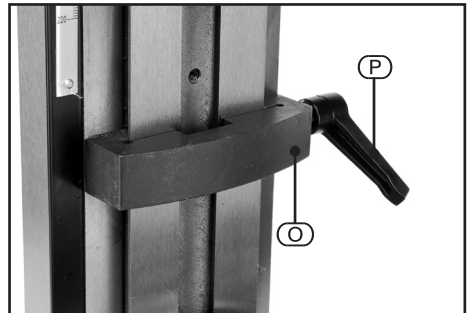


FIG.8



## 9. OPERATION & USE

**Warning!** Never attempt to adjust, maintain or service this machine while it is connected to the power supply.

### 9.5 ARBOR REMOVAL – FIGS.9-10

The arbor is held in place with a draw bar (a bolt which screws into the end of the arbor).

- Remove the protective cover (Q) by pulling it upwards.
- Insert the fixing pin (R) through the hole in the top of the spindle.

**Note:** The chuck may require manually turning until the pin correctly locates, locking the spindle.

- With the 14mm spanner loosen the draw bar (S) one half turn anti-clockwise.
- With a soft blow mallet carefully strike the top of the draw bar.
- Continue loosening and striking the draw bar alternately until the arbor becomes free.

**Note:** Do not loosen the draw bar too much before striking it as damage will occur to the threads.

To refit the arbor - make sure the tapers are clean before taping it up into the spindle, then secure it in place with the draw bar.

**Attention:** Always replace the protective cover before connecting this machine to the power supply.



FIG.9

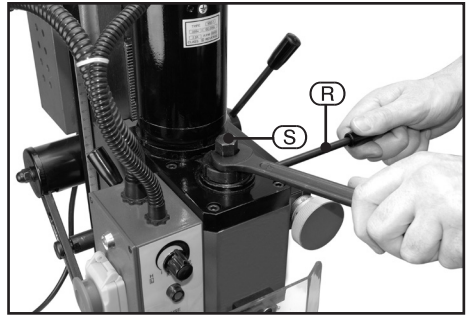


FIG.10

# 10. MAINTENANCE

## 10.1 DAILY MAINTENANCE

Inspect each operating part or ensure the condition of lubrication.

Examine each component for abnormal situations.

Clean and remove obstacles around the machine to prevent damage and maintain the safety of the operator.

Keep the machine clean after daily use and lubricate moving parts to prevent rust.

Watch the machine for any unusual events; stop and repair immediately.

## 10.2 REGULAR MAINTENANCE

Use clean cotton or soft gauze to clean each part of the machine.

Check the motion of the machine's head and fixture are smooth.

Check tightness of each nut and bolt.

## 10.3 MAINTENANCE OF CUTTER

Use a rag while installing or unloading the cutter to prevent the cutter falling and causing injuries or damage to the cutter.

Keep the cutter in a wooden or plastic box when you don't need it, in order to maintain the sharp blade.

Pay extra attention on cutter rotating direction. Incorrect direction might cause damage to the cutter or injury.

Put the cutter and workpiece in place before you turn on the machine. After turning on the machine, the cutter will get close to the workpiece and mill it.

Sharpen or replace the cutter as soon as it becomes dull.

## 10.4 ATTENTION ITEMS FOR ACCESSORIES

Please keep the taper shank clean.

Please keep the taper shank and cutter in order and keep the same cutter together.

Draw bar and chuck have their own wrenches. For your convenience, please keep the wrenches near by the machine and never operate the machine with inappropriate tools.

Please use wrench to tighten the nuts and never use other tools.

## 10.5 MECHANICS LUBRICATION

In order to ensure precision, maintain lubrication on contact faces.

The following are the item the needs to be lubricated on this machine.

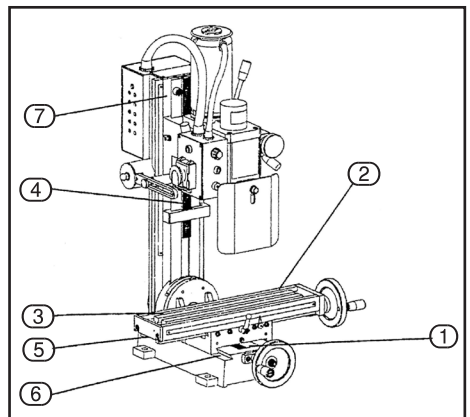
### Use lubricating oil:

- ① Base and saddle seat slide face.
- ② Saddle seat and worktable slide fence.
- ③ Headstock gear and connecting strut slide face.
- ④ Headstock and spindle box slide face.

### Use lubricating grease:

- ⑤ X-axis feeding screw (saddle seat).
- ⑥ Y-axis feeding screw (working table).
- ⑦ Z-axis feeding gear rack (fuselage).

After working, clean the worktable and lubricate with a little lubricant to protect the worktable.



# 11. OPTIONAL ACCESSORIES

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## 11.1 OPTIONAL ACCESSORIES

A full range of accessories are available from Draper Tools.

Please visit our website for details: [www.drapertools.com](http://www.drapertools.com)

# 12. DISPOSAL

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## 12.1 DISPOSAL

- At the end of the machine's working life, or when it can no longer be repaired, ensure that it is disposed of according to national regulations.
- Contact your local authority for details of collection schemes in your area.

In all circumstances:

- Do not dispose of power tools with domestic waste.
- Do not incinerate.
- Do not dispose of WEEE\* as unsorted municipal waste.



\* Waste Electrical & Electronic Equipment.

# 13. EXPLANATION OF SYMBOLS

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## 13.1 EXPLANATION OF SYMBOLS



Read the instruction manual.



Wear face mask and safety glasses.



Wear ear defenders.



Wear protective gloves.



Keep hands away from blade.



WEEE –  
Waste Electrical & Electronic Equipment.  
Do not dispose of Waste Electrical & Electronic  
Equipment in with domestic rubbish.



Disable the machine before  
attempting to maintain it.

# NOTES

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# NOTES

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## **CONTACTS**

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**Service/Warranty Repair Agent:**

For aftersales servicing or warranty repairs, please contact the Draper Tools Help Line for details of an agent in your local area.

### **YOUR DRAPER STOCKIST**

RDMC0922

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