

DRAPER®

INSTRUCTIONS FOR **350W** **Milling Machine**

Stock No.34023 Part No.MILL-170

IMPORTANT: PLEASE READ THESE INSTRUCTIONS CAREFULLY TO ENSURE THE SAFE AND EFFECTIVE USE OF THIS PRODUCT.



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GENERAL INFORMATION

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. Contents/Guarantee	1	9. Optional accessories	12
2. Specification	2	10. Disposal	12
3. Power supply	3	11. Explanation of symbols/pictograms.....	13
4. Safety instructions	4	12. Maintenance	14
5. Additional safety instructions	5	PREVENTION AND MAINTENANCE	
6. Identification guide	6	12.1 Daily maintenance	14
7. Assembly		12.2 Regular maintenance	14
7.1 Handle attachments	7	MAINTENANCE OF CUTTER	
7.2 Installation	7	12.3 Maintenance of cutter.....	14
8. Operation & Use		12.4 Attention items for accessories.....	14
8.1 Gear selection	8	12.5 Mechanics lubrication.....	14
8.2 Starting and stopping.....	9	Declaration of conformity.....	Enclosed
8.3 Headstock angle adjustment	9		
8.4 Plunge and plunge stop.....	10		
8.5 Arbor removal	11		

1. GUARANTEE

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 Helpline (023) 8049 4344.

A proof of purchase must be provided with the tool.

If upon inspection it is found that a fault occurring is due to defective materials or workmanship, repairs will be carried out free of charge. The guarantee period covering parts/labour is 12 months from the date of purchase. The guarantee is extended to 24 months for parts only. This guarantee does not apply to 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 agents.

Note: If the tool is found not to be within the Terms of Warranty, repair and carriage charges will be quoted and made accordingly.

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

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

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

Draper Tools Limited.



2. SPECIFICATION

The Draper Tools policy of continuous improvement determines the right to change specification without notice.

Stock no.	34023
Part no.	MILL-170
Rated voltage	230V
Rated frequency.....	50Hz
Rated input	350W
Speed settings.....	2(low/high)
Revolutions per minute (no load).....	0-1100/0-2500min ⁻¹
Drilling capacity	13mm
End milling capacity.....	16mm
.....	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 pressure level	???.?dB(A)
Sound power level	???.?dB(A)
Vibration level.....	<2.5m/s ²
Weight (gross).....	68kg

ALWAYS WEAR EYE AND EAR PROTECTION.

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 other application is considered misuse.



3. 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.



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.

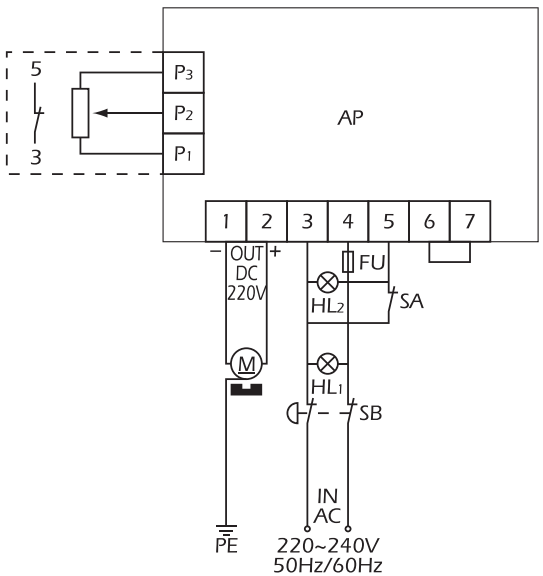
The damaged or incomplete plug, when cut from the cable shall be disabled to prevent connection to a live electrical outlet.

This appliance is Class I[†] 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 instruction supplied with the extension lead.

[†]Earthed : This product requires an earth connection to protect against electric shock from accessible conductive parts in the event of a 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



WARNING: When using electric tools basic safety precautions should always be followed to reduce the risk of fire, electric shock and personal injury including the following.

Read all these instructions before attempting to operate this product and save these instructions.

Safe operation

1. Keep work area clear

- Cluttered areas and benches invite injuries.

2. Consider work area environment

- Do not expose tools to rain.
- Do not use tools in damp or wet locations.
- Keep work area well lit.
- Do not use tools in the presence of flammable liquids or gases.

3. Guard against electric shock

- Avoid body contact with earthed or grounded surfaces (e.g. pipes, radiators, ranges, refrigerators).

4. Keep other persons away

- Do not let persons, especially children, not involved in the work touch the tool or the extension cord and keep them away from the work area.

5. Store idle tools

- When not in use, tool should be stored in a dry locked-up place, out of reach of children.

6. Do not force the tool

- It will do the job better and safer at the rate for which it was intended.

7. Use the right tool

- Do not force tools to do the job of a heavy duty tool.
- Do not use tools for purposes not intended; for example do not use circular saws to cut tree limbs or logs.

8. Dress properly

- Do not wear loose clothing or jewellery, they can be caught in moving parts.
- Non-skid footwear is recommended when working outdoors.
- Wear protective hair covering to contain long hair.

9. Use protective equipment

- Use safety glasses.
- Use face or dust mask if working operations create dust.

10. Connect dust extraction equipment

- If the tool is provided for the connection of dust extraction and collecting equipment, ensure these are connected and properly used.

11. Do not abuse the cord

- Never yank the cord to disconnect it from the socket. Keep the cord away from heat, oil and sharp edges.

12. Secure work

- Where possible use clamps or a vice to hold the work. It is safer than using your hand.

13. Do not overreach

- Keep proper footing and balance at all times.

14. Maintain tools with care

- Keep cutting tools sharp and clean for better and safer performance.
- Follow instruction for lubricating and changing accessories.
- Inspect tool cords periodically and if damaged have them repaired by an authorised service facility.
- Inspect extension cords periodically and replace if damaged.
- Keep handles dry, clean and free from oil and grease.

15. Disconnect tools

- When not in use, before servicing and when changing accessories such as blades, bits and cutters, disconnect tools from the power supply.

16. Remove adjusting keys and wrenches

- Form the habit of checking to see that keys and adjusting wrenches are removed from the tool before turning it on.

17. Avoid unintentional starting

- Ensure switch is in "off" position when plugging in.

18. Use outdoor extension leads

- When the tool is used outdoors, use only extension cords intended for outdoor use and so marked.

19. Stay alert

- Watch what you are doing, use common sense and do not operate the tool when you are tired.

20. Check damaged parts

- Before further use of tool, it should be carefully checked to determine that it will operate properly and perform its intended function.
- Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may affect its operation.
- A guard or other part that is damaged should be properly repaired or replaced by an authorised service centre unless otherwise indicated in this instruction manual.
- Have defective switches replaced by an authorized service centre.
- Do not use the tool if the switch does not turn it on and off.

21. Warning

- The use of any accessory or attachment other than one recommended in this instruction manual may present a risk of personal injury.

22. Have your tool repaired by a qualified person

- This electric tool complies with the relevant safety rules. Repairs should only be carried out by qualified persons using original spare parts, otherwise this may result in considerable danger to the user.

ADDITIONAL SAFETY INSTRUCTIONS FOR BENCH DRILLS

MECHANICAL HAZARDS:

1. Crushing

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

2. Cutting or Severing

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

3. 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.

4. 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.

5. 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:

1. 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:

1. 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:

1. Contact and Inhalation

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

2. Fire or Explosion

Do not drill or drill in the vicinity of flammable or combustible materials.

LOCATION:

1. Posture

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

2. Lighting

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

3. Reach

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

UNEXPECTED START-UP:

1. Remove the plug

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

ERRORS OF FITTING:

1. 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:

1. Toppling

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

2. Slipping

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

GENERAL:

1. Limits

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

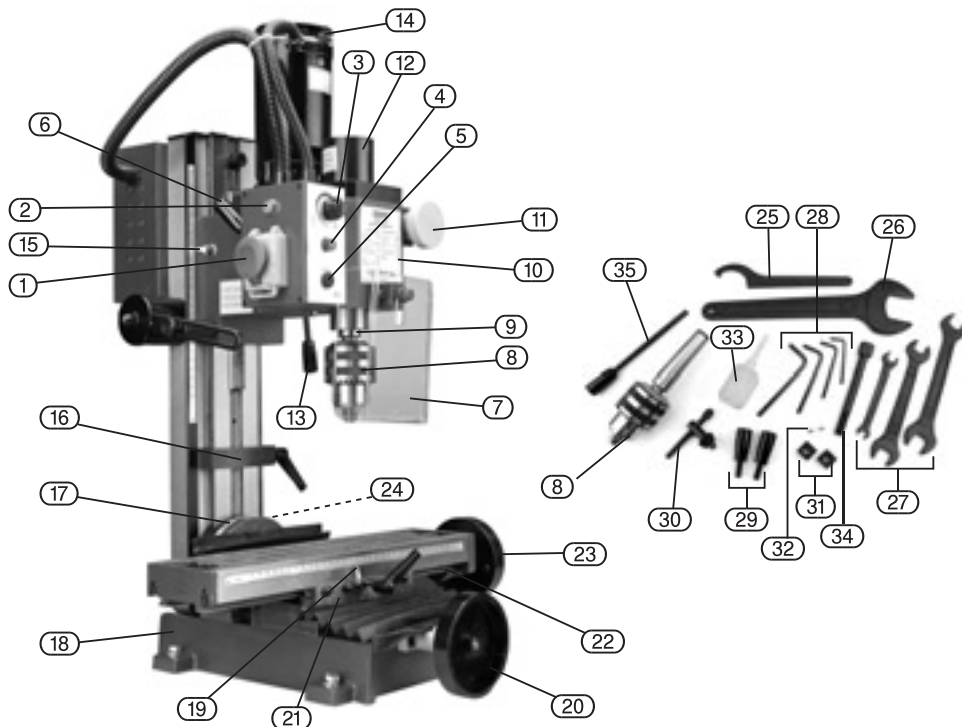
2. Training

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

3. Always wear the appropriate safety goggles when operating this machine.

4. Never leave this machine unattended.

6. IDENTIFICATION GUIDE



- | | | |
|---------------------------------------|----------------------------|--|
| ① Emergency stop switch. | ⑫ Spindle cover. | ⑫ Service spanner. |
| ② Amber light (protection indicator). | ⑬ Feed handle. | ⑫ 36mm spanner. |
| ③ Variable speed dial. | ⑭ Motor. | ⑫ D.O.E. spanners: 8-10mm, 14-17mm, 17-19mm. |
| ④ Green light (power indicator). | ⑮ Scale (feed). | ⑫ Hexagon keys: 3, 4, 5, 6mm. |
| ⑤ Fuse compartment. | ⑯ Feed limit block. | ⑫ Handle. |
| ⑥ Speed selection lever. | ⑰ Scale (angle). | ⑫ Chuck key. |
| ⑦ Guard. | ⑱ Base. | ⑫ T-nut. |
| ⑧ 13mm geared chuck. | ⑲ Scale (longitude). | ⑫ 5A glass fuse. |
| ⑨ Arbor. | ⑳ Cross feed handle. | ⑫ Oil bottle. |
| ⑩ Headstock. | ㉑ Saddle. | ⑫ Draw bar. |
| ⑪ Fine feed wheel. | ㉒ Work table. | ⑫ Fixing pin. |
| | ㉓ Longitudinal feed. | |
| | ㉔ Headstock angle locknut. | |

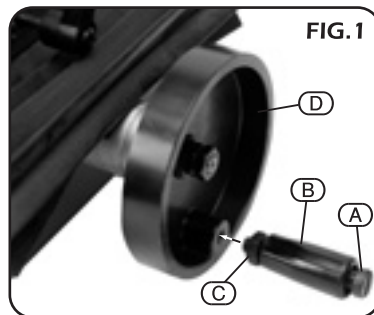
- **UNPACKING:** After removing the packing material, make sure the product is in perfect condition and that there are no visible damaged parts. If in doubt, do not use the product and contact the dealer from whom it was purchased.
- The packaging materials (plastic bags, polystyrene, etc.), must be disposed of in an appropriate refuse collection container. These materials must not be left within the reach of children as they are potential sources of danger.

With the exception of some minor assembly, this machine comes "ready to run" straight from the packaging.

7.1 HANDLE ATTACHMENTS (FIG.1):

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

- i. Pass bolt (A) through the handle (B) and thread on nut (C).
- ii. Screw the bolt (A) into the threaded hole in wheel (D).
- iii. 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.



7.2 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.

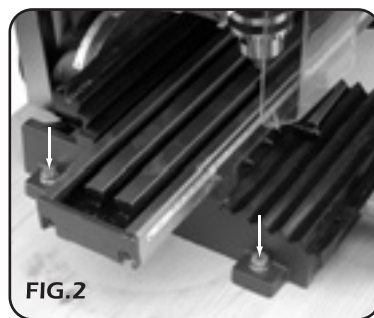
The area must also be well lit and provide adequate space around the machine to allow for odd shape workpieces.

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 work bench. 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.



ATTENTION! Before using this machine each time, the following checks must be carried out:

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

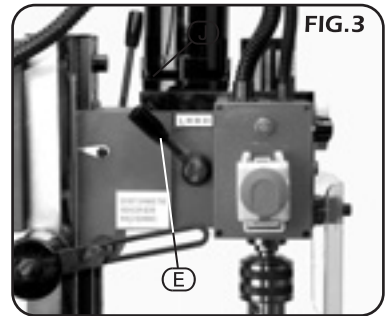
8.1 GEAR SELECTION (FIG.3):

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.

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



8.2 STARTING AND STOPPING (Fig.4):

Make sure the power is on.

Starting:

- i. Slide the red button (F) upward and hold to unlock the switch cover.
- ii. Lift up the switch cover to release the emergency stop switch. The green light (G) will come on.
- iii. 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.

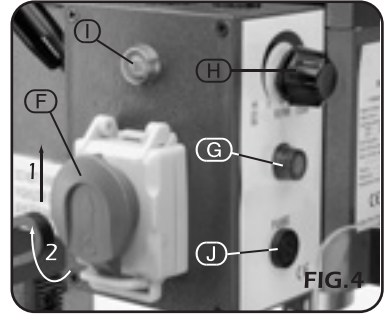
NOTE: If no lights appear remove the plug from the power supply before checking the glass fuse (J) is installed and still intact.

Stopping:

- i. 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.

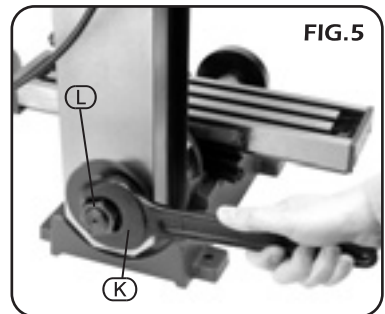


WARNING! Before attempting adjustment, servicing or maintenance, remove the plug from the power supply.

8.3 HEADSTOCK ANGLE ADJUSTMENT (Fig.5):

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

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



8.4 PLUNGE AND PLUNGE STOP (Figs.6-8):

The manual feed action on this machine has two settings:

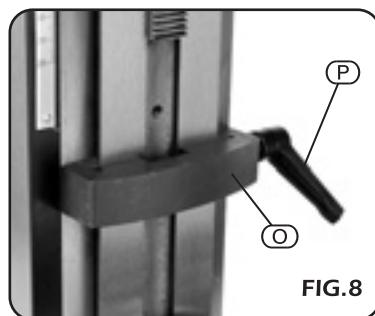
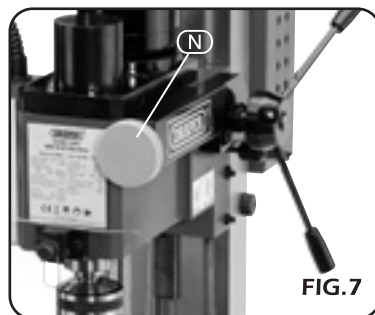
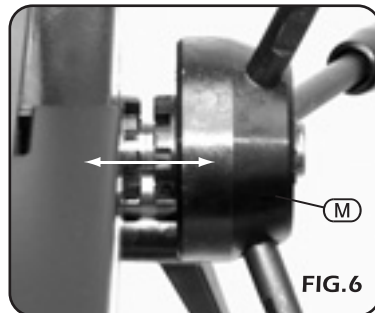
- Micro adjustment for milling operations.
- Unrestricted which allows quicker feeding over a larger distance.

This is for drilling and setting up for milling.

- i. For unrestricted feed movement, pull the hub (M) of the feed handles out, away from the machine body.
- ii. For micro adjustment - make sure the teeth mate correctly, then push the hub (M) inward.
- iii. 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 feed.

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



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

8.5 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).

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

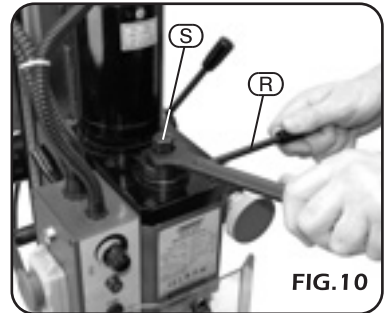
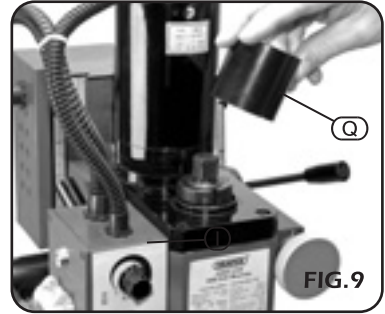
NOTE: The chuck may require manually turning until the pin correctly locates, locking the spindle.

- iii. With the 14mm spanner loosen the draw bar (S) one half turn anti-clockwise.
- iv. With a soft blow mallet carefully strike the top of the draw bar.
- v. 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.



9. OPTIONAL ACCESSORIES

Please contact your local Draper stockist for details of accessories compatible with this machine.

10. 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 abandon in the environment.
- Do not dispose of WEEE* as unsorted municipal waste.



* Waste Electrical & Electronic Equipment.

11. EXPLANATION OF SYMBOLS/PICTOGRAMS



Do not dispose of WEEE*
as unsorted municipal waste.

* Waste Electrical & Electronic Equipment.

PREVENTION AND MAINTENANCE

12.1 DAILY MAINTENANCE

Inspect each operating part to 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.

12.2 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.

MAINTENANCE OF ACCESSORIES

12.3 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.

12.4 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.

12.5 MECHANICS LUBRICATION

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

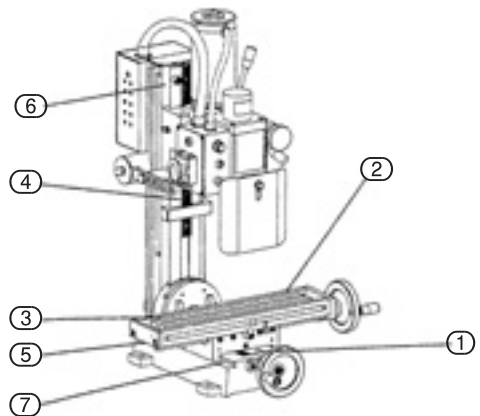
The following are the item the needs to be lubricated on this machine.

USE LUBRICATING OIL

- ① Base and saddle seat slide face.
- ② Saddle seat and worktable slide face.
- 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.

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- **Service/Warranty Repair Agent**
For aftersales servicing or warranty repairs, please
contact the Draper Tools Helpline for details of an
agent in your local area.

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