Bäumr-AG®

Mill Drill BMMDL-07 + Metal Lathe BMLAT-05

User Manual

READ THIS MANUAL CAREFULLY BEFORE USE – FAILURE TO DO SO MAY RESULT IN INJURY, PROPERTY DAMAGE AND MAY VOID WARRANTY. • KEEP THIS MANUAL FOR FUTURE REFERENCE. • Products covered by this manual may vary in appearance, assembly, inclusions, specifications, description and packaging.

Safety

Safety messages are designed to alert you to possible dangers or hazards that could cause death, injury or equipment or property damage if not understood or followed. Safety messages have the following symbols:

You WILL be KILLED or SERIOUSLY INJURED if you do not follow instructions.

You CAN be KILLED or SERIOUSLY INJURED if you do not follow instructions.

You CAN be INJURED if you do not follow instructions or equipment damage may occur.

It is vital that you read and understand this user manual before using the product, including safety warnings, and any assembly and operating instructions. Keep the manual for future reference.

Safety precautions and recommendations detailed here must be fully understood and followed to reduce the risk of injury, fire, explosion, electrical hazard, and/or property damage.

Safety information presented here is generic in nature – some advice may not be applicable to every product. The term "equipment" refers to the product, be it electrical mains powered, battery powered or combustion engine powered.

- **Before Use** - If you are not familiar with the safe operation/handling of the equipment or are in any way unsure of any aspect of suitability or correct use for your application, you should complete training conducted by a person or organization qualified in safe use and operation of this equipment, including fuel/electrical handling and safety.
- Do NOT operate the equipment in flammable or explosive environments, such as in the presence of flammable liquids, gases or dust. The equipment may create sparks or heat that may ignite flammable substances.
- Keep clear of moving parts.
- Equipment may be a potential source of electric shock or injury if misused.
- Do NOT operate the equipment if it is damaged, malfunctioning or is in an excessively worn state.
- Do NOT allow others to use the equipment unless they have read this manual and are adequately trained.
- Keep packaging away from children - risk of suffocation! Operators must use the equipment correctly. When using the equipment, consider conditions and pay due care to persons and property.

General Work Area Safety

- Work areas should be clean and well it.
- Do not operate the equipment if bystanders, animals etc are within operating range of the equipment or the general work area.
- If devices are provided for connecting dust extraction / collection facilities, ensure these are connected and used properly. Dust collection can reduce dust-related hazards.

General Personal Safety

- Wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect from eye and ear injury, poisoning, burns, cutting and crush injuries. Protective equipment such as safety goggles, respirators, non-slip safety footwear, hard hat, hearing protection etc should be used for appropriate equipment / conditions. Other people nearby should also wear appropriate personal protective equipment. Do not wear loose clothing or jewellery, which can be caught in moving parts. Keep hair and clothing away from the equipment.
- Stay alert and use common sense when operating the equipment. Do not over-reach. Always maintain secure footing and balance.
- Do not use the equipment if tired or under the influence of drugs, alcohol or medication.
- This equipment is not intended for use by persons with reduced physical, sensory or mental capabilities.

General Fuel Safety

- Petrol/fuel/gasoline is extremely flammable – keep clear of naked flames or other ignition sources.
- Do not spill fuel. If you spill fuel, wipe it off the equipment immediately – if fuel gets on your clothing, change clothing.
- Do NOT smoke near fuel or when refuelling.
- Always shut off the engine before refuelling.
- Do NOT refuel a hot engine.
- Open the fuel cap carefully to allow any pressure build-up in the tank to release slowly.
- Always refuel in well ventilated areas.
- Always check for fuel leakage. If fuel leakage is found, do not start or run the engine until all leaks are fixed.

General Carbon-Monoxide Safety

- Using a combustion engine indoors **CAN KILL IN MINUTES**. Engine exhaust contains carbon-monoxide – a poison you cannot smell or see.
- Use combustion engines OUTSIDE only, and far away from windows, doors and vents.

General Equipment Use and Care

- The equipment is designed for domestic use only.
- Handle the equipment safely and carefully.
- Before use, inspect the equipment for misalignment or binding of moving parts, loose components, damage or any other condition that may affect its operation. If damaged, have the equipment repaired by an authorised service centre or technician before use.
- Prevent unintentional starting of the equipment - ensure equipment and power switches are in the OFF position before connecting or moving equipment. Do not carry equipment with hands or fingers touching any controls. Remove any tools or other items that are not a part of the equipment from it before starting or switching on.
- Do not force the equipment. Use the correct equipment for your application. Equipment will perform better and be safer when used within its design and usage parameters.
- Use the equipment and accessories etc. in accordance with these instructions, considering working conditions and the work to be performed. Using the equipment for operations different from those intended could result in hazardous situations.
- Always keep equipment components (engines, hoses, handles, controls, frames, housings, guards etc) and accessories (cutting tools, nozzles, bits etc) properly maintained. Keep the equipment clean and, where applicable, properly lubricated.
- Store the equipment out of reach of children or untrained persons. To avoid burns or fire hazards, let the equipment cool completely before transporting or storing. Never place or store the equipment near flammable materials, combustible gases or liquids etc.
- The equipment is not weather-proof, and should not be stored in direct sunlight, at high ambient temperatures or locations that are damp or humid.
- Do not clean equipment with solvents, flammable liquids or harsh abrasives.
- For specific equipment safety use and care, see Equipment Safety.

General Electrical Safety

- Inspect electrical equipment, extension cords, power bars, and electrical fittings for damage or wear before each use. Repair or replace damaged equipment immediately.
- Ensure all power sources conform to equipment voltage requirements and are disconnected before connecting or disconnecting equipment.
- When wiring electrically powered equipment, follow all electrical and safety codes.
- Wherever possible, use a residual current device (RCD).
- High voltage / high current power lines may be present. Use extreme caution to avoid contact or interference with power lines. Electrical shock can be fatal.

General Electrical Safety

- Electrically grounded equipment must have an approved cord and plug and be connected to a grounded electrical outlet.
- Do NOT bypass the ON/OFF switch and operate equipment by connecting and disconnecting the electrical cord.
- Do NOT use equipment that has exposed wiring, damaged switches, covers or guards.
- Do NOT use electrical equipment in wet conditions or in damp locations.
- Do NOT use electrical cords to lift, move or carry equipment.
- Do NOT coil or knot electrical cords, and ensure electrical cords are not trip hazards.

General Service Information

- The equipment must be serviced or repaired at authorised service centres by qualified personnel only.
- Replacement parts must be original equipment manufacturer (OEM) to ensure equipment safety is maintained.
- Do NOT attempt any maintenance or repair work not described in this manual.
- After use, the equipment and components may still be hot – allow the equipment to cool and disconnect spark plugs and/or electrical power sources and/or batteries from it before adjusting, changing accessories or performing repair or maintenance.
- Do NOT adjust while the equipment is running.
- Perform service related activities in suitable conditions, such as a workshop.
- Replace worn, damaged or missing warning/safety labels immediately.

Mill Drill General Safety

This machine is designed for drilling, deep milling and face milling of small work pieces with size limitations of 300x200x200mm. If the operator intends to use this machine beyond its intended design/purpose, please contact the manufacturer or your dealer before operation.

Do not use the mill drill if you intend to operate it:

- Without reading the manual.
- Without any professional training of drilling and milling.
- Beyond its intended design/purpose and without getting enough advice about safety from manufacturer.
- Without making sure that every safety precaution is followed.

Important Safety Information:

- Noise level during operation is 70 – 75dB(A).
- Temperature range to operate and store this machine should be between -20 to 40°C.
- **WARNING**! After interruption due to power failure, it's possible that the machine will accidentally start up. Please turn OFF the machine as soon as a power failure occurs.
- **WARNING**! Always wear approved eye protection during operation.

Correct Handling:

- The machine is quite heavy. It would be better to carry this machine with the help of an appropriate lifting tool.
- If the operator has to handle this machine without any lifting tools, ensure that the operator can comfortably carry its weight and handle it with care while practicing common sense and self-protection.

WARNING! When using electric tools, basic safety precautions should always be followed to reduce the risk of fire, electric shocks and personal injuries. Read all these instructions before operating this product and save these instructions.

- Keep work area clean. Cluttered areas and benches invite injuries.
- Consider work area environment. Do not expose power outlet to rain or moisture. Do not use power tools in damp or wet locations. Keep work area well lit. Do not use power tools where there is risk of causing a fire or explosion.
- Guard against electric shock. Avoid bodily contact with earthed or grounded surfaces (e.g. pipes, radiators, ranges, refrigerators, etc.)
- Keep children away. Do not let visitors touch the tool or extension cord. All visitors should be kept away from the work area.
- Store idle tools. When not in use, tools should be stored in a dry, high or locked-up place, out of reach of children.
- Do not force the tools. It will do the job better and safer at the rate for which it was intended.
- Use the right tools. Do not force small tools or attachments 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.
- Dress properly. Do not wear loose clothing or jewellery, they can get caught in moving parts. Rubber gloves and non-skid footwear are recommended when working outdoors. Wear protective hair covering to contain long hair.
- Use safety glasses. Also use face or dust mask if the cutting operation is dusty.
- Connect a dust extraction equipment. If devices are provided for the connection of extraction and collection facilities, ensure these are connected and properly used.
- Do not abuse the cord. Never carry the tool by cord or yank it to disconnect it from the socket. Keep the cord away from heat, oil and sharp edges.
- Secure work. Use a clamp or a vise to hold down the work. Once it's fixed securely, you can then use both hands to operate the machine.
- Do not overreach. Always keep proper footing and balance.

- Maintain tools with care. Keep cutting tool sharp and clean for better and safer performance. Follow instructions for lubrication and changing accessories. Inspect tool cord periodically and if damaged have it repaired by an authorised serviced facility. Inspect extension cords periodically and replace, if damaged Keep handle dry, clean and free from oil and grease.
- Disconnect tools. When not in use, before servicing and when changing accessories such as blade, bits and cutters.
- 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.
- Avoid unintentional starting. Do not carry a plugged-in tool with a finger on the switch. Ensure switch. Ensure switch is OFF when plugging in.
- Use outdoor extension leads. When tool is used outdoors, use only extension cords intended for outdoor use.
- Stay alert. Watch what you are doing. Use common sense. Do not operate tool when you are tired. Check damaged parts. Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perfom1 its intended function. Check for alignment of moving parts, free running of moving parts, breakage of parts, mounting and any other conditions that may affect its operation, 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 authorised service facility. Do not use the tool if the switch does not turn it ON and OFF.
- **Warning**. The use of any accessory or attachment, other than those recommended in this instruction manual, may present a risk of personal injury.
- Have your tool repaired by a qualified person. -This electric tool is in accordance with the relevant safety requirements. Repairs should only be carried out by qualified persons using original spare parts, otherwise this may result in considerable danger to the user.

Mini Metal Lathe General Safety

OPERATOR: COMMON SENSE AND CAUTION ARE FACTORS WHICH CANNOT BE BUILT INTO ANY PRODUCT. THESE FACTORS MUST BE SUPPLIED BY THE OPERATOR. PLEASE REMEMBER:

- When using electric tools, machines or equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and personal injury.
- Keep work area clean. Cluttered areas invite injuries.
- Consider work area conditions. Do not use machines or power tools in damp, wet, or poorly lit locations. Do not expose equipment to rain. Keep work area well lit. Do not use tools in the presence of flammable gases or liquids.
- Keep children away. All children should be kept away from the work area.
- Guard against ele9tric shock. Prevent body contact with grounded surfaces such as pipes, radiators, ranges, and refrigerator enclosures.
- Stay alert. Never operate equipment if you are tired.
- Do not operate the product if under the influence of alcohol or drugs. Read warning labels on prescriptions to determine if your judgment or reflexes might be impaired.
- Do not wear loose clothing or jewellery as they can be caught in moving parts.
- Wear restrictive hair covering to contain long hair.
- Use eye and ear protection. Always wear:
  - ANSI approved chemical splash goggles when working with chemicals.
  - ANSI approved impact safety goggles at other times.
  - ANSI approved dust mask or respirator when working around metal, wood, and chemical dusts and mists.
  - A full-face shield if you are producing metal or wood filings.
- Always keep proper footing and balance.
- Do not reach over or across running machines.
- Always check that adjusting keys and wrenches are removed from the tool or machine work surface before plugging it in.
- Do not carry any tool with your finger on either the start button or trigger.
- When servicing, use only identical replacement parts.

Before Operation

- Be sure the switch is OFF when not in use and before plugging in.
- Do not attempt to use inappropriate attachments to exceed the tool's capacity. Approved accessories are available from the dealer or machine maker.
- Check for damaged Parts. Before using any tool, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function.
- Check for alignment and binding of all moving parts, broken parts or mounting fixtures and any other condition that may affect proper operation. Any part that is damaged should be properly repaired or replaced by a qualified technician.
- Do not use the tool if any switch does not turn off and on properly.

Operation

- Never force the tool or attachment to do the work of a larger industrial tool. It is designed to do the job better and more safely at the rate for which it was intended.
- Do not carry the tool by its power cord.
- Always unplug the cord by the plug. Never yank the cord out of the wall.
- Always turn off the machine before unplugging.

IF THERE IS ANY QUESTION ABOUT A CONDITION BEING SAFE OR UNSAFE, DO NOT OPERATE THE TOOL!

Grounding Instructions

This machine has a three-prong plug, the third(round)prong is the ground. Plug this cord only into a three-prong receptacle. Do not attempt to defeat the protection the ground wire provides by cutting off the round prong. Cutting off the ground will result in a safety hazard and void the warranty.

DO NOT MODIFY THE PLUG IN ANY WAY. IF YOU HAVE ANY DOUBT, CALL A QUALIFIED ELECTRICIAN.

Safety Symbols

The product may have safety warning labels attached to it, explained below. Understand the symbols on your product and their meanings. If any stickers become unreadable, unattached etc., replace them.

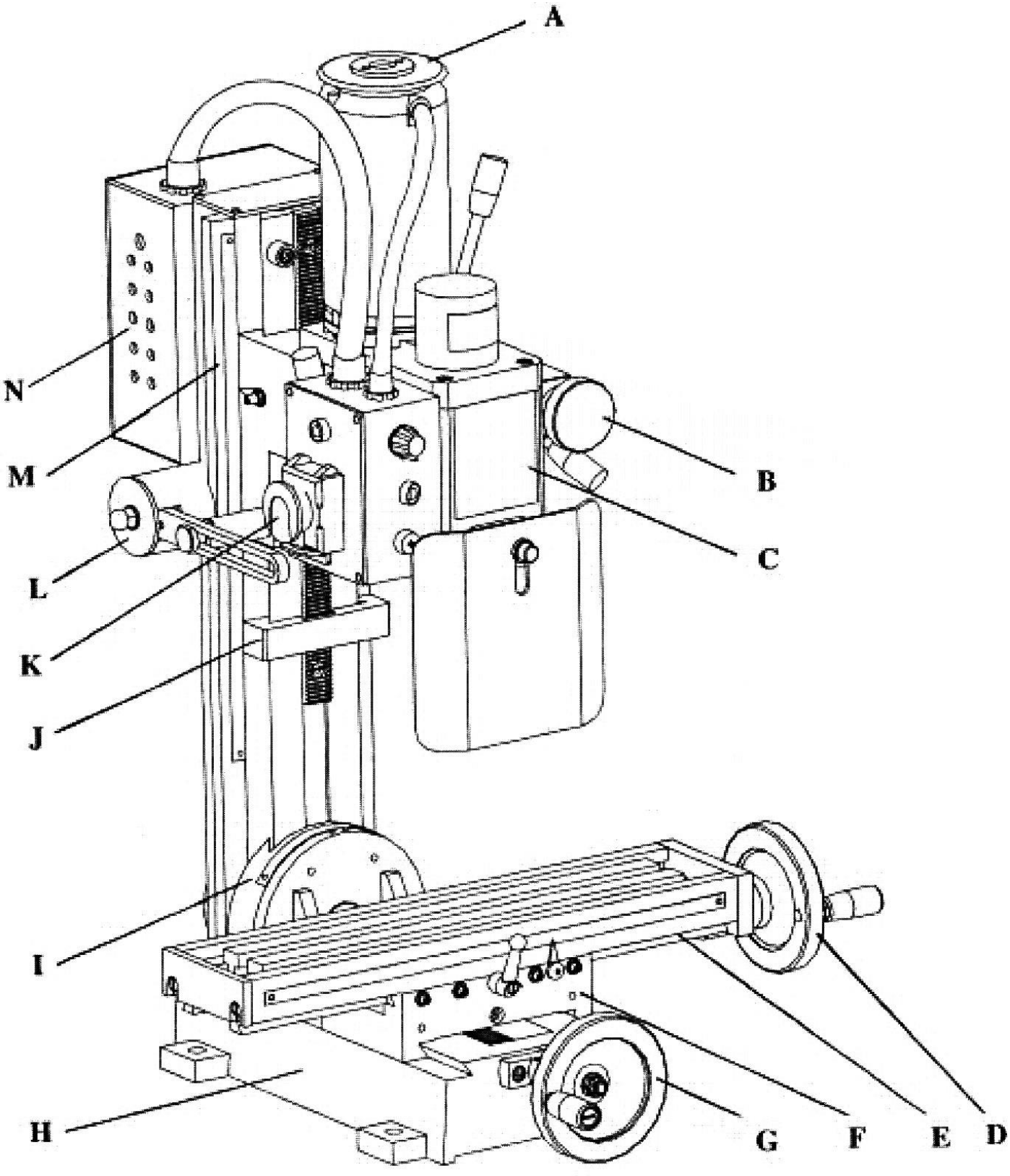
 **Flammable Material Hazard** Flammable liquids, gases or substances etc may present. Avoid ignition sources and open flames. Danger of fire.	 **Read User Manual** Read and fully understand product safety warnings, operation, procedures etc before using the product.	 **Use Hand Protection** Wear appropriate hand protection and take due care as the product or use of the product may present hand hazards.	 **Carbon-Monoxide Hazard** Do not use the product in confined areas or without adequate ventilation. Carbon-monoxide poisoning can be fatal.
 **Electrocution / Electrical Shock Hazard** High voltage or high current electricity may be present or required by the product. Take due care when handling electrical products, cables, plugs and leads. Electrical shock can be fatal.	 **Toxic Fumes / Dust Hazard** Using the product or by-products from use may produce fumes, smoke or particles that could be harmful if inhaled. Wear appropriate breathing protection and have adequate ventilation.	 **Explosive Material Hazard** Combustible liquids, gases or substances etc may be present. Avoid ignition sources and open flames. Danger of explosion.	 **Cutting / Amputation Hazard** The product may have blades, edges or mechanical devices that can cause severe cut injury to fingers, limbs etc. Take due care when handling and using the product.
 **Crush Hazard** The product may have blades, edges or mechanical devices that can cause severe crush injury to fingers, limbs etc. Take due care when handling and using the product.	 **Single Operator Only** The product must be operated by a single person only. More than one person operating the product may introduce additional hazards.	 **Use Face Protection** Wear appropriate full-face protection and take due care as the product or use of the product may present face and eye hazards.	 **Use Foot Protection** Wear appropriate foot protection and take due care as the product or use of the product may present foot hazards.
 **Use Eye / Ear / Head Protection** Wear appropriate eye and / or ear and / or head protection and take due care as the product or use of the product may present eye, hearing and head hazards.	 **Running Hazard** Do not run on or near the product as doing so may present a fall hazard.	 **Diving Hazard** Do not dive into the product as doing so may present a neck / head injury hazard.	 **Adult Supervision Required** Always supervise children and other users of a product to prevent drowning or injury.
 **Skin Penetration / Puncture Hazard** The product may produce pressure, emit liquids or objects that can cause severe injury to fingers, limbs, blood etc. Take due care when handling and using the product.	 **Hot Surface Hazard** Be aware that the product may produce high temperatures and hot surfaces that can cause burn injuries.	 **Flying Debris Hazard** Be aware that the product or use of the product may present hazards produced by flying debris. Wear appropriate clothing and protective devices.	 **Moving Parts Hazard** Be aware that the product contains or uses mechanical devices that move or rotate. Always wait for moving parts to stop fully before handling the product, adjusting, maintenance etc.

 **Carbon-Monoxide Hazard** Do not use the product in confined areas or without adequate ventilation. Carbon-monoxide poisoning can be fatal.	 **Pull Hazard** Be aware that the product contains or uses mechanical devices that can pull in objects and can cause severe injury to fingers, limbs etc. Take due care when handling and using the product.	 **Slope / Fall Injury Hazard** Be aware that using the product on sloping surfaces or in slippery conditions may present additional dangers from falls and contact with blades, moving parts, hot surfaces etc.	 **"Slam Dunk" Warning** Do NOT attempt "slam dunk" manoeuvres as this may result in severe injury due to falling, product breakage or collapse etc.
 **Electrocution / Electrical Shock Hazard - Outdoor** High voltage or high current electricity may be present or required by the product. Do NOT use in rain, damp or wet conditions. Electrical shock can be fatal.	 **Electrocution / Electrical Shock Hazard - Disconnect** High voltage or high current electricity may be present or required by the product. Always disconnect the product from the electrical supply before handling the product, adjusting, maintenance etc.	 **Power Line Electrocution Hazard** High voltage / high current power lines may be present. Use extreme caution to avoid contact or interference with power lines. Electrical shock can be fatal.	 **"Kick-Back" Hazard** High level of "kick-back" hazard that can cause the machine to suddenly rotate towards operator. Kick-back injury can be fatal.
 **Winch Operator Position Hazard** Do NOT stand between winch and load. Do NOT use winch to move people.	 **Winch Lift Hazard** Do NOT LIFT load vertically. Use machine to PULL only.	 **Cable Hazard** Ensure that load bearing cable is not kinked or knotted.	 **Winch Cable Hazard** Ensure that there is a minimum number of cable coils on winching mechanism.
 **Winch Hook Hazard** Carry hook to load – do NOT throw or run.	 **Flash / Blinding Hazard** Wear appropriate eye protection for welding. Direct exposure to weld arcs may cause permanent eye injury.	 **Laser Hazard** Laser may be in use – do NOT look directly at laser or allow others to.	

Table of Contents

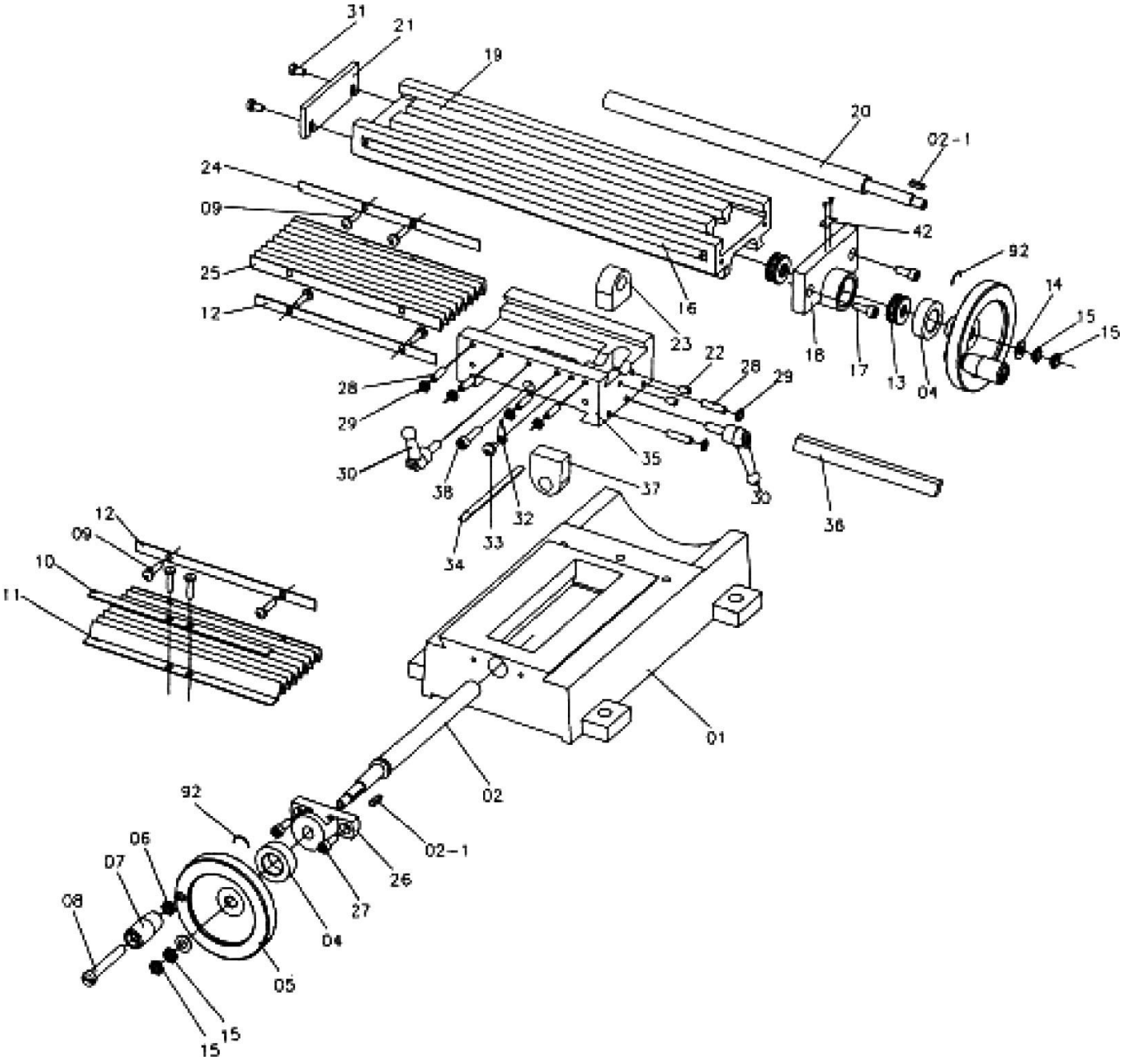
Parts Identification – Mill Drill BMMDL-07

External Features

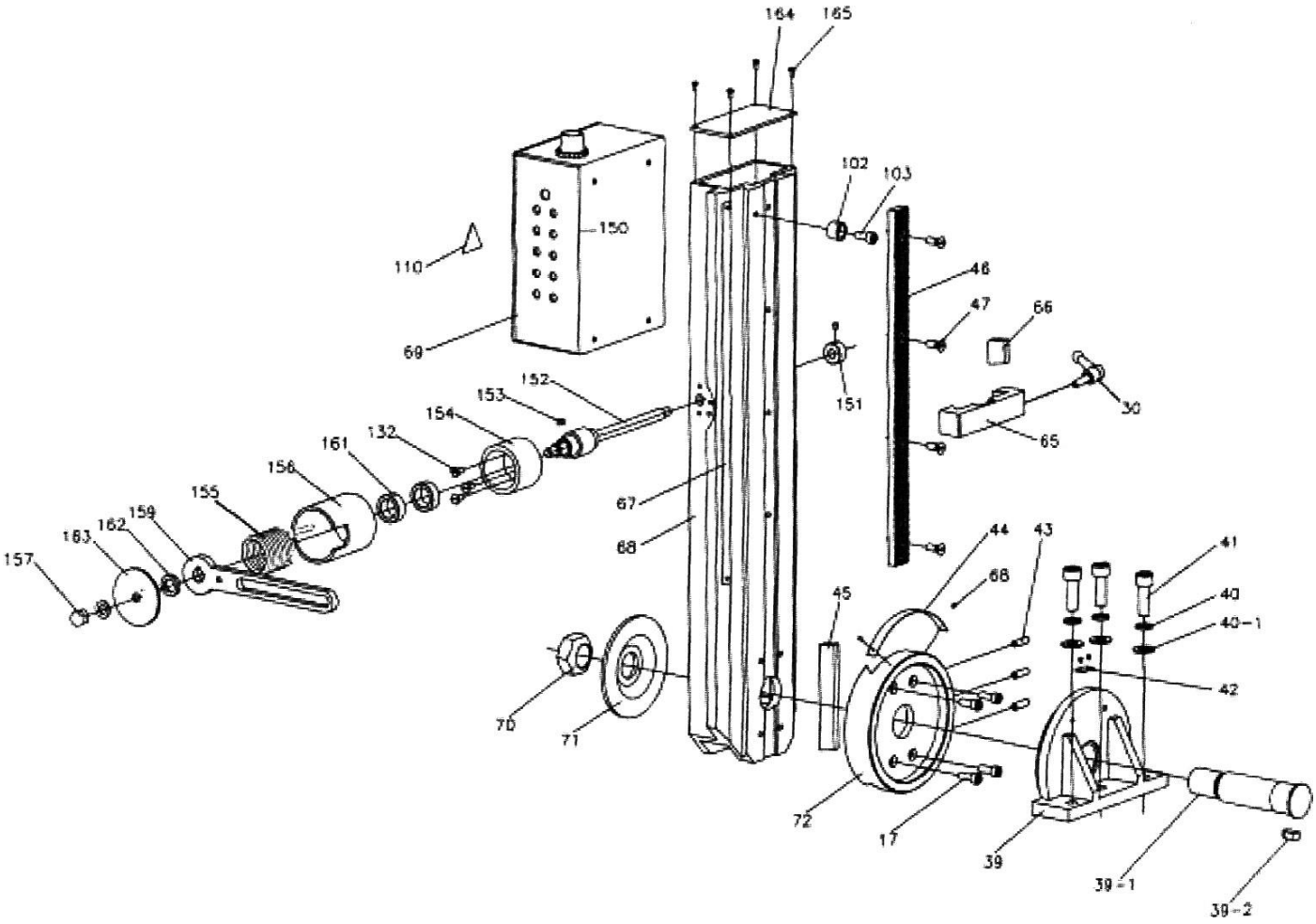


No.	Name	No.	Name
A	Motor	**H**	Base
B	Fine feeding wheel	**I**	Connecting strut
C	Headstock & spindle	**J**	Limit block
D	Longitudinal feed hand wheel	**K**	Controller
E	Working table	**L**	Balance mechanism
F	Saddle	**M**	Fuselage
G	Cross feed hand wheel	**N**	Electrical box

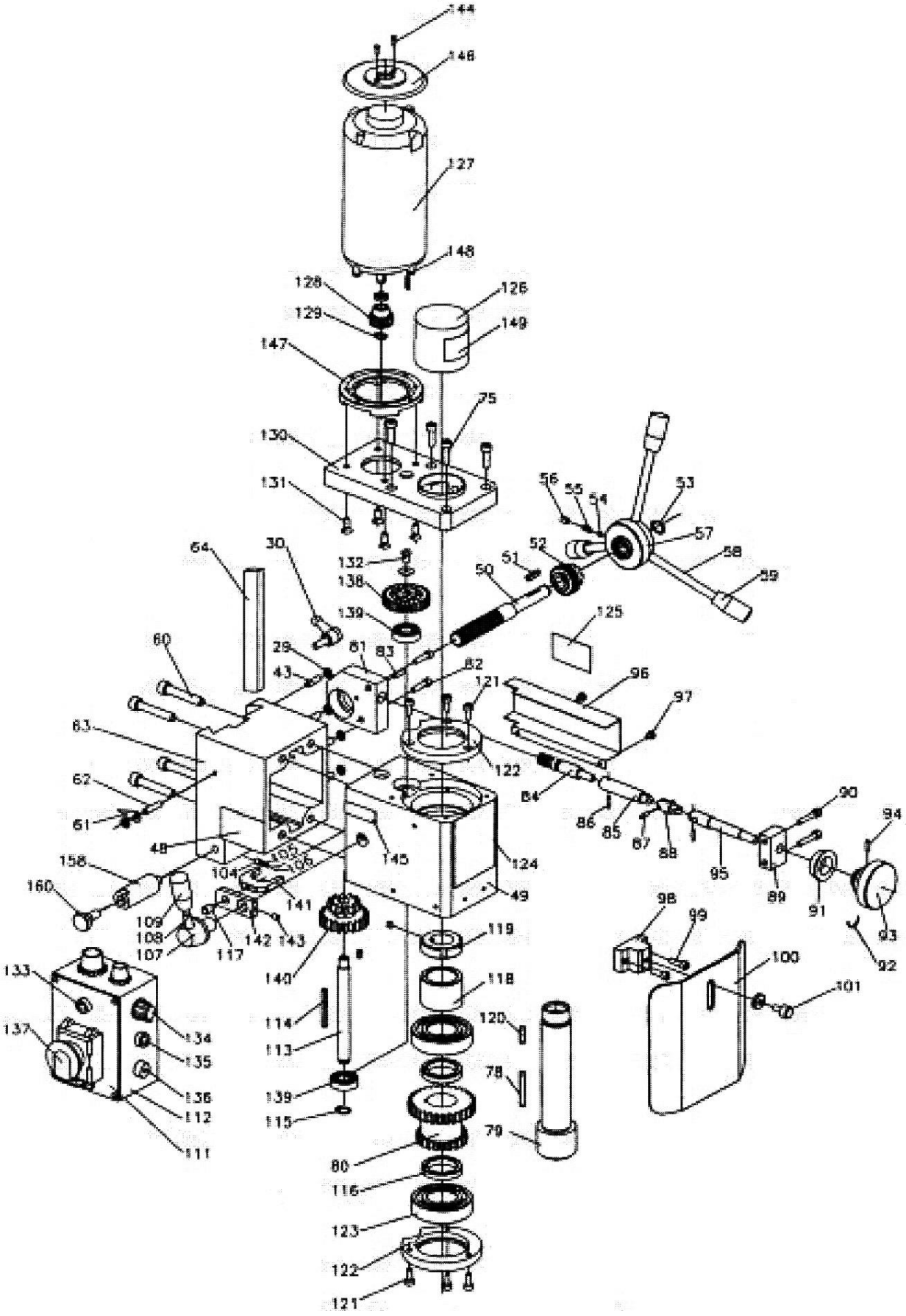
Longitudinal (Y) and Cross (X) Axis



Vertical (Z) Axis



Spindle and Gear Box



Parts List

Item No	Part Name	Q'ty	Item No	Part Name	Q'ty
1	Base	1	38	Cap screw M6 x 25	2
2	X-axis feeding screw	1	39	Fuselage seat	1
2-1	Key 4 x 16	2	39-1	Shaft	1
4	Dial	2	39-2	Key 8 x 12	1
5	Hand wheel	2	40	Spring washer 10	3
6	Nut MS	2	40-1	Washer 10	3
7	Knob	2	41	Cap screw Ml0 x 30	3
8	Screw MS x 55	2	42	Guide finger	2
9	Cap screw M6x 8	8	43	Set screw M6 x 22	7
10	Holding plate (1)	1	44	Ruler	1
11	Dust guard cover	1	45	Wedge	1
12	Holding plate (2)	2	46	Gear rack	1
13	Ball bearing 8200	2	47	Cap screw M6 x 12	4
14	Washer	2	48	Name plate	1
15	Nut MS	4	49	Spindle box	1
16	Y-axis ruler	1	50	Pinion	1
17	Cap screw M6x 16	4	51	Key 4 x 25	1
18	Y-axis bearing seat	1	52	Bevel gear	1
19	Working table	1	53	Retaining ring 12	1
20	Y-axis feeding screw	1	54	Ball ø 5.0	1
21	End cover	1	55	Spring 0.8x 0.8 x 10	1
22	Screw M6x 10	2	56	Screw M6x 8	1
23	Y-axis screw nut	1	57	Handle stock	1
24	Holding plate (3)	1	58	Operating lever	3
25	Dust guard cover	1	59	Lever cap	3
26	Screw seat	1	60	Cap screw MS x 25	4
27	Cap screw M6x 16	2	61	Guide finger	1
28	Set screw M6 x 22	6	62	Cap screw M6 x 25	1
29	NutM6	13	63	Spindle box seat	1
30	Handle	3	64	Wedge	1
31	Screw M6x 10	2	65	Limit block	1
32	Guide finger	1	66	Wedge	1
33	Screw M6x 8	1	67	Ruler	1
34	X-axis wedge	1	68	Fuselage	1
35	Saddle	1	69	Electric box	1
36	Y-axis wedge	1	70	Lock nut M24	1
37	X-axis screw nut	1	71	Big washer	1

Item No	Part Name	Q'ty	Item No	Part Name	Q'ty
72	Connecting strut	1	122	Bearing cover	2
78	Key 5 x 5 x 40	1	123	Ball bearing 80206	2
79	Spindle	1	124	Name plate	1
80	Transmission gear	1	125	Fine feeding label	1
81	Support block	1	126	Protecting cover	1
82	Screw MS x 20	2	127	Motor	1
83	Pin4 x 15	1	128	Motor gear	1
84	Worm	1	129	Interring ring 9.0	1
85	Sleeve	1	130	Motor seat	1
86	Pin 3x 12	1	131	Flat screw M6x 12	4
87	Pin 3 x 12	2	132	Round screw M5 x 8	4
88	Adjustable union	1	133	Yellow lamp	1
89	Bracket	1	134	Speed control knob	1
90	Screw MS x 25	1	135	Green lamp	1
91	Dial	1	136	Fuse box	1
92	Spring steel 1.0	3	137	Emergency stop switch	1
93	Small hand wheel	1	138	Gear	1
94	Screw MS x 16	1	139	Ball bearing 80101	2
95	Small shaft	1	140	Transmission gear	1
96	Cover	1	141	Bar	1
97	Screw M4 x 6	2	142	Linking board	1
98	Support of dust cover	1	143	Set screw M5 x 8	1
99	Screw MS x 16	2	144	Self-tapping Screw ST2.9 x 8	2
100	Dust guard	1	145	H/L label	1
101	Clamp bolt M6 x 12	1	146	Motor cover	1
102	Upper end washer	1	147	Motor connecting flange	1
103	Upper end screw M6 x 16	1	148	Screw M6 x 10	4
104	Set screw M6 x 6	1	149	Warning label	1
105	Spring0.8 x 4.8 x 10	1	150	PC board	1
106	Ball ø 5.0	1	151	Lock sleeve	1
107	Handle seat	1	152	Rotor shaft	1
108	Double head bolt MS x 70	1	153	Key 4 x 6	1
109	Knob	1	154	Spring support	1
110	Warning label	1	155	Torsion spring	1
111	Controller	1	156	Cover	1
112	Label on controller	1	157	Nut	1
113	Shaft (1)	1	158	Prop	1

Item No	Part Name	Q'ty	Item No	Part Name	Q'ty
114	Double round head key 4x4x45	1	159	Supporting shank	1
115	Internal ring ø 12	1	160	Screw	1
116	Spacing ring	2	161	Washer	2
117	Small shaft	1	162	Internal ring 12	1
118	Spacing ring	1	163	Cover	1
119	Spindle nut	1	164	Top Cover	1
120	Double round head key 5x5x30	1	165	Screw M3 x 6	4
121	Cap screw M5 x 8	6			

Installation

Location Set-Up

The machine should be fixed on a flat and secure worktable with four hexagon bolts. Install it at an appropriate location in order to fully-utilised the precision requirements of the machine.

Selecting an Appropriate Location

- The worktable should have a flat, stable surface.
- Avoid placing it under direct sunlight or areas with heavy dust and moisture.

Securing the Mill Drill

1. Drill four holes on the worktable. Dimensions should be the same as the holes on the machine's base.

   NOTE: Consider the Y-axis handwheel when choosing a suitable location for the machine.
2. Adjust the machine accordingly and secure it to the worktable with 4 M10 bolts and nuts.

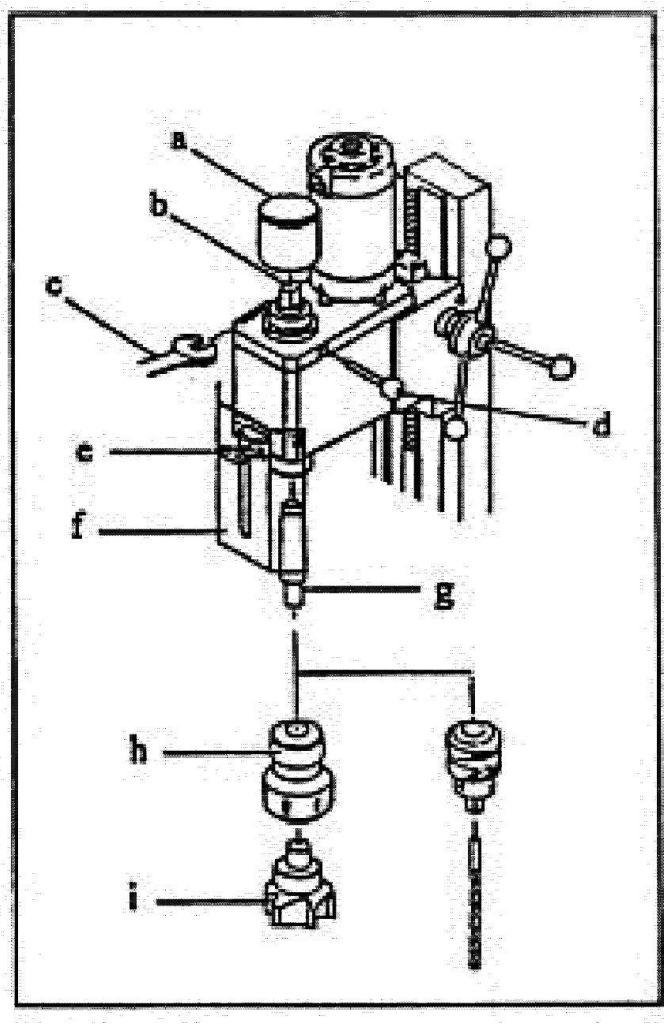
Checklist Before Switching ON the Machine

- Remove all fixtures which that might impede the normal operation of the machine.
- Check whether the power voltage is suited to the machine (see label in front of the machine).
- Remove all obstacles and debris around the machine.
- Remove the anti-rust protection before affixing the machine.
- Check the angle of the pillar and adjust the bolts to see if they are tight enough.
- Check the chuck, chuck holder and fixing pin on the spindle to ensure they are unloaded.
- Check the High-Low speed on spindle to see if it’s set on the right speed setting.
- Turn on the machine and check the direction of the spindle rotation (should be clockwise).
- Run the Longitudinal Axis (Working table), Cross Axis (Saddle seat) and Vertical Axis (Fuselage) to ensure they’re in normal condition.
- Be aware always while operating the machine. If you notice anything unusual, immediately stop using the machine and have it repaired immediately.

Installation and Removal of the Taper Shank

Installation

1. Turn off the main power before you replace the cutter.
2. Pull out the protective cover (a).
3. Wipe the spindle sleeve and taper shank.
4. Put the taper shank (g) into the spindle sleeve. Cutter should be matted with oil cloth to ensure the safety of the machine and your fingers.
5. Insert the Fixing Pin (d) right on the spindle sleeve.
6. Use a #l4 open end wrench (c) to tighten the spindle draw bar (b) in a clockwise direction to secure the taper shank.
7. Pull out the fixing pin.
8. Install the protective cover (a).



Removal

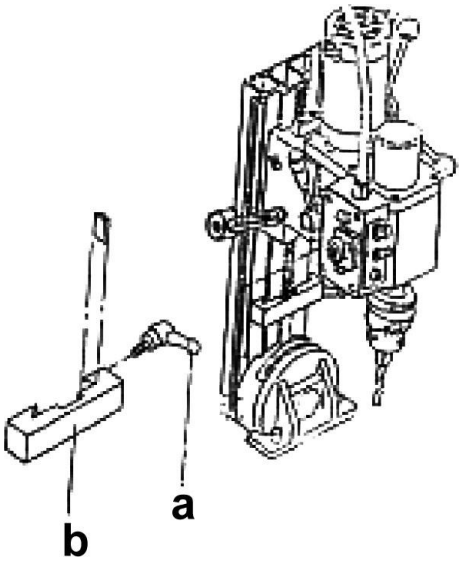
1. Turn off the main power before you replace the cutter.
2. Pull out the protective cover (a).
3. Insert the fixing pin (d) right on the spindle sleeve.
4. Use a #14 open end wrench (c) to loosen the spindle draw bar (b) in an anti-clockwise direction.
5. Knock the taper shank (g) gently with a plastic hammer to loosen it in the spindle sleeve. Then, take off the taper shank (g).
6. Cutter should be matted with an oil cloth to ensure the safety of the machine and your fingers.
7. Re-install the protective cover (a).

IMPORTANT! For your safety, any adjustments on the machine should be done only when it is already unplugged from the mains power supply.

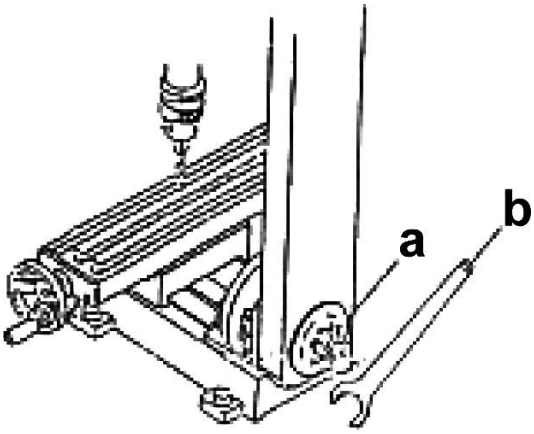
Adjusting the Spindle Box

Using the limit block, you can control the traveling rate of the spindle box.

1. Loosen the handle (a) beside the limit block (b).
2. Adjust the limit block (b) into the desired position.
3. Tighten the handle.
4. Travel position can refer to the ruler on the fuselage rotary.



Adjusting the Tip Angle of the Fuselage



1. Turn OFF the mains power before doing any adjustments.
2. Hold the fuselage by hands to prevent the fuselage from falling.
3. Loosen the locked nut (a) with a large wrench (b).
4. Adjust the fuselage tip angle, as needed (max. angle is 450 for both left and right).
5. Tighten it.

Adjusting the Mitre Wedge

After long-term contact motion to the machine, function error will occur due to relative surface motion. Mitre wedge will act as an interface on each slide surface. In order to eliminate this error, this machine will make use of adjusting the screw pressure between the two machine parts (ex. Spindle Box and Fuselage). Adjust and keep-up the contact pressure to maintain its mechanical precision.

To ensure constant precision, the pressure between the two elements needs to be adjusted appropriately because of abrasion, which the machine produces from contact motion for the same timeframe (about one year).

The following items will need to make pressure adjustments to the mitre wedge:

- Basement and saddle seat slide surface
- Saddle seat and working table slide surface.
- Fuselage seat and connecting strut slide surface.
- Fuselage and spindle box slide surface.

NOTE: Position the spindle box at its highest position when not in use.

To Adjust:

1. Loosen the locked nuts.
2. Adjust the foremost pressure of the mitre wedge with the locked nut. If necessary, adjust all screws.
3. Tighten and loosen the adjusting screws and keep in mind that the pressure of each adjusting screw must be the same.
4. Tighten the locked nut uniformly.
5. When locking the nut, please use a #3 interior hexagonal wrench to secure the adjusting screw from rotating, which can cause unbalance in the pressure.
6. Adjust the middle portion first and then go towards the interior from two sides uniformly while you are adjusting the screw to ensure a uniformed pressure setting.

Operation

Power Connection/Disconnection

- Connecting, disconnecting and grounding are carried out through the plug equipped on the machine. For safety reasons, DO NOT change this plug into any other type in any situation.
- For the control device's protection, its' recommended for the operator to supply a fuse with the current rating and the total length between the fuse and the connecting terminal. Please refer to table below:

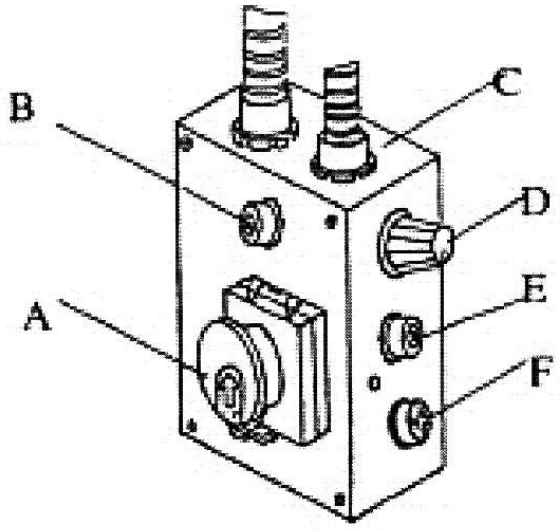
Extension Lead Table

Ampere rating	3A	6A	10A	13A
Extension Cable Length	Wire Size (mm^2)			
7.5m	0.75	0.75	1.0	1.25
15m	0.75	0.75	1.0	1.5
22.5m	0.75	0.75	1.0	1.5
30m	0.75	0.75	1.25	1.5
45.5m	0.75	1.25	1.5	2.5

- Ensure that the Emergency Stop Switch (A, on the left side beside the electrical box) is in the OFF position before plugging in the cord.
- Disconnect all tools from power sources before servicing them and when changing their accessories.

Initial Starting

1. Taking all precautions stated, set the HIGH-LOW range lever to LOW.
2. Insert the electric plug into the socket.
3. Release the Emergency Stop Switch (A) by pushing down on the red knob slightly and pushing it up, as indicated by the arrow on the top of the red knob.
4. Switch on the machine by GENTLY turning the Variable Speed Control Knob (D) clockwise. A click will be heard as the motor power is turned ON, but the spindle will not rotate until the knob is turning clockwise a little further. Speed will increase progressively the further the knob is turned.
5. Run for a total of 5 minutes, during which you can gradually increase the spindle speed to its maximum value.
6. Run for at least 2 minutes at this speed before stopping the machine and disconnecting it from the mains supply.



A. Emergency stop switch B. Yellow LED
C. Electric control box D. Variable speed control knob
E. Green LED F. Fuse box

7. Ensure that all components are still secure and are working freely and correctly.
8. Ensure that all mountings are secure.

9. Repeat these procedures at HIGH range setting.

CAUTION! NEVER attempt to change from HIGH to LOW range setting when the machine is running.

Starting Under Normal Conditions

1. Take all the necessary precautions previously stated and ensure the workpiece is firmly secured.
2. Set the Speed range control lever to HIGH or LOW, as needed.
3. Proceed to start the machine as described above.

ATTENTION: The power supply system of this machine has an auto over-load protective function. If the feeding is too fast or drilling is too deep, the system will stop working and the yellow LED (B) will light-up. Just turn off the Variable Speed Control Knob (D) and then turn it ON again. The system will work again and the yellow LED will turn OFF automatically.

Drilling or Deep Milling

1. As per Installation and Removal of the Taper Shank, install an appropriate adjustment and tighten it securely.
2. Select an appropriate speed level.

   WARNING! When the spindle is running, DON'T change the speed setting.

3. Using the fixture, secure the workpiece on the working table.
4. Adjust working table (longitudinal Axis Y) and the saddle seat (Cross Axis X) into position.
5. Loosen the limit block handle and adjust the blocks into position.

   NOTE: Ensure that the workpiece doesn't come in contact the tool.
6. Put the adjusting tools in order and remove all obstacles and debris around the machine.
7. Turn the main power ON. Adjust the appropriate spindle speed for drilling or deep milling.
8. Refer to the ruler on the fuselage to measure the drilling or milling depth.
9. When finished with your work, turn OFF the power and take the spindle to the upper position.
10. Clean the machine.

Face Milling

1. As per Installation and Removal of the Taper Shank, install an appropriate adjustment and tighten it securely.
2. Select an appropriate speed level.

   WARNING! When the spindle is running, DON'T change the speed setting.

3. Using the fixture, secure the workpiece on the working table.
4. Adjust working table (longitudinal Axis Y) and the saddle seat (Cross Axis X) into position.
5. Release the limit block on the fuselage, adjust the cutting depth then fix it into position.
6. Arrange all tools into their proper positions.
7. Turn the hand wheel of the working table (Y-axis) and the saddle seat (X-axis) to perform face milling.
8. Finishing all the steps, turn the power OFF and take the spindle back to the upper position, then you can take out the workpiece.

9. Clean the machine.

Drilling/Milling Speed

Before performing any work, set the spindle to a correct running speed.

The normal operating speed range for working is from 0 to 2500rpm. Most of the time, choosing the correct speed will depend on the size of the workpiece and the material. Generally, you can use higher speed for softer material or workpieces with small holes. Use a lower speed setting for harder material or workpieces with bigger holes.

A good rule of thumb is:

Small holes and soft material will need higher speed settings. Avoid drilling above 2300rpm if your workpiece is made of wood, as you may run the risk of burning it. For metal workpieces, the speed range can be 0 to 2500rpm.

Operational Checklist

IMPORTANT! Please ensure to follow these instructions as you operate the machine to ensure operational safety and to maintain its working capacity.

Before Turning ON

- Before turning ON the power, inspect the tool chuck and cutter. If they are loose, re-tighten them securely.
- Inspect each machine part to see if they are loose and re-tighten them securely.
- Check if the speed adjustment rod is at a correct position and re-position securely if needed.
- The workpiece is securely fixed onto the fixture.
- Clean or remove obstacles and debris around the machine.

During Operation

- Never drink any form of alcoholic drinks or strong spirits while operating the machine.
- Do not wear any thick gloves or articles of clothing (i.e. neckties, jewelleries, etc.) that could get stuck in any part of the machine.
- Select and install an appropriate cutter, and ensure they are securely fastened.
- If vigorous shaking occurs, the following conditions will likely cause it:
  - The depth of the cut is too deep.
  - The feeding speed is too fast.
  - The rotating speed is too fast.
  - The machine and stock plane are not secured firmly.
  - The vise and workpiece are not secured firmly.

Protection and Maintenance

- Perform frequent maintenance checks and record any unusual findings.
- Ensure that the power is turned OFF before performing any maintenance work on the machine.

- If there is an abnormal situation/condition and it’s beyond regular user maintenance, please contact an authorised service centre to avoid further damaging the machine and to ensure safety.

Maintenance

Daily Maintenance

- Inspect each operating part to ensure they are properly lubricated.
- Examine each component for any worn or broken parts and other issues.
- Clean and remove all obstacles and debris around the machine to prevent damaging the machine and endangering the operator.
- Clean the machine daily after every use and lubricate all moving parts to prevent rust from developing.
- Be aware always while operating the machine. If you notice anything unusual, immediately stop using the machine and have it repaired immediately.

Seasonal Maintenance

- Use a clean cotton or soft gauze to clean each part of the machine.
- Confirm whether the motion of the machine's head and fixture are smooth or loose.
- Check if the spindle is over-swinging.
- Check whether each bolt and nut is loose.
- Examine the overall circuitry parts (contact points, conductor, plugs and switches) to ensure they are in normal condition.
- Perform maintenance on each part and record any findings.
- Turn OFF the machine and wait for it to completely stop before replacing any part or performing any maintenance works on it to avoid any hazards.
- Maintenance and repair should be done regularly. If there are any abnormal situations or conditions, stop the machine and have it repaired immediately.
- If abnormal situation/condition is beyond regular maintenance, please contact an authorised service centre to avoid further damaging the machine and to ensure safety.

Cutter Maintenance

- Use a clean rag while installing or unloading the cutter to prevent it from falling and splitting the blade and to protect yourself from cuts.
- Keep the cutter in a wooden or plastic box when you don't need it. In order to maintain the sharpness of the blade, the cutter should also be kept respectively.
- Pay extra attention to the cutter’s rotating direction. A wrong rotating direction might decrease the sharpness, split the blade and accelerate the cutter wearing out. If you cannot determine the cutter’s rotating direction when it’s revolving at high speeds, turn off the machine and observe it again while it’s decelerating. It will then be easier to identify the blade’s direction.
- Put the cutter and work piece (or chuck piece) in the right places before turning ON the machine. After turning on the machine, the cutter will get closer to the working piece and will start milling it.

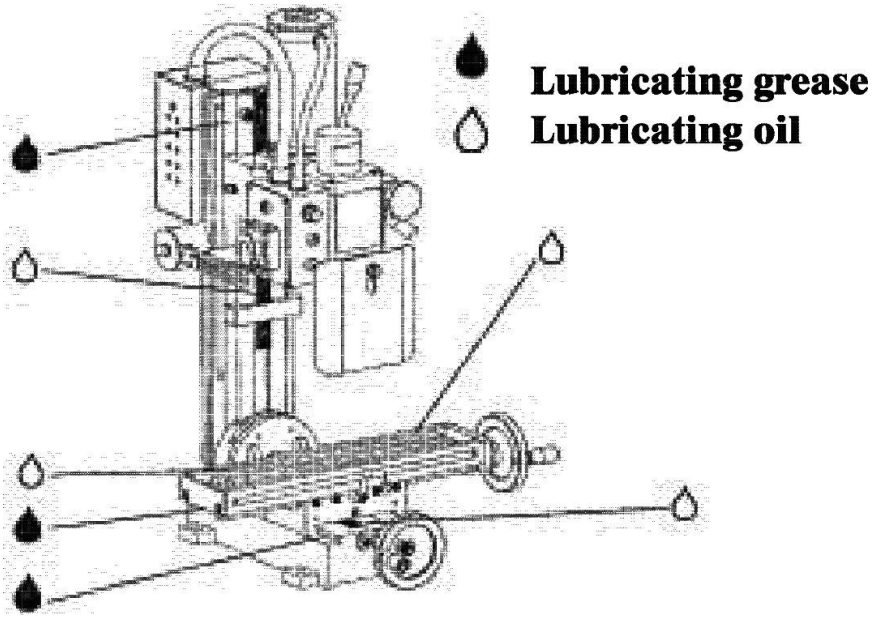
- Sharpen the cutter as soon as it gets blunt. A blunt cutter will make your milling work not only more difficult, but it can also damage the blade.

Accessories Maintenance

- Please always keep the taper shank clean.
- Keep the taper shank and cutter together so the next time you will use them, it will be more convenient for you.
- The draw bar and chuck will have their own wrenches. For your convenience, please keep the wrenches near the machine and ever operate it with inappropriate tools.
- Please use a wrench to tighten the nuts and never use any other tools, such as a steel hammer, to do so.

Lubrication Mechanics

- In order to ensure precision, apply lubrication only on the contact surface.
- Use the oil can to lubricate accessories. Apply some lubricant to all surfaces before operating the machine.



The following the parts that needs lubrication:

Lubricating Oil

- Basement and saddle seat surface
- Saddle seat and worktable surface
- Fuselage sear and connecting strut surface

Lubricating Grease

- X-axis feeding screw (saddle seat)
- Y-axis feeding screw (worktable)
- Z-axis feeding gear rack (fuselage)

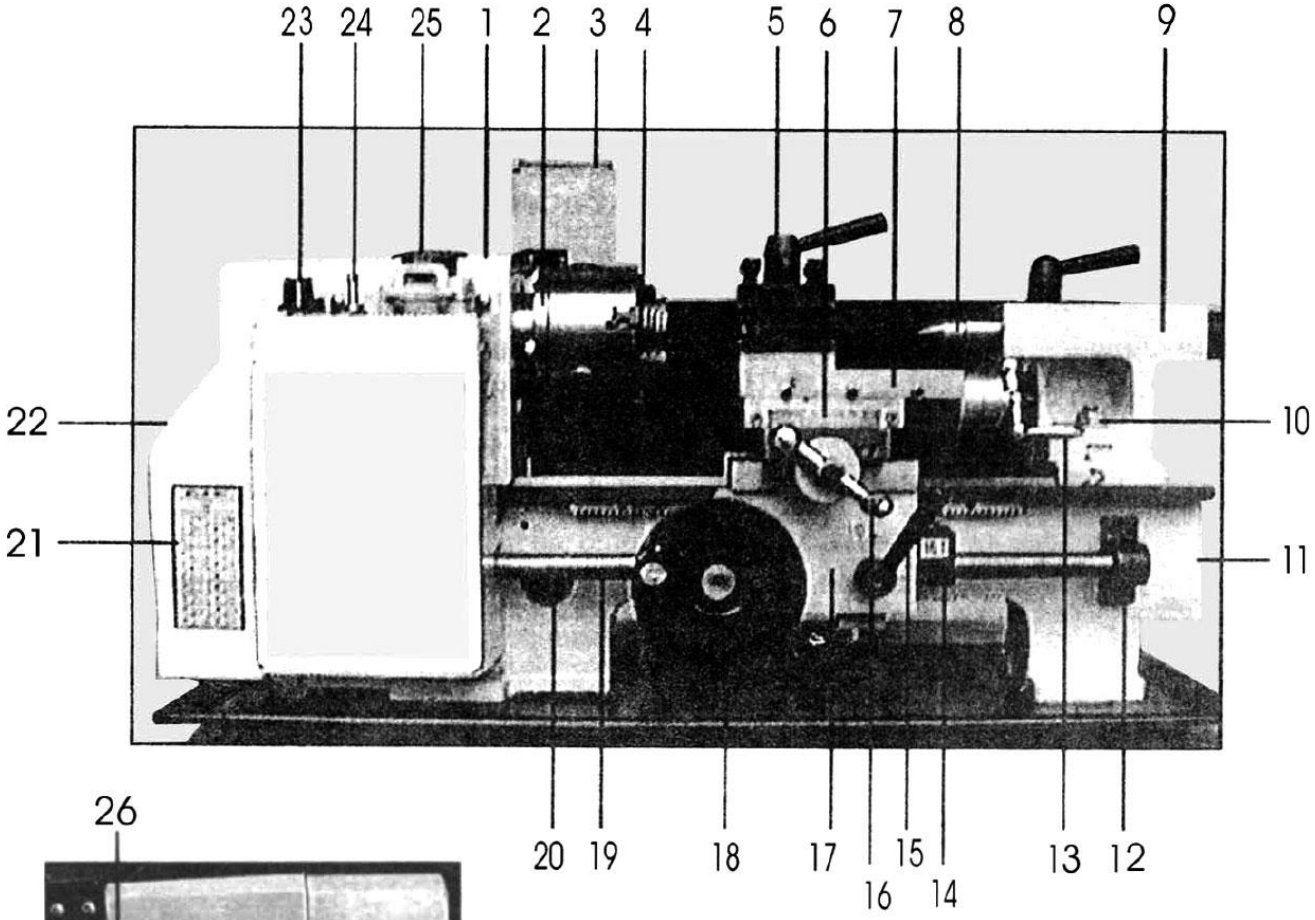
After each work, clean the worktable and lubricate it with a little lubricant for protection.

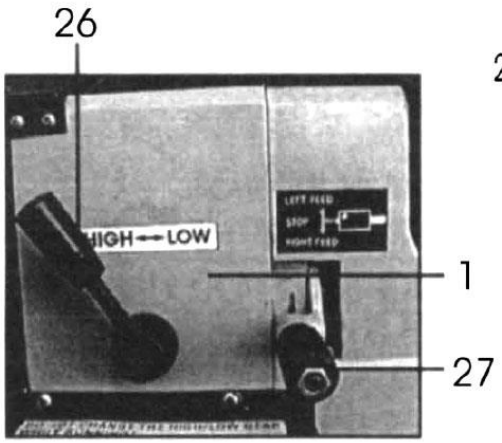
Specifications

Output Power	350W
Voltage	240V AC
Drilling Capacity	13mm
End Mill Capacity	16mm
Face Mill Capacity	30mm
Tilt angle	-45 to +45
Max X Axis Table Travel	220mm
Max Y Axis Table Travel	100mm
Max Z Axis without collet	180mm
Spindle Taper	MT #3
Throat	167mm
Table Size	390x92mm
Spindle Speed	Low :0~1000 RPM; High: 0~2500 RPM
Swing	324mm
Spindle to Table	292mm

Parts Identification – Mini Metal Lathe BMLAT-05

Features





Rear view of headstock

No.	Name	No.	Name	No.	Name
1	Headstock	**10**	Tailstock Securing Nut	**19**	Leadscrew
2	Spindle Flange	**11**	Bed	**20**	Motor Brush Cap
3	Chuck Guard (Accessory)	**12**	R.H. Leadscrew Bearing	**21**	Thread Dial Indicator Table (Accessory)
4	3-Jaw Chuck	**13**	Compound Slide Feed Handle	**22**	Running Gear Cover
5	Tool Post	**14**	Thread Dial Indicator (Accessory)	**23**	Variable Speed Control Knob
6	Cross-Slide	**15**	Automatic Feed Lever	**24**	Forward/Off/Reverse Switch
7	Compound Slide	**16**	Cross-Slide Feed Handle	**25**	Emergency Stop Switch
8	Tailstock Centre	**17**	Apron	**26**	High/Low Speed Range Lever
9	Tailstock	**18**	Manual (Saddle) Feed Handle	**27**	Leadscrew Fwd./Neutral/Reverse Lever

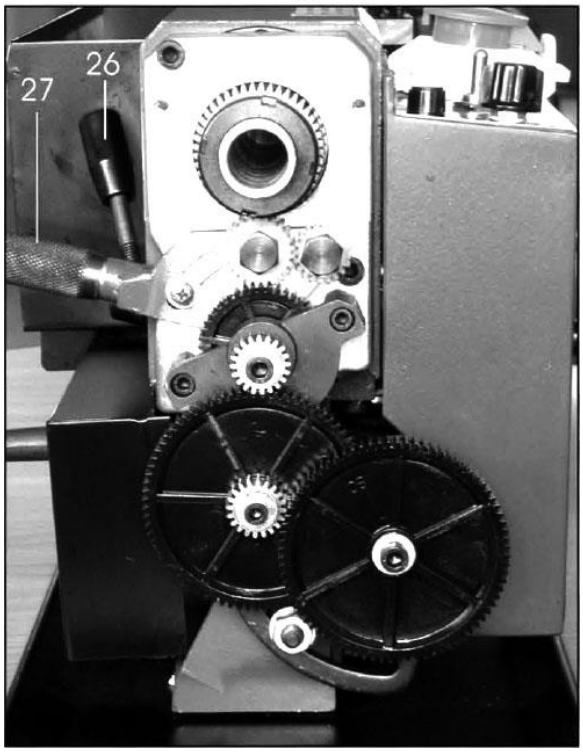
Headstock

- The motor provides a direct drive to the Spindle via an internal tooth type belt. Spindle speed is variable and is regulated by the Speed Control Knob (23). located on the main control panel.
- The Spindle is provided with an internal No.3 Morse taper to accommodate a centre for use with a face plate or turning clamp.
- The 3-Jaw. Self-Centring Chuck (4) is mounted on the Spindle Flange (2). To remove the chuck, simply remove the three securing nuts to the rear of the flange allowing it to be pulled free together with the three mounting studs.
- Three external jaws are also supplied, which extend the capacity of the chuck. Their uses and method of assembly is described under Accessories.
- The spindle has 6 holes drilled in its flange to accommodate a range of fixtures such as the Face Plate, 4-Jaw chuck etc., (See Accessories).

Running Gear

- The Running Gear is protected by a cover (22), which is removed by unscrewing the two securing hex screws.
- The gear train, shown in Fig. 2, transmits drive to the lead screw. The Lead Screw acts as a worm and by operating the Auto Feed Lever (15), which engages a nut with the lead screw (worm) drive is transmitted to the saddle, and consequently the cutting tool, thereby providing a power feed for screw cutting or general turning operations. The rotational speed of the lead screw, and hence the rate of feed of the cutting tool, is determined by the gear configuration. This is explained in greater detail under Screw Cutting.
- The drive to the leadscrew may be disconnected by operating the lever (27) and the same lever is used to drive the leadscrew in a forward or reverse direction. (These actions are described in detail under Screw Cutting).

Fig.2



Tailstock

The Tailstock (9) may be moved along the bed to any desired position and is secured in position by a single nut (10) at its base. The Tailstock Spindle carries an internal No.2 Morse taper for use with the Centre (8) provided. A Revolving Centre and Drill Chuck are also available from your dealer (See Accessories).

Saddle

The Saddle carries the Cross-Slide (6) onto which is mounted the Compound Slide (7) with Tool Post (5), allowing intricate and delicate operations to be performed. It may be driven by the Leadscrew, via a Drive Nut, to provide automatic feed when the Auto Feed lever (15), mounted on the Apron (17), is operated.

The position of the tool is affected by turning the cross-slide feed handle (16), which moves it across the lathe, and the saddle or manual feed handle (18), which moves it longitudinally. Additionally the compound slide feed handle (13) may be used to move the tool by small amounts at right angles to the cross-slide, or the slide may be set at an angle to the cross-slide so that short tapers or bevels may be cut. This is described in greater detail under Bevel Cutting.

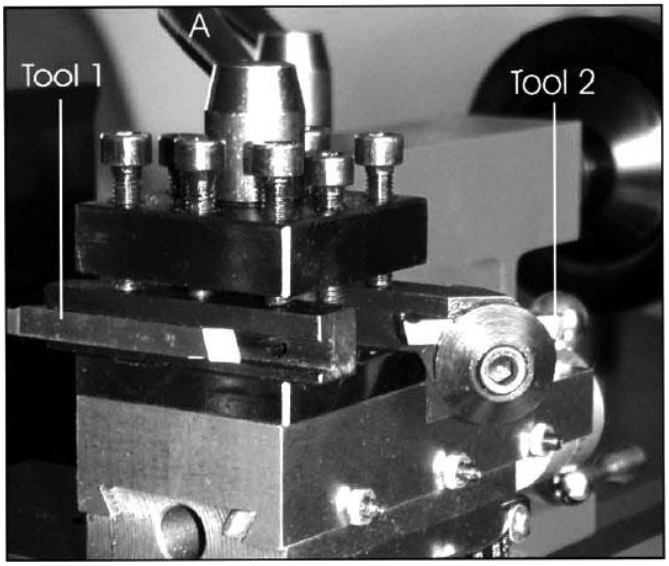
The cross-slide and compound slide feeds are provided with a scale. These are used to move the tool by precise amounts - one division being equivalent to 0.001" (0.025mm). As the feed handle is turned, so does the scale. The scale on the cross-slide feed may also be held stationary whilst the handle is turned. allowing the scale to be 'zeroed'. The way this is used is discussed in greater detail under Operation.

The tool post carries 8 hex socket head screws, which are used to secure a cutting tool in any desired position. Four may be mounted for convenience and to speed up your operation. Two are shown mounted.

The tool post is rotated by slackening the lever (A) on its top. It's enough for the post to be lifted slightly and then turned to the desired position.

ALWAYS ensure the post, and hence the tool, is secured by screwing down the lever firmly before attempting to cut.

Fig.3



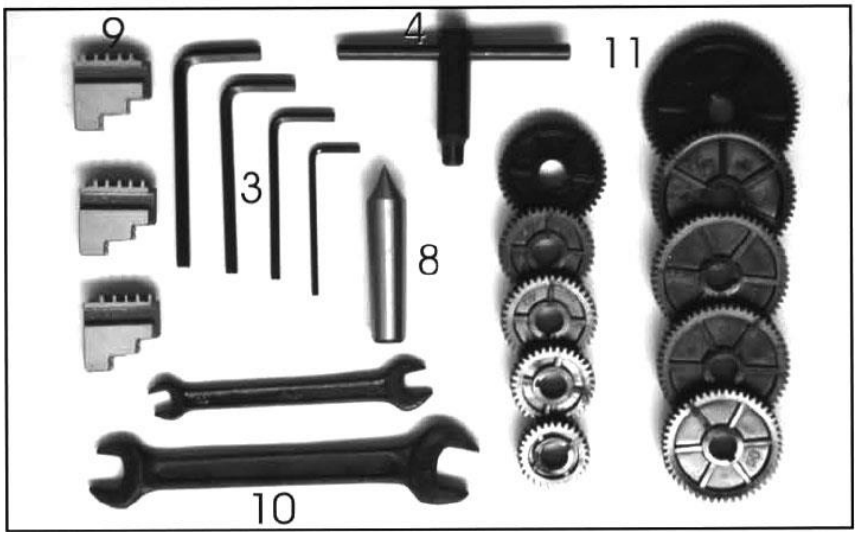
Motor

It is not recommended that you disassemble the motor. Brushes may be replaced as described under Maintenance. For all other servicing and repairs, please contact your dealer.

Unpacking & Preparing for Use

On receipt, carefully unpack the lathe and inspect to ensure that no damage was suffered in transit and all parts are accounted for. Should any damage be apparent, or parts are missing, please contact your dealer immediately.

Fig.4



The following loose items are to be found in the carton:

10. 4 x Rubber Feet *
11. 4 x M6 Pan Head Screws *
12. 4 x Hex Keys
13. 1 x Chuck Key
14. 1 x Plastic Oil Container *
15. 1 x Spare Fuse glass type *
16. 2 x Plastic Handles w/Nuts and Bolts *
17. No.2 Morse Taper Centre (for Tailstock)
18. 3 x External Jaws (for 3-Jaw Chuck)
19. 2 x Double Open-Ended Spanners 8x10mm and 14x17mm
20. 1 x Gear Set

    Imperial - Z: 30, 35, 40, 40, 45, 50, 55, 57, 60, 65

    Metric - Z.30, 35, 40, 40, 50, 60) *

* *denotes not illustrated.*

With assistance, considering the weight of the machine, raise it onto a good solid surface or workbench. Proceed to remove all traces of preservative with paraffin or good quality solvent and lightly oil all machined surfaces.

You will notice that, for transit purposes, the cross-slide feed handle has been mounted in reverse. Remove it, by unscrewing the hex socket head screw, securing it, and mount it the correct way around. Then turn all feed handles to ensure they are free and move evenly and smoothly.

Attach the plastic handles to the rims of the manual feed and tailstock feed handwheels respectively, ensuring the nuts are tight and the handles spin freely about the bolts, without excessive end play.

Saddle, cross-slide and compound slide adjustments are all factory set to ensure smooth movement in both directions. If, however, the adjustments have been upset during transit, indicated by stiff or erratic movement, refer to Settings and Adjustments for the methods of adjustment.

All hex keys and spanners necessary to carry out various adjustments are supplied, together with a chuck key for the 3-Jaw chuck and a spare fuse. The fuse holder is located on the main control panel.

The four rubber feet are attached to the underside of the bed, using the four M6 pan head screws, in the tapped holes provided. These screws are also used to secure the chip tray. We strongly recommend however, that to provide maximum stability and additional safety, you secure the lathe to a firm foundation as described under Mounting the Lathe.

The three external jaws for the 3-Jaw self-centring chuck extend the capacity of the chuck and are discussed in greater detail under Accessories.

Installation

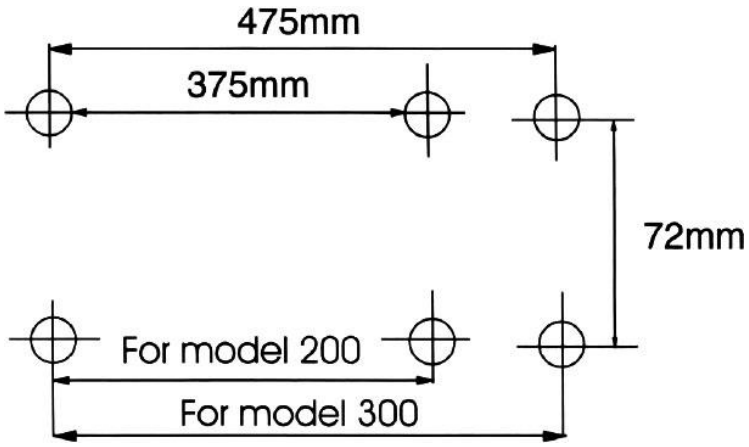
CAUTION! DO NOT ATTEMPT TO USE THE MACHINE UNTIL INSTALLATION IS COMPLETED, AND ALL PRELIMINARY CHECKS HAVE BEEN MADE IN ACCORDANCE WITH THIS MANUAL.

Mounting the Lathe

The lathe should be mounted on a strong, heavy workbench of enough height so that you do not need to bend your back to perform normal operations. Take the necessary precautions when moving the lathe considering its' weight. Assistance will be required.

Ensure the location is adequately lit and that you will not be working in your own shadow.

We strongly recommend that the machine is bolted firmly to a strong workbench using the tapped holes used to secure the feet to the lathe. This is to provide added stability and consequently, additional safety.

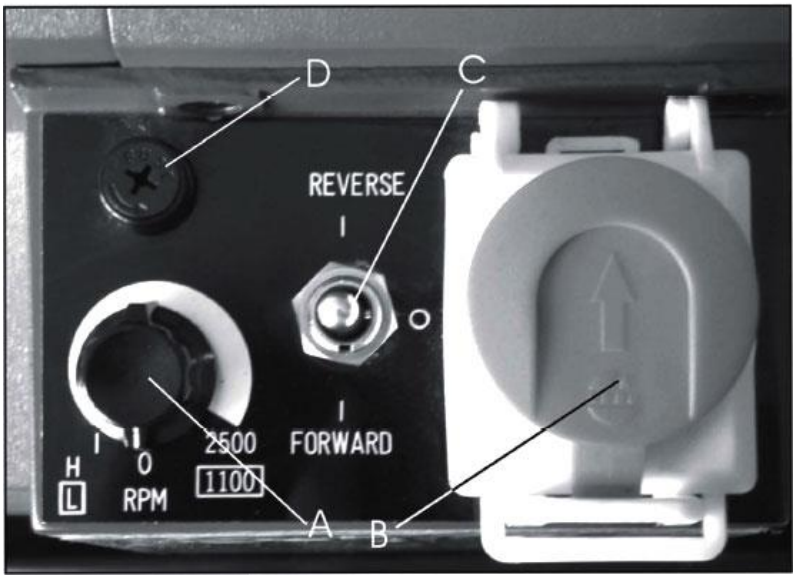


To do this, remove the four M6 screws which secure the rubber feet and chip tray to the machine (if already fitted) and discard the feet. Drill four M6 clearance holes in a worktop at the dimensions shown in the diagram opposite and with appropriate length M6 bolts or screws, with flat washers, (not supplied) proceed to secure the lathe to the worktop ensuring the chip tray is in place.

Alternatively, if you do not wish for a permanent installation, you may secure the lathe to a 5/8" thick plywood board with a minimum recommended dimension of 800x300mm, the mounting holes being centralised on the board. When the lathe is in use, the board should be clamped to workbench using with 'G' clamps.

Starting Procedure

Fig.5



Plugging It In And Switching It On

1. Push the Forward-off-Reverse switch to off (C).
2. Push the Stop button to 'open' (B).
3. Turn the knob fully anticlockwise (A).
4. Chuck the guard down over the chuck (3).
5. Next switch the Forward - off - Reverse switch to the direction desired (C).
6. Now turn the speed control knob to the speed required (A). It will now run.
7. If at any time the yellow LED light is ON, the machine will not run. This is a fault condition. The lathe will remember this fault until the Forward - off - Reverse switch (C) has been switched off.

If you overload the lathe or stop the lathe with the emergency stop button or lift the chuck guard, you will cause a Fault condition. You will then have to set the Forward-off-Reverse switch to the OFF position for a couple of seconds to reset the fault light to get it to operate again.

To check that the chuck guard micro switch is working, set:

8. Power ON (At the wall socket).
9. Stop button to open (B).
10. Turn speed knob fully anticlockwise (A).
11. Chuck guard down over chuck (3).
12. Now switch the Forward-off-Reverse switch to either direction (C)

If you lift the chuck guard up and down, the fault light should go ON and OFF. Now, switch the Forward-off-Reverse switch to OFF. The light will go OFF.

If you always use the Forward-off-Reverse switch (C) to Stop and start the lathe, you will not cause a fault condition and it will be quicker to use.

CAUTION! NEVER attempt to change the range from HIGH to LOW with the machine still running.

Starting Under Normal Conditions

Please refer to Fig. 5

13. Take all necessary precautions previously stated and ensure the workpiece can rotate fully without obstruction.
14. Set the Speed Range control lever to HIGH or LOW as required.
15. Set the Forward/Off/Reverse (F/O/R) switch (C) on the main control panel, to the FORWARD position.
16. Engage or ensure the Auto Feed lever is dis-engaged, depending upon whether automatic feed is required.

IMPORTANT: This should ALWAYS be a deliberate, conscious action.

NOTE: If Auto feed is required, the Leadscrew Forward/Neutral/Reverse Lever should be set to FORWARD. If Auto feed is not required, the lever may be set to Neutral. To do this, grasp the knurled handle and pull out against spring pressure. Holding the handle in this position, move the lever until the point, on its end, locates in the middle pit mark in the casing.

---

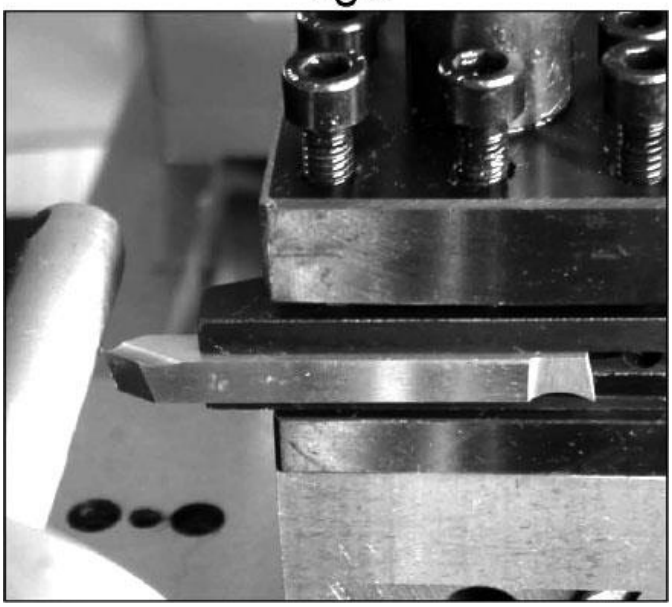
17. Proceed to start the machine as described in Section. A above.
18. If the machine is finished with or is to be left unattended, turn the F/O/R switch to the OFF position then disconnect from the mains supply.

CAUTION! ALWAYS turn the machine OFF at the Forward/off/Reverse switch BEFORE attempting to change any settings or make any adjustments. This includes changing from High to Low range. ALWAYS turn the machine OFF at the Forward/off/Reverse switch BEFORE attempting to change any settings or make any adjustments. This includes changing from High to Low range.

Operation

Simple Turning

Fig.6



Before starting the machine, as described above, it is imperative that the setup for the type of work to be carried out is fully checked.

The following notes are guidelines as to how to set up the lathe in order to carry out a simple turning operation.

ALWAYS plan your work. Have drawings or a plan on hand together with any measuring instruments you may require, such as micrometres/verniers/callipers etc.

Select a cutting tool that will produce the desired cut and mount it in the Tool Rest, with as little overhang as possible, securing it using three hex socket head screws in the manner shown in FIG.6. (Ideally, the overhang should be approx. 10mm but not more than 15mm for a straight tool).

It is IMPORTANT to ensure that the tip of the cutting tool is on the centre line of the work, or very slightly below it. On no account should it be above the centre line. Where necessary, shims should be used beneath the tool in order to achieve the correct height, or, if the tip is too high, the only recourse is to select another tool or grind down the tip.

To check to ensure the tip is at the correct height, position the tool so that the tip is almost touching the point of the tailstock centre. They should coincide. If necessary, adjust using shims, grind down the cutting tool tip or select another tool.

When satisfied, mount the work, either in the chuck or on a faceplate, and if necessary, use the tailstock centre for additional support (If the work cannot be adequately secured by the chuck, or if it is a long piece, or of small diameter). Additionally, 'Steadies' may be used which are described in greater detail under Accessories. If the Tailstock is not to be used, you may remove it completely by slackening off the securing nut at its base and sliding it free of the bed.

Mark the surface of the work at the point where the cut is to end, i.e. the shoulder, using a scriber or similar means, and move the saddle so that the cutting tool is directly opposite the mark, then wind in the cross-slide so that the tool touches the surface of the work. Whilst carrying out these manoeuvres, rotate the chuck by hand to ensure that nothing will meet it when turning takes place, i.e. there is adequate clearance between the saddle, cross-slide, tool post or cutting tool and the chuck.

It may be necessary to adjust the position of the compound slide or reposition the work in the chuck to guarantee that there is adequate clearance.

When satisfied, retract the cutting tool and wind the saddle away from the headstock, then wind the cutting tool up to the work, somewhere along the length to be cut, whilst rotating the work by hand, using the chuck. Continue to advance the cutting tool slowly, until it just touches the surface. Record this position by zeroing the scale on the cross-slide, i.e. turn the moveable scale until the zero marks coincide, (see diagram opposite).

Once zeroed, retract the cross-slide one complete turn, then move the saddle until the tool is a short distance from the right-hand edge of the Work.

Wind in the cross-slide again one full turn until the zero marks again coincide.

IMPORTANT: If you go past the zero marks, back off again at least one half of a turn, then slowly bring the marks back together. Whenever you use the scale, as an indicator, to advance the cross-slide or compound slide, ALWAYS use this procedure to align the marks. This is to consider backlash and other clearances in the gearing and slides etc. Continue to turn the handle an amount equivalent to your desired depth of cut.

NOTE: We recommend that for rough cutting, you do not exceed 0.010"(0.25mm) as your depth of cut.

The setup is now complete to begin your cutting operation, but before starting, check the position of:

- Auto feed lever. Ensure it is in the UP position for manual feed.
- Forward/Neutral/Reverse leadscrew lever. If Auto feed is not required, set to 'Neutral'.
- HIGH/LOW lever. Select required speed range.

Switch the machine ON as described under Starting Procedure and slowly feed the cutting tool into the work using the Manual Feed Handle. Proceed until you reach the previously marked line on the work, then retract the tool one or two complete turns on the Cross-Slide feed handle.

Wind the saddle back to the beginning, then wind the tool the same number of turns 'in', plus the depth of desired cut, and proceed to cut once more.

NOTE: This describes the procedure for general, rough cutting. For other types of cuts - finishing, cutting shoulders etc., you should consult a suitable handbook.

Simple Turning with Power Feed

The same basic setup is used as described above, except that, before starting, the Leadscrew F/N/R Lever (25) is set to the 'Forward' position and the Auto Feed Lever (13), is operated in order to drive the saddle.

As mentioned previously, the rotational speed of the leadscrew, and hence the rate of feed of the tool, is dependent upon the gear configuration of the gear train.

The feed rate for normal turning is considerably less than that used for screw cutting.

The lathe is factory-configured for normal turning, however, if you have been screw cutting, always remember to reset the gear configuration to that for normal turning.

Please refer to the chart on later pages which shows the gear configuration, and the explanation of how to change the gears on the same page.

19. Taking all precautions previously mentioned, position the cutting tool a short distance to the right of the workpiece with the appropriate depth of cut set on the cross-slide.
20. Ensure the leadscrew F/N/R lever is set to 'Forward' and select 'Forward on the Forward/Off/Reverse switch on the main control panel. Switch on the machine.
21. Turn the knob to achieve your desired spindle speed with your right hand, push down on the auto feed lever until the nut becomes firmly engaged with the leadscrew.

    IMPORTANT: Your left hand should always be free in order to hit the emergency stop should it become necessary.

22. Carefully observe the movement of the tool and as it approaches the mark on the surface, denoting the end of cut, pull the Auto Lever UP sharply and ensure it stays UP. If a degree of accuracy is required, it is recommended that you finish the cut by hand.

NOTE: If you require a shoulder with perfectly clean corners, then you need to use an appropriately shaped tool.

23. Retract the tool one or two complete turns on the cross-slide feed, then wind the saddle so that the tool is at the start point once again. Advance the tool the same number of turns, plus the depth of cut, and when ready, push down the auto feed lever and proceed to take another cut.

Bevel Cutting

Bevel cutting involves the use of the compound slide, which is mounted on the cross-slide and set at right angles to it for all normal cutting operations. This is indicated by the zero mark, on the scale, (B Fig. 8), lining up with the mark etched on the body of the cross-slide.

To set the compound slide so that the cutting tool will cut a bevel, first retract the slide, until the two hex socket head screws (A) are revealed as shown in Fig 9.

Slacken the screws enough to allow the compound slide to be turned to the desired angle, as indicated on the scale, and secure the slide in this position by retightening the hex socket head screws.

The taper, or bevel, is cut by setting the cross-slide appropriately then using the compound slide feed handle to advance the cutting tool in the direction of the arrow, as shown in Fig. 9.

Fig.8

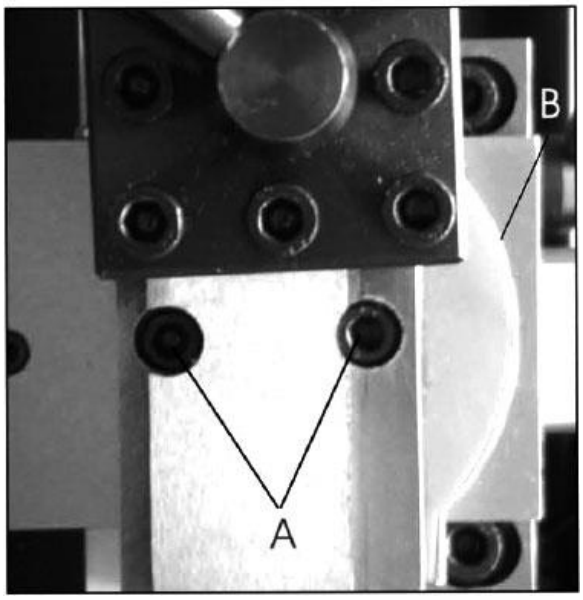
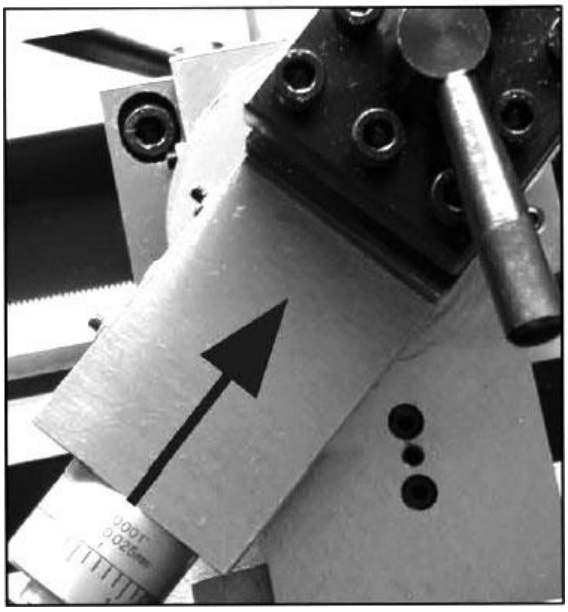


Fig.9



Screw Cutting

This operation requires a degree of skill and accuracy and should not be attempted unless you are completely familiar with all aspects of the lathe.

Essentially, the saddle will move towards the headstock under power, the same as cutting using auto feed, except the rate of feed is greater, as determined by the gear configuration. The cutting tool, therefore, is moving ever closer to the rotating chuck. Great care and concentration must be exercised to ensure that the two do not meet when the machine is operating, as the possible damage caused could be disastrous.

The lathe is supplied with a leadscrew that will produce Imperial Threads in a range from 12 to 52 threads per inch or metric threads in a range from 0.4-2.0mm pitch. It is important to remember that the type of thread you need to cut, i.e. UNF, BA, BSP, BSW etc., will be totally dependent upon the cutting tool profile, as profiles differ from thread to thread.

For detailed information regarding screw cutting techniques, cutting tools etc., you should consult a suitable handbook or obtain advice from a qualified person.

The general procedure for screw cutting is as follows:

24. Try to get as much distance from the chuck to the end of the proposed screw thread as possible, and if your design allows, cut a 'run-off' into the workpiece which is of a smaller diameter than the root diameter of the proposed screw thread.

    NOTE: For long threads, it may be necessary to use 'steady's' (see Accessories).

25. Install the appropriate gears for the thread required, and correctly mount the cutting tool. Set your required depth of cut and position the tool ready to begin cutting.

    NOTE: Depth of cut is vitally important and may be calculated or obtained from an appropriate reference manual.

26. Take all necessary precautions previously stated and start the machine with the automatic feed lever in its' disengaged position (UP).
27. Engage the auto-feed lever sharply, turn the FORWARD/OFF/REVERSE (F/O/R) switch (C) to 'FORWARD'. As the tool approaches the end of the desired thread, turn the switch (C) to 'OFF'. Do not disengage the auto-feed lever.
28. Retract the tool, using the cross-slide feed handle, noting the exact position on the scale and the exact number of turns.

    Turn the switch (C) to 'REVERSE', the saddle winds back to the beginning and turn switch (C) to 'OFF'.

    Reset the tool by winding IN the cross-slide the exact number of turns previously wound OUT and then continue to wind IN the to the desired depth of cut.
29. Repeat steps 4 and 5. Proceed in this manner until the thread is completed.

Changing Gears for Screw Cutting

The leadscrew is driven, via a gear train, by a gear on the spindle. The gear ratio will therefore determine the rotational speed of the leadscrew with relation to the spindle. i.e. one turn of the spindle will turn the leadscrew an amount determined by the gear ratio.

By setting the gears to a known ratio, we can therefore produce threads to a known size, and as the leadscrew supplied produces Imperial threads, the known values will be in Threads Per Inch (TPI), or if the leadscrew supplied produces Metric threads, the known values will be in mm pitch.

As previously mentioned, the actual thread produced will be totally dependent upon the profile of the cutting tool. It is not within the scope of this manual to provide detailed information regarding types of cutting tool, cutting speeds and working with various types of material etc., and it is strongly advised that you consult appropriate handbooks or seek advice from a qualified person.

The chart below shows the thread sizes that may be cut using the gear configuration shown in the corresponding columns.

NOTE: The factory setup for the lathe provides for normal turning using the power or auto feed, and the gear configuration is as follows:

Gear A 20T
Gear B 80T
Gear C 20T
Gear D 80T

Fig A

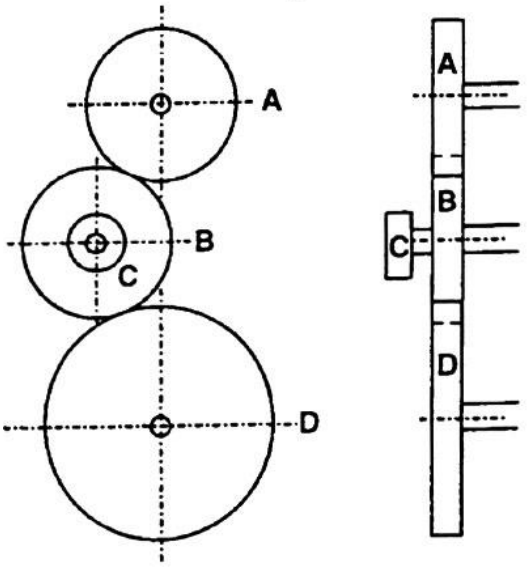
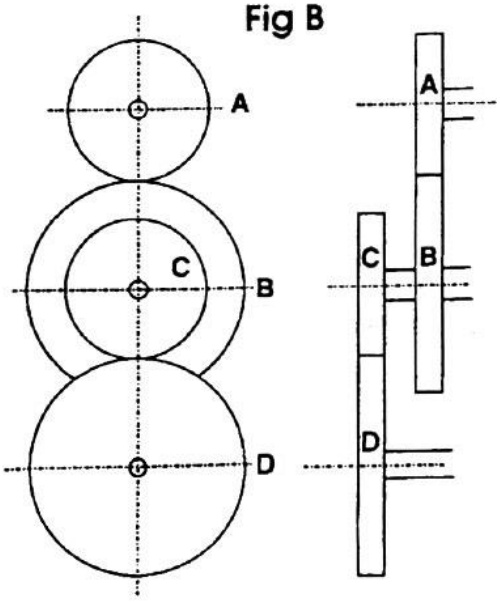


Fig B



Gear Chart for Cutting Imperial Threads

Threads per Inch	Gear			
	A	B	C	D
12	40			30
13	40	65	60	30
14	40			35
16	40			40
18	40			45
19	40	50	60	57
20	40			50
22	40			55
24	40			60
26	40			65
28	20			35
32	20			40
36	20			45
38	20	50	50	57
40	20			50
44	20			55
48	20			60
52	20			65

Examples:

30. Ref. Fig. A

    To cut 12 TPI, use 40T in position A, 30T in position D, and any convenient gear in position B to connect A and D.

31. Ref. Fig. B

    To cut 13 TPI, use 40T in position A, 65T in position B, 60T in position C, 30T in position D.

Gear Chart for Cutting Metric Threads

mm	Gear			
	A	B	C	D
0.4	20	50	40	60
0.5	20	50		60
0.6	40	50	30	60
0.7	40	50	35	60
0.8	40	50	40	60
1.0	20	60		30
1.25	50	40		60
1.5	40	60		40
1.75	35	60		30
2.0	40	60		30

Examples:

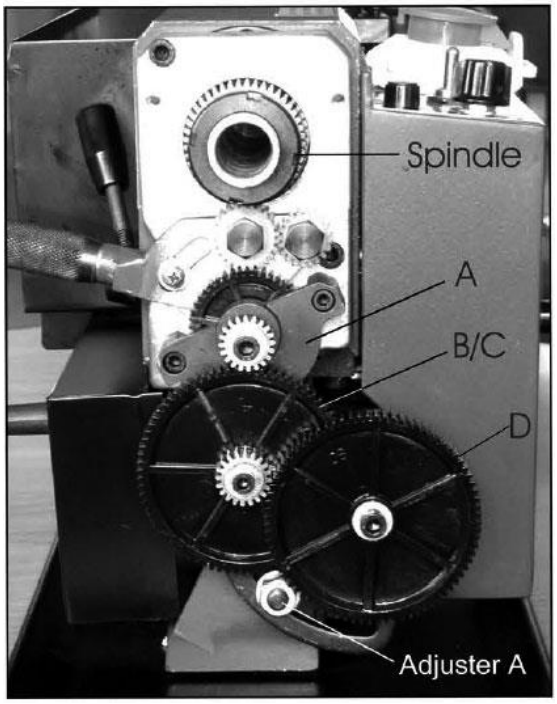
32. Ref. Fig. A

    To cut 0.5mm/T, use 20T in position A, 50T in position B, 60T in position D, and any convenient gear in position C.

33. Ref. Fig. B

    To cut 0.4mm/T, use 20T in position A, 50T in position B, 40T in position C, 60T in position D.

Fig.10



In order to change the gears, ensure the machine is switched OFF and disconnected from the mains supply. Remove the gear train cover which is secured with two hex socket head screws. Gear A may be considered as the Driver, and Gear D as the Driven gear.

When a Simple gear train is configured, as illustrated in Fig. At the gear at B acts as an Idler and its size is therefore irrelevant - any convenient gear will suffice to connect A and D. This is denoted by a blank space in the column in the gear chart.

The positions of the shafts carrying gears A and D are fixed, therefore all adjustments are carried out on the shaft carrying gears Band C and the Adjuster 'A', shown in Fig. 10.

34. Unscrew the hex socket head screws, securing gears A and D, followed by the screw securing gears B and C.
35. To allow the gears Band C to disengage completely and to provide for easier reassembly, unscrew the nut securing the shaft carrying B and C and the nut securing the adjuster A.
36. Remove the gears, taking care to retain the small keys on each shaft, and replace with those necessary to produce your screw thread. They may be mounted either way round.

    The number of teeth on each gear is clearly marked. Replace the securing screws, ensuring the flat washer bears up against the gear hub in each case.

NOTE: If a compound gear train is required, as shown in Fig. B, ensure the spacer, which is keyed to the shaft carrying gear D, is located on the shaft BEFORE the gear, in order to align gear D with gear C.

37. Proceed to move the shaft carrying B and C and the adjuster 'A' so that all gears mesh correctly, then tighten the adjuster securing nuts. This may take one or two attempts but make sure there is as little backlash as possible without being overtight. (Turn the spindle by hand to test for backlash).

Replace the cover and secure with the two hex socket head bolts.

Maintenance

For maximum performance, it is essential that the lathe is properly maintained.

Before Use

- Always inspect before use. Any damage should be repaired, and maladjustments rectified. Damage to machined surfaces should be repaired with an oil stone. Test by hand to ensure smooth operation of all parts before use.
- Apply a few drops of oil to the oilways at both leadscrew bearings (each end bracket) and once or twice during the day if used continuously. It will be necessary to remove the gear train cover in order to oil the left-hand bearing.
- Apply a few drops also to the compound slide oilway, located on the slides' top surface, between the two hex socket head screws.

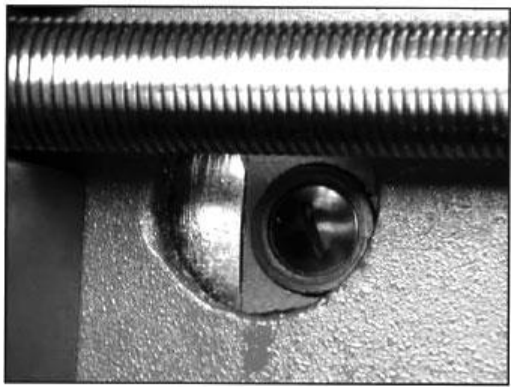
After Use

- Remove all swarf from the machine and thoroughly clean all surfaces. If coolant has been used, ensure it has completely drained from the tray.
- Components should be dry, and all machined surfaces should be lightly oiled.
- Always remove cutting tools, and store in a safe place.

Motor Brushes

The Motor brushes may be changed by unscrewing the caps, visible at the front and rear of the machine, beneath the Headstock, as shown in Fig. 11.

Fig.11

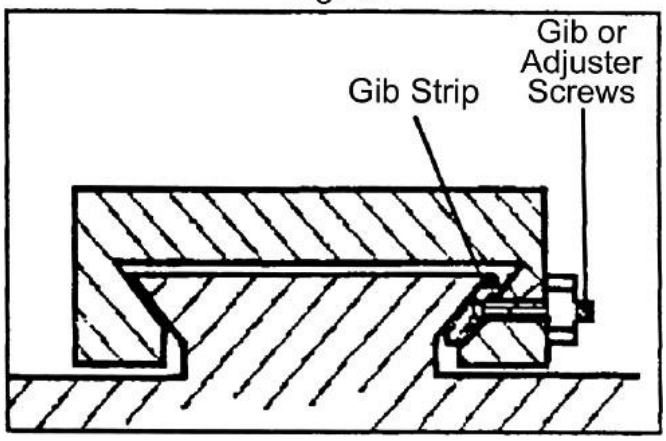


Settings and Adjustments

Occasionally, it may be necessary to readjust various components in order to maintain optimum performance. The adjustments that may be performed are as follows:

Cross-Slide Adjustments

Fig. 12



The cross-slide is mounted on a dovetail slide, as shown in Fig. 12. Between the sloping surfaces on one side of the dovetail, a 'jib strip' is inserted, which may be tightened against the dovetail under the influence of three adjuster, or 'jib' screws, mounted along its' length.

The jib screws are to be found on the right-hand side of the slide, directly beneath the compound slide handle. In time, wear will occur on the mating surfaces resulting in a 'sloppiness' of action.

To adjust the jib strip, to account for wear and ensure the slide moves evenly and smoothly, proceed as follows:

38. Slacken off all lock nuts and screw in the jib screws evenly, i.e. use the same torque for each screw. The slide should be held firmly. Test by trying to turn the handle, but do not force it.
39. Screw out each jib screw by one quarter of a turn ONLY, and nip up the lock nuts
40. Test again, by turning the handle. The movement should be even and smooth along its complete length.
41. If the movement is too slack, screw all adjusters 'in' by one eighth of a turn, and re-try. Similarly, if the movement is too stiff, screw 'out' the adjusters by one eighth of a turn until the correct adjustment is attained.
42. Tighten all lock nuts taking care to ensure you do not move the jib screws whilst doing so.
43. When completed. retract the slide fully and apply oil to all mating surfaces and the feed screw thread, then wind the slide back to its normal position.

Cross-Slide Feed Handle

The cross-slide feed should run smoothly, and the scale must rotate with the handle.

If any stiffness occurs, it is probably the result of swarf lodging between the mating surfaces. Undo the securing hex socket head screw securing the handle. Remove the handle and pull off the collar with the scale taking great care to retain the small spring plate which sits in a groove beneath the collar.

Clean the assembly and reassemble in reverse order. It will be necessary to hold the spring plate in place with a small screwdriver, or similar tool, and pushing down on it to allow the collar to be correctly located on to the shaft.

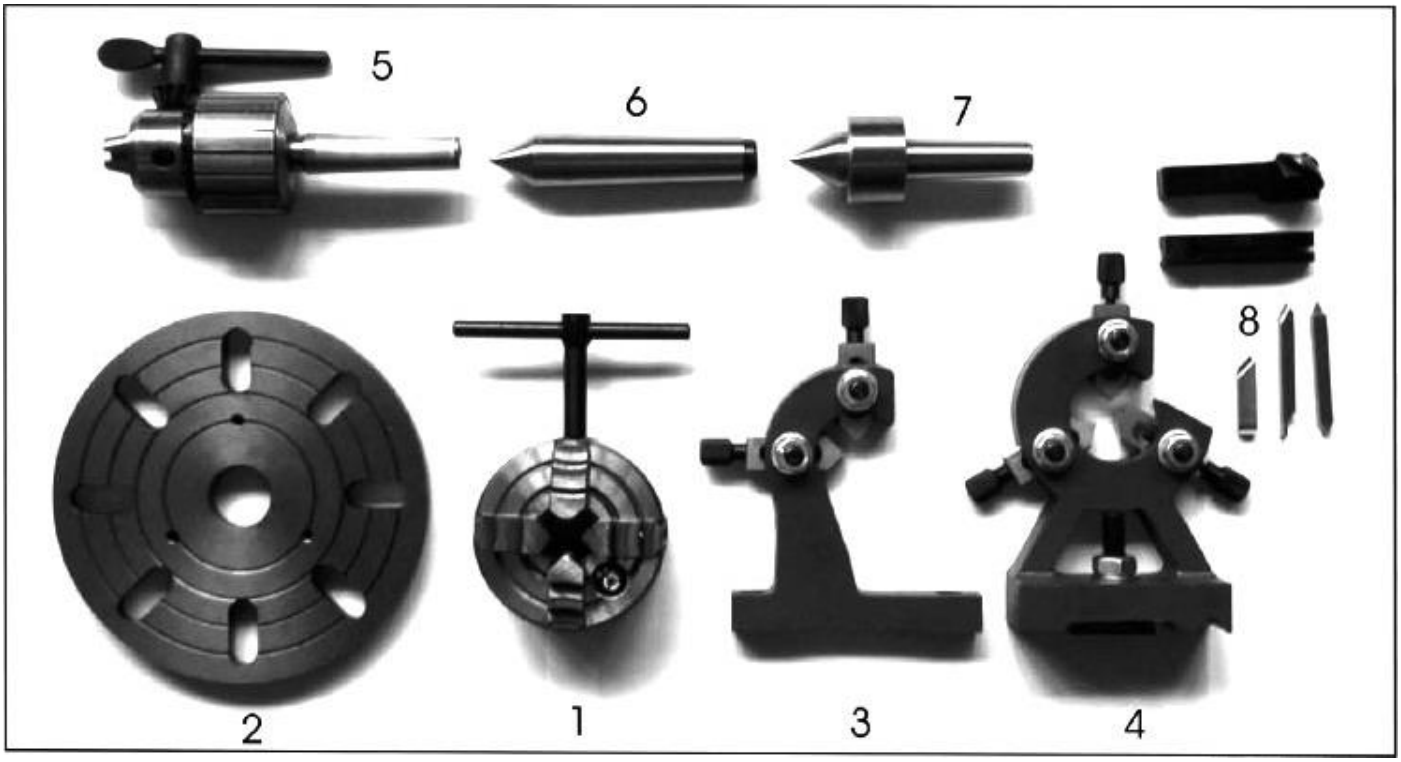
Compound Slide Adjustments

Compound slide adjustments are made in the same way as those for the cross-slide. The jib screws are to be found on the left-hand side of the slide, i.e. facing the front of the lathe.

NOTE: It is important that the cross-slide and compound slide adjustments are correctly carried out and that there is no 'sloppiness' of action. Any maladjustments will have a serious effect on the quality of your work, as they will all be transferred to the tool tip. It is vital that there is as little movement of the tool as possible.

Accessories

A range of accessories is available from your versatility of your machine. These are as follows:



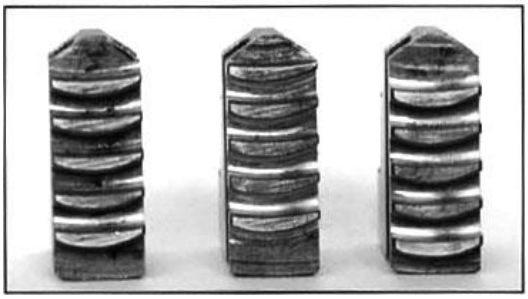
44. Independent 4-Jaw Chuck 80mm dia.
45. Face Plate - 160mm dia.
46. Moving Steady
47. Fixed Steady
48. Tailstock Drilling Chuck with a 13 mm capacity
49. Headstock Centre (MT3)
50. Revolving Centre (Tailstock - MT2)
51. 6 Piece Cutting Tool Set Comprising tools for 60 thread cutting, parting/grooving, facing and general turning work (Hex wrench not shown).
52. Thread Dial indicator (not shown) (Imperial or Metric)

External Jaws – 3-Jaw Chuck

To change the jaws, insert the chuck key and open the jaws to their fullest extent. It will then be possible to remove each jaw in turn. Replace them with the external jaws, noting the following:

- The thread segments of the jaws are progressively 'stepped' as shown in Fig. 14. They are also numbered 1 to 3. This is to consider the lead of the screw thread within the chuck. It is therefore necessary to assemble the jaws in the correct order.
- Place them as shown in Fig. 14, and assemble in the same order, clockwise in the slots in the chuck, turning the chuck key as you insert them. Close the jaws fully and check to ensure

Fig.14

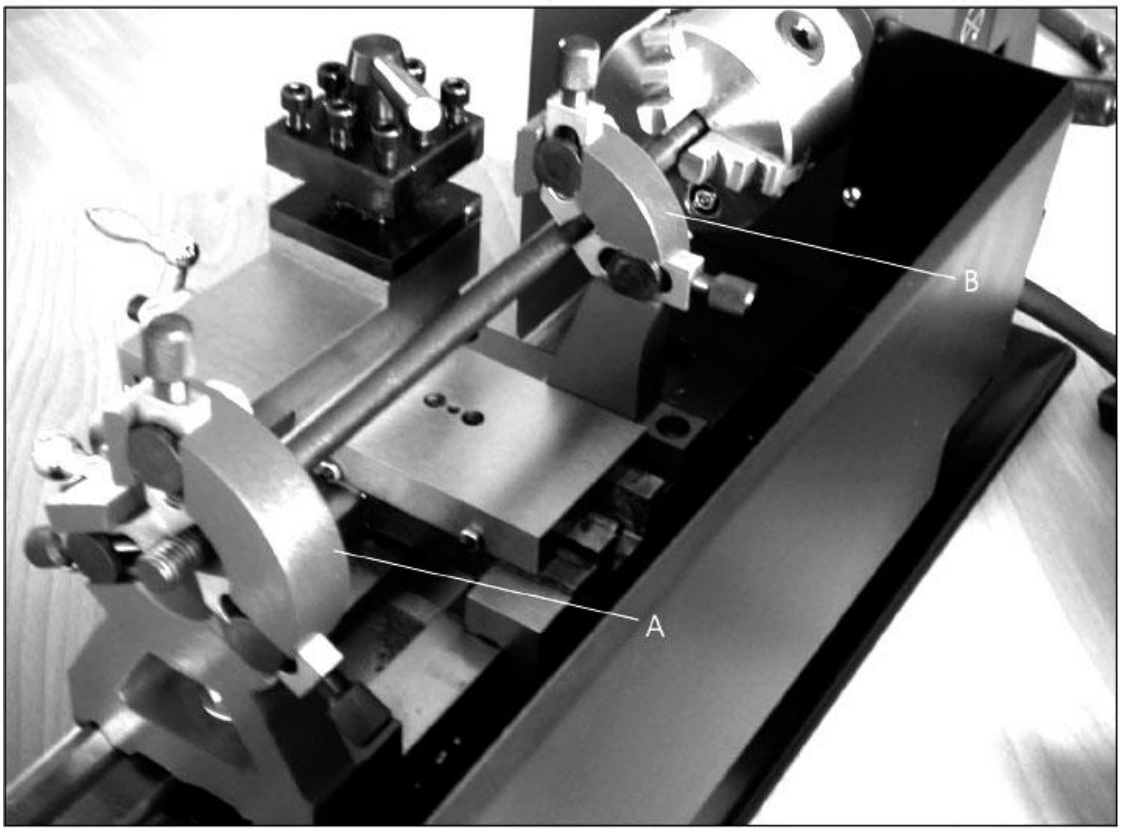


they all meet at the centre. If a jaw is out, open the jaws fully, and retain pressure on the jaw in question whist turning the chuck key, until it snaps down into position. Re-check to ensure all jaws meet at the centre.

Fixed and Moving Steadies

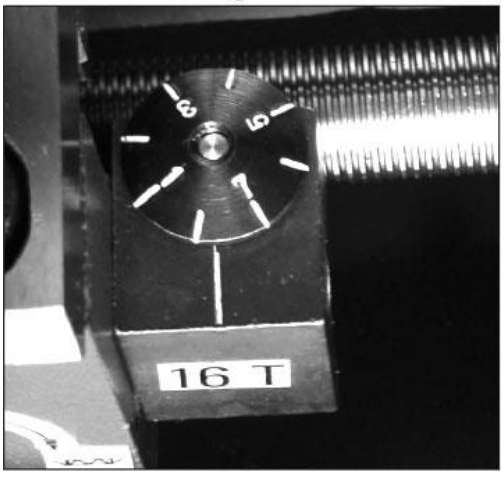
Fig. 15 illustrates the Fixed Steady (A) and Moving Steady (B) assembled to the lathe, used to support a long workpiece.

Fig.15



How to Use a Thread Dial Indicator (Optional)

Fig.16



Mounted on the Apron, adjacent to the Auto Feed Lever, is the Thread Dial Indicator, shown in Fig. 16. This is permanently connected to the leadscrew and, as the leadscrew turns, the 'dial' spins. Eight radial marks are etched on the dial and these are used to determine the exact position of the leadscrew thread in relation to the saddle.

The numbers in the 'SCALE' column refer to the numbers on the radial lines on the Indicator Dial. Therefore, if a 20TPI thread is to be cut for example, the marks 1, 3, 5 or 7 may be used. You should now proceed as follows:

53. Observe the spinning Dial. Concentrate on one of the numbered marks etched on the dial which corresponds to the scale number given in the Indicator Table. (In the example, this could be 1 ,3,5 or 7). As your line passes the mark on the body of the dial indicator, engage the auto lever sharply and thread cutting will commence.
54. As the tool approaches the end of the desired thread, **DISENGAGE THE AUTO FEED LEVER**. Do not switch the machine OFF.

55. Retract the tool, using the cross-slide feed handle, noting the exact position on the scale and the exact number of turns. Wind the saddle back to the beginning and reset the tool by winding IN the cross-slide the exact number of turns previously wound OUT and then continue to wind IN to the desired depth of cut
56. With the machine still running, observe the dial indicator and as the same numbered line, passes the mark on the body, engage the auto feed lever once again. Proceed in this manner until the thread is completed.

Engaging the auto feed lever as your predetermined line on the dial passes the mark on the body ensures the half nuts of the auto IMPERIAL feed mechanism engage in the same thread on the leadscrew each time, thereby ensuring the cutting tool is in the same place for each pass which in turn produces a per feet thread.

Indicator Tables

TPI	Scale
12	1, 3, 5, 7
13	1
14	1, 5
16	1 – 8
18	1, 5
19	1
20	1, 3, 5, 7
22	1, 5
24	1 – 8
26	1, 5
28	1, 3, 5, 7
32	1 – 8
36	1, 3, 5, 7
38	1, 5
40	1 – 8
44	1, 3, 5, 7
48	1 – 8
52	1, 3, 5, 7

IMPERIAL

mm	Scale
0.4	1, 3, 5, 7
0.5	1 – 8
0.6	1 – 8
0.7	1, 4.5
0.8	1, 5
1.0	1 – 8
1.25	1, 3.5
1 .5	1 – 8
1.75	1, 4.5
2.0	1 – 8

METRIC

i.e.

1. 0.5mm/T, 0.6mm/T, l mm/T, 1.5mm/T or 2mm'T = 1-8
2. 1.25mrn/T = 1, 3.5
3. 0.7mm/T, 1.75mrn/T = 1, 4.5
4. 0.4mrn/T = 1, 3, 5, 7
5. 0.8mm/T = 1, 5

Specifications

Power	400W
Input Voltage	240V/50Hz
Distance Between Centres	300mm
Swing Over Bed	180mm
Speed (High Gear)	100-2500rpm
Speed (Low Gear)	100-1100rpm
Swing Over Cross Slide	65mm
Spindle Bore	MT3
Tailstock Taper	MT2
Spindle Bore	20mm
Cross Slide Travel	65mm
Compound Slide Travel	55mm
Metric Range of Threads	0.4-2.0mm (10 Thread Pitches)
Chuck Diameter	80mm
Inch Thread (T.P.I)	12-52TPI (18 Thread Pitches)
Power Plug	Australian Standard

Some experts believe that the incorrect or prolonged use of almost any product may cause serious injury or death. To help reduce your risk of serious injury or death, refer to the information below. For more information, see www.datastreamserver.com/safety

- Consult all documentation, packaging and product labelling before use. Note that some products feature documentation available online. It is recommended to print and retain the documentation.
- Before each use, check the product for loose/broken/damaged/missing parts, wear or leaks (if applicable). Never use a product with loose/broken/damaged/missing parts, wear or leaks.
- Products must be inspected and serviced (if applicable) by a qualified technician every 6 months. This is based on average residential use by persons of average size and strength, and on a property of average metropolitan size. Use beyond these recommendations may require more frequent inspections/servicing.
- Ensure that all users of the product have completed a suitable industry recognised training course before being allowed access to the product.
- The product has been supplied by a general merchandise retailer that may not be familiar with your specific application or description of application. Be sure to attain third-party approval from a qualified specialist for your application before use, regardless of any assurances from the retailer or its representatives.
- This product is not intended for use where fail-safe operation is required. As with any product (for example, automobile, computer, toaster), there is the possibility of technical issues that may require the repair or replacement of parts, or the product itself. If the possibility of such failure and the associated time it may take to rectify could in any way inconvenience the user, business or employee, or financially affect the user, business or employee, then the product is not suitable for your requirements. This product is not intended for use where incorrect operation or a failure of any kind, including but not limited to, a condition requiring product return, replacement, parts replacement or service by a technician may cause financial loss, loss of employee time or an inconvenience requiring compensation.
- If this product has been purchased in error when considering the information presented here, contact the retailer directly for details of their returns policy, if required.

Bäumr-AG®
.com.au