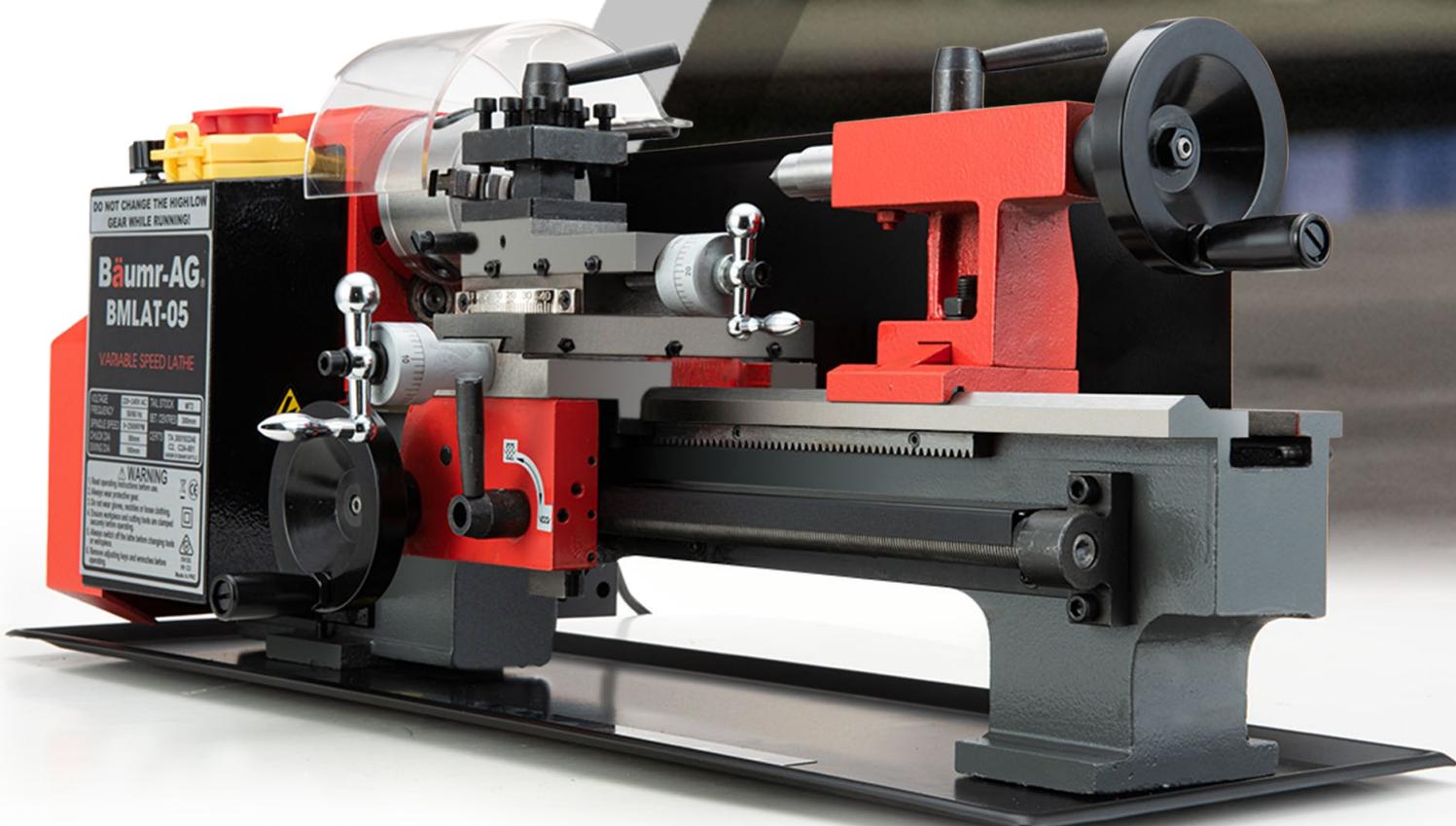


Bäumr-AG®

Mini Metal Lathe

BMLAT-05



User Manual

[Revision 1.0 February 2020]

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 lit.
- 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	General Electrical Safety	General Service Information
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.

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 electric 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.

			 WARNING EXHAUST FUMES
			
			
			
			

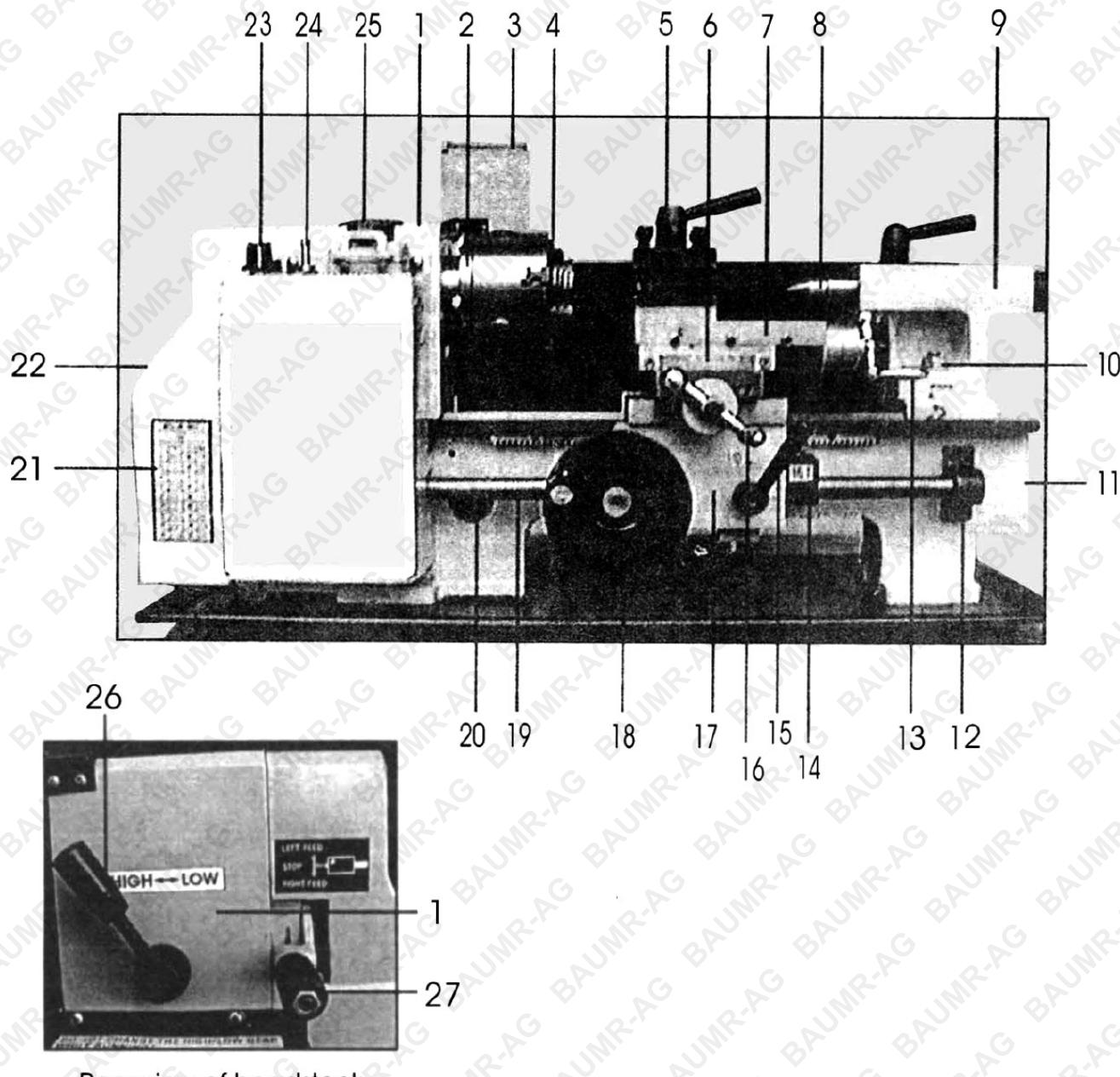
			
Carbon-Monoxide Hazard Do not use the product in confined areas or without adequate ventilation. Carbon-monoxide poisoning can be fatal.	Pull Hazard Be aware that the product contains or uses mechanical devices that can pull in objects and can cause severe injury to fingers, limbs etc. Take due care 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.	

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Parts Identification

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](#)).

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](#).

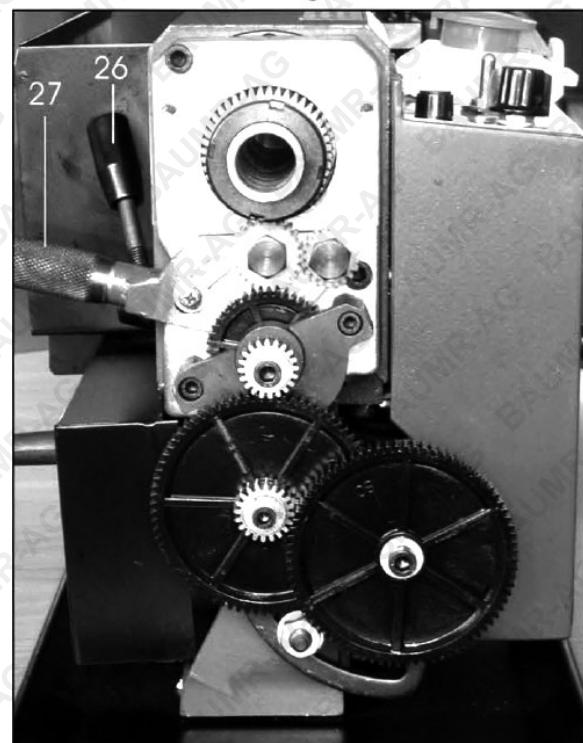


Fig.2

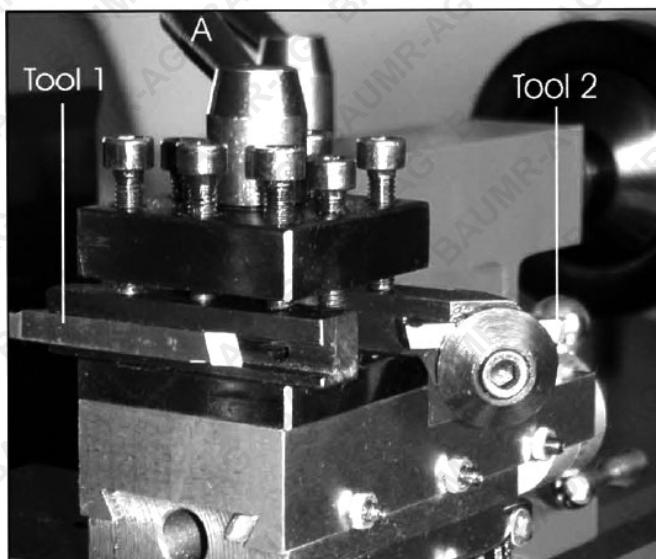
The cross-slide and compound slide feeds are provided with a scale. These are used to move the tool by precise amounts - one division being equivalent to 0.001" (0.025mm). As the feed handle is turned, so does the scale. The scale on the cross-slide feed may also be held stationary whilst the handle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



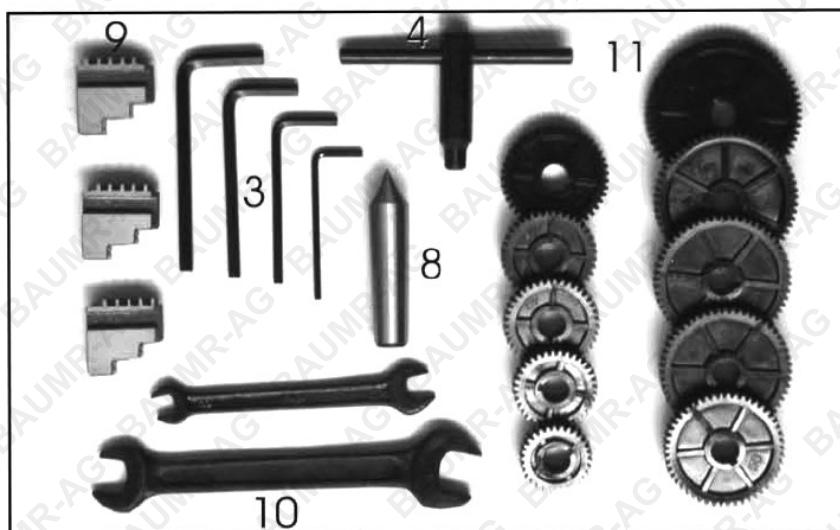
Motor

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:

1. 4 x Rubber Feet *
2. 4 x M6 Pan Head Screws *
3. 4 x Hex Keys
4. 1 x Chuck Key
5. 1 x Plastic Oil Container *
6. 1 x Spare Fuse glass type *
7. 2 x Plastic Handles w/Nuts and Bolts *
8. No.2 Morse Taper Centre (for Tailstock)
9. 3 x External Jaws (for 3-Jaw Chuck)
10. 2 x Double Open-Ended Spanners 8x10mm and 14x17mm
11. 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



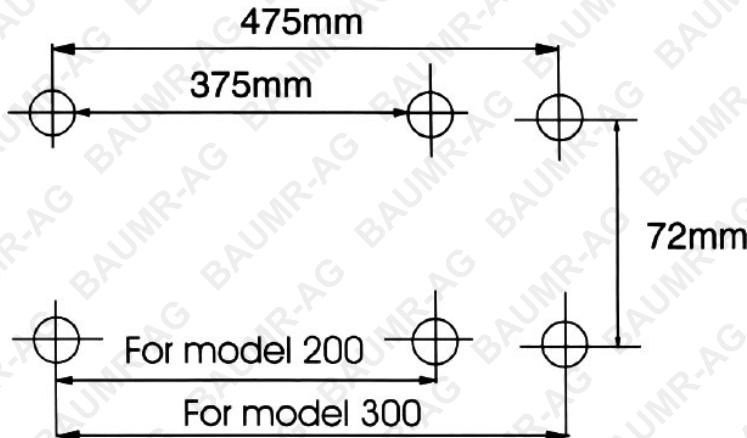
CAUTION! DO NOT ATTEMPT TO USE THE MACHINE UNTIL INSTALLATION IS COMPLETED, AND ALL PRELIMINARY CHECKS HAVE BEEN MADE IN ACCORDANCE WITH THIS MANUAL.

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.

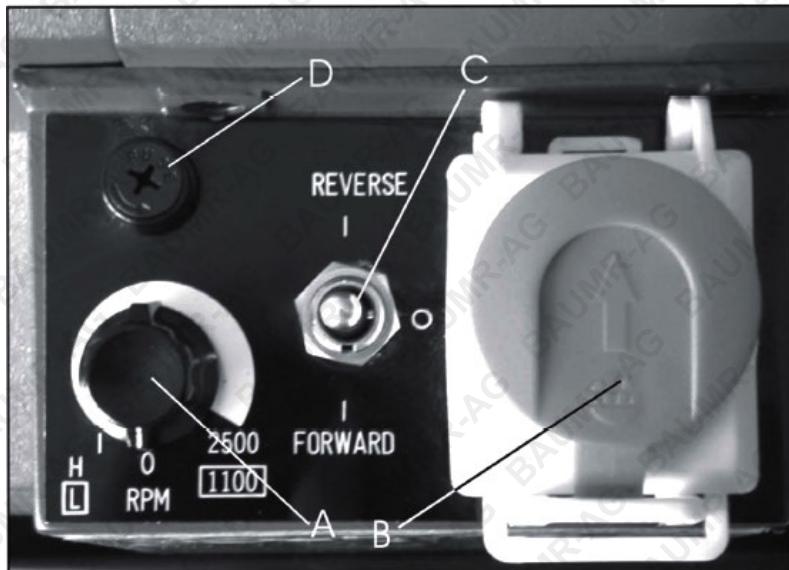
Alternatively, if you do not wish for a permanent installation, you may secure the lathe to a 5/8" thick plywood board with a minimum recommended dimension of 800x300mm, the mounting holes being centralised on the board. When the lathe is in use, the board should be clamped to workbench using with 'G'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

1. Power ON (At the wall socket).
2. Stop button to open (B).
3. Turn speed knob fully anticlockwise (A).
4. Chuck guard down over chuck (3).
5. 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

1. Take all necessary precautions previously stated and ensure the workpiece can rotate fully without obstruction.
2. Set the Speed Range control lever to HIGH or LOW as required.
3. Set the Forward/Off/Reverse (F/O/R) switch (C) on the main control panel, to the FORWARD position.
4. 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.

5. Proceed to start the machine as described in Section. A above.
6. 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

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.

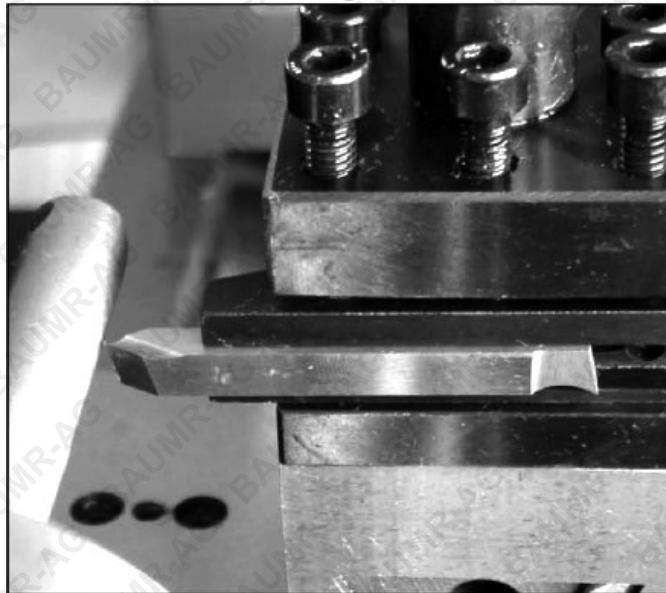
It may be necessary to adjust the position of the compound slide or reposition the work in the chuck to guarantee that there is adequate clearance.

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.

Fig.6





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.

1. 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.
2. 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.
3. 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.

4. 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.

5. 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

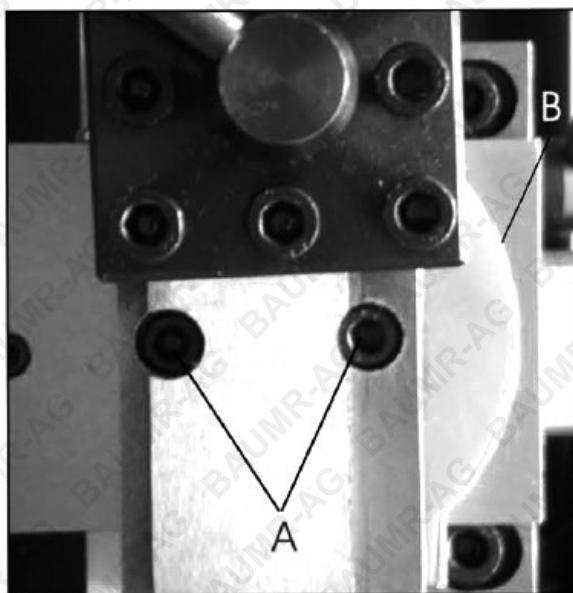


Fig.9



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:

1. 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](#)).

2. 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.

3. Take all necessary precautions previously stated and start the machine with the automatic feed lever in its' disengaged position (UP).
4. 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.
5. 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.

6. 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

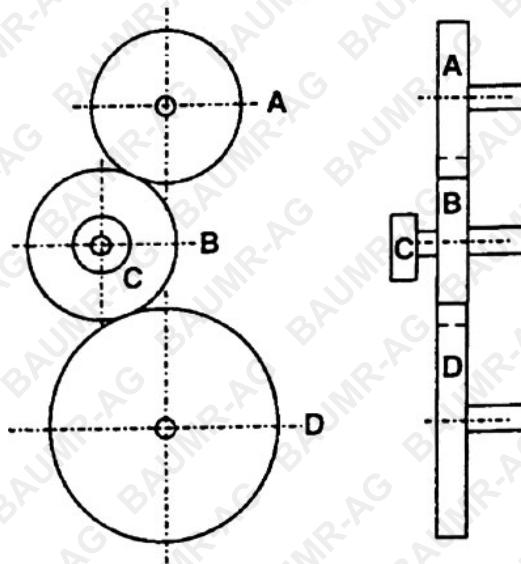
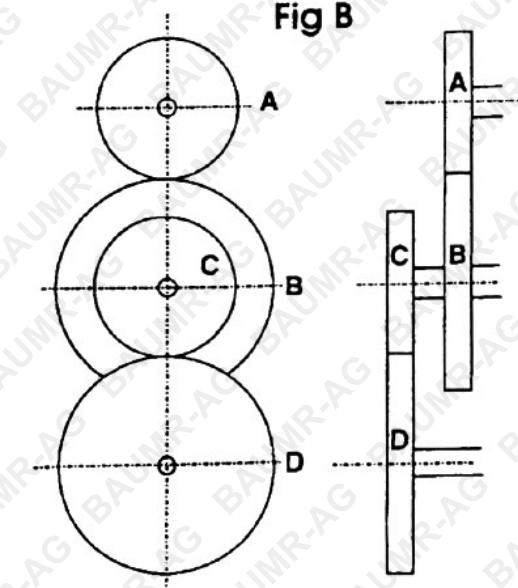


Fig B



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:

1. 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.

2. 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:

1. 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.

2. 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.

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.

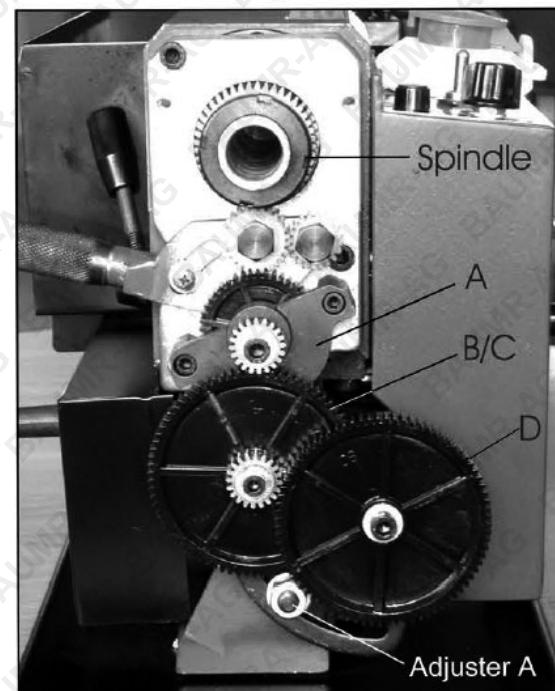
When a Simple gear train is configured, as illustrated in Fig. At the gear at B acts as an Idler and its size is therefore irrelevant - any convenient gear will suffice to connect A and D. This is denoted by a blank space in the column in the gear chart.

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

1. Unscrew the hex socket head screws, securing gears A and D, followed by the screw securing gears B and C.
2. To allow the gears B and 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.
3. 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.

Fig. 10



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.

4. 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.

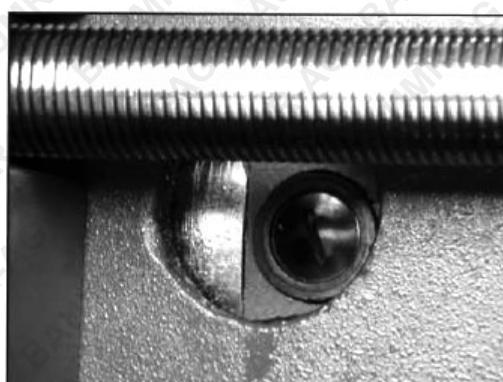
After Use

- 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

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:

1. 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.
2. Screw out each jib screw by one quarter of a turn ONLY, and nip up the lock nuts
3. Test again, by turning the handle. The movement should be even and smooth along its complete length.
4. 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.
5. Tighten all lock nuts taking care to ensure you do not move the jib screws whilst doing so.
6. 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.

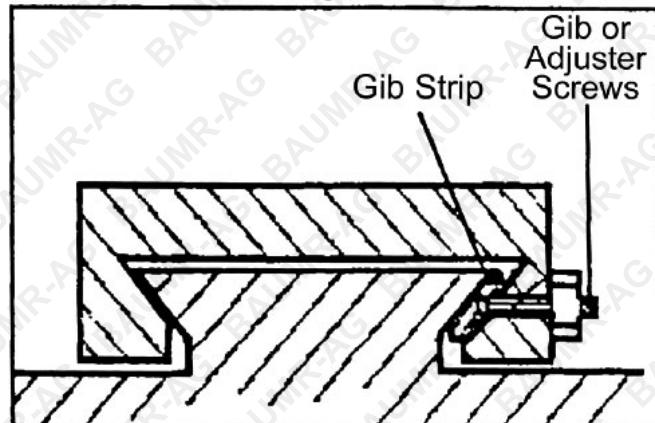


Fig. 12

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.

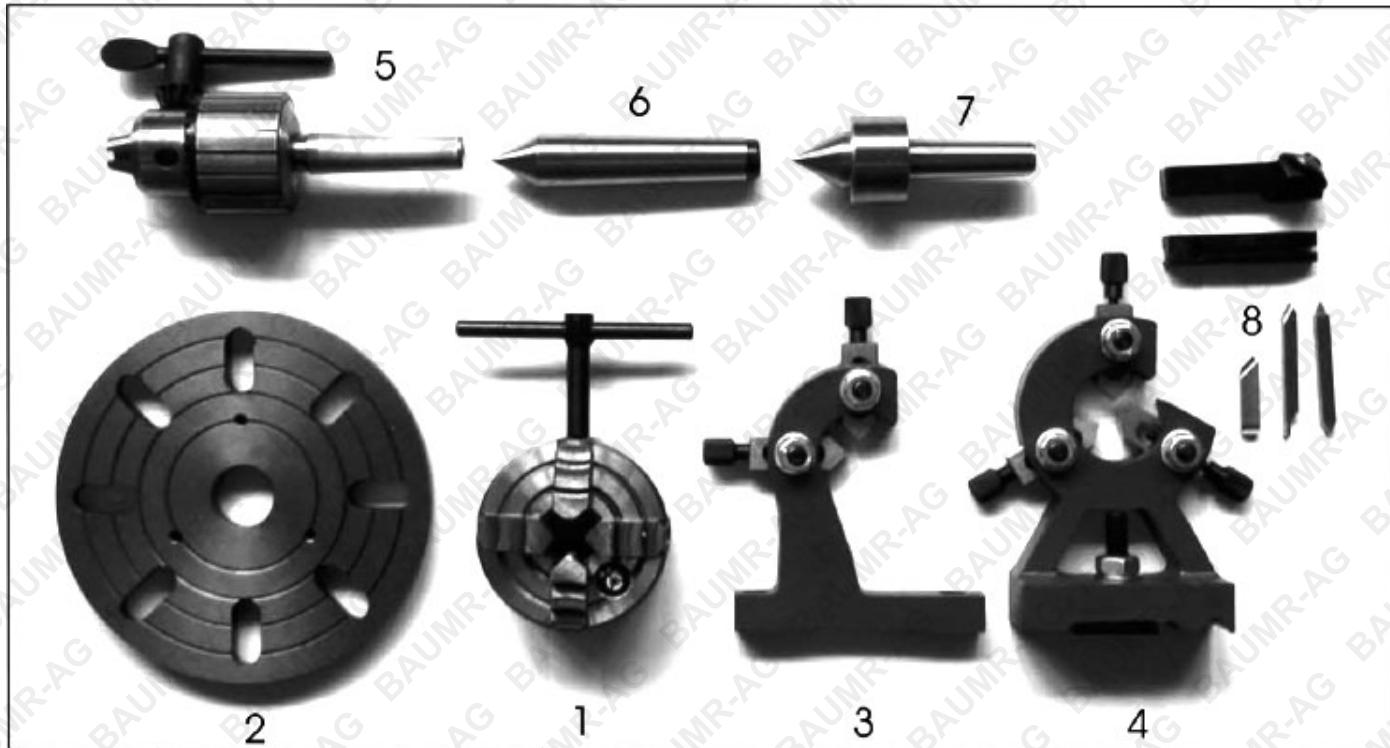
Compound Slide Adjustments

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:



1. Independent 4-Jaw Chuck 80mm dia.
2. Face Plate - 160mm dia.
3. Moving Steady
4. Fixed Steady
5. Tailstock Drilling Chuck with a 13 mm capacity
6. Headstock Centre (MT3)
7. Revolving Centre (Tailstock - MT2)
8. 6 Piece Cutting Tool Set Comprising tools for 60 thread cutting, parting/grooving, facing and general turning work (Hex wrench not shown).
9. 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

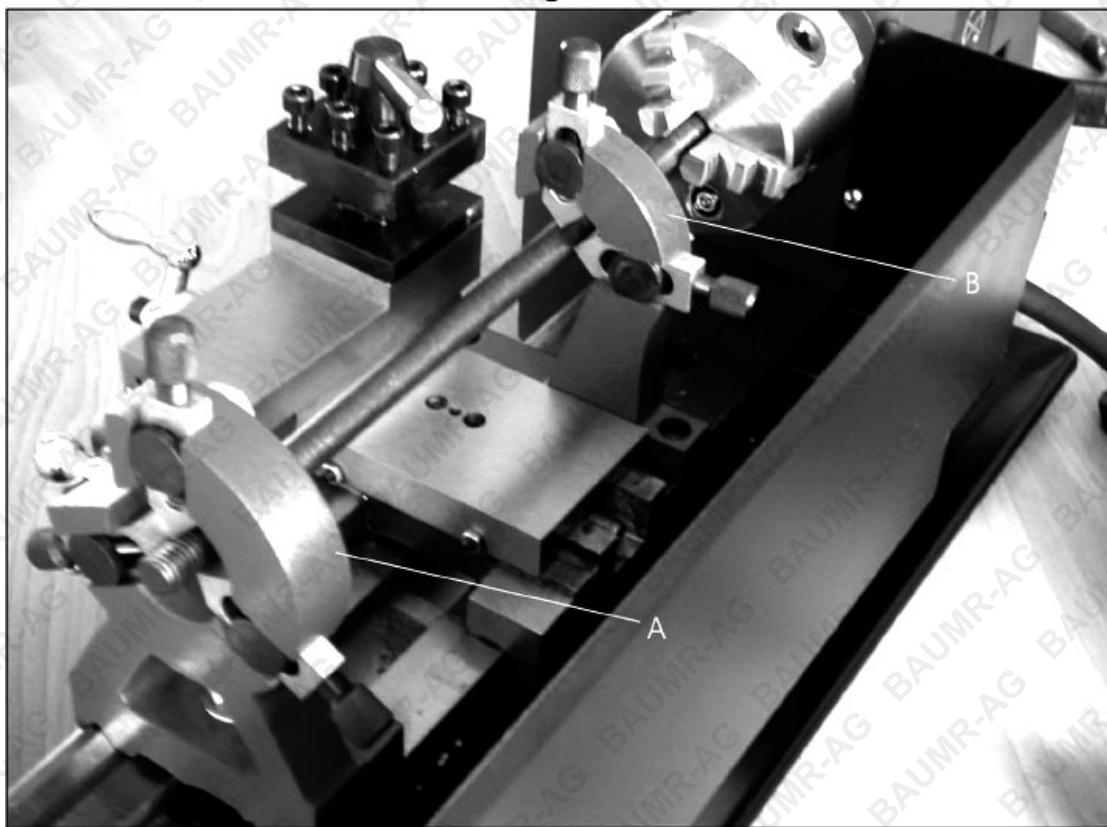


they all meet at the centre. If a jaw is out, open the jaws fully, and retain pressure on the jaw in question whilst turning the chuck key, until it snaps down into position. Re-check to ensure all jaws meet at the centre.

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



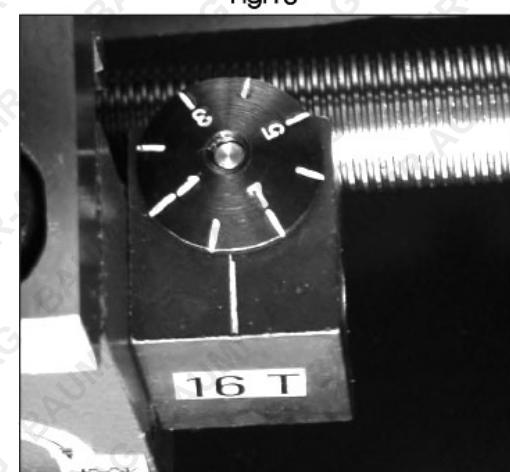
How to Use a Thread Dial Indicator (Optional)

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:

1. 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.
2. As the tool approaches the end of the desired thread, **DISENGAGE THE AUTO FEED LEVER**. Do not switch the machine OFF.

Fig.16



3. 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
4. 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. $0.5\text{mm}/T, 0.6\text{mm}/T, 1\text{mm}/T, 1.5\text{mm}/T$ or $2\text{mm}'T = 1-8$
2. $1.25\text{mm}/T = 1, 3.5$
3. $0.7\text{mm}/T, 1.75\text{mm}/T = 1, 4.5$
4. $0.4\text{mm}/T = 1, 3, 5, 7$
5. $0.8\text{mm}/T = 1, 5$

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



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- 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.
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