

8000 Retracting Sledge Microtome Manual



 **MADE IN BRITAIN**

Bright
Instruments

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SAFETY WARNING

Low temperatures are present in this equipment. Extreme care should be taken.

DO NOT let bare skin come into contact with metal surfaces.



SAFETY WARNING

**Extremely sharp knives/blades.
Use knife/blade guards at all times.
Use correct tools for removal and insertion of knives/blades.**

**DO NOT leave knives/blades laying around.
Place knives/blades not in use, into box/wallet provided.**

Safety Information

CONSUMER PROTECTION

The Consumer Protection Act 1987 Part 1. refers to Product Liability. This legislation was issued as a direct result of an EC Directive to all member states and has been in force with effect from 1 March 1988.

The Bright Instrument Company Limited, ever mindful of the need to ensure that their products are not subject to misuse and/or incorrect handling, have made it their aim to communicate any possible dangers to their customers.

Whilst the Bright Instrument Company Limited markets products manufactured to the highest safety standards, it is in the interest of the purchaser that he is aware of the resultant dangers of misuse and/or incorrect handling of these products.

Your attention is therefore drawn to the following precautions:

MECHANICAL

MICROTOME KNIVES/BLADES:

The microtome knife/blade can be a hazard in the laboratory. Personnel should be made aware of the dangers and observe the following warnings:

- a. DO NOT leave the microtome unattended with an exposed knife/blade in position Remove the knife/blade, or cover with the guards or visor provided.
- b. DO NOT leave unboxed knives/blades lying around. Place knives/blades that are not in use in their boxes or packets.
- c. DO NOT carry knives/blades unless secure in the box or packet provided.
- d. DO NOT clean the knife/blade along its length. Wipe the knife from the back edge to the cutting edge.
- e. REMEMBER that even used knives and blades are dangerous. They are still sharp and may have been used to cut potentially infectious specimens.

f. DISPOSE of used knives and blades with the same care as other sharp objects. On no account should used knives or blades be placed in waste bins.

OPERATION

When placing object holders in the vice, when orientating, manipulating or in any way placing fingers in a position above the knife/blade edge – ensure that knife guards are in position.

ACCESSORIES

Fluids supplied as accessories with Bright instruments, such as Cryospray 134 and microtome oil are strictly for laboratory use only.

They should not be taken by mouth and precautions afforded to other laboratory chemicals should be adhered to. Please refer to the material safety data information, towards the back of this instruction manual for further details.

Safety Information Cont.

PRODUCT SAFETY INFORMATION

All Bright Instrument Company Limited personnel are encouraged to make suggests regarding product safety. We also welcome such suggestions from our customers.

They may be submitted by completing the appropriate (Safety) section of the Quality Survey Record Form supplied with all Bright instruments, or alternatively, by letter, telephone, fax or email. All communications should be direct to our Quality Assurance Department and will be acknowledged.

DECONTAMINATION CERTIFICATES

IMPORTANT If the instrument or any part of it is to be returned to Bright Instrument Company Limited, a decontamination certificate must accompany it, and please note the following:

a. If the instrument or any part of it has been exposed to or been in contact with potential pathogenic or radioactive material, it is essential that it be decontaminated.

b. Set procedures are laid down by the Health and Safety Executive for decontamination. For the avoidance of doubt, we ask that instruments or parts returned to us should be accompanied by a completed decontamination certificate. A copy of this can be found at the back of this instruction manual and we suggest you use a photocopy of this when returning parts. Alternatively we would be pleased to either post or fax you another copy should you require.

c. Should the instrument or any part of it be received in a condition that Bright Instrument Company Limited, consider to be a potential biological hazard, the instrument or part will be returned un-repaired at the expense of the customer.

d. Customers declarations must indicate that the package contains 'British Returned Goods'. Failure to do so will involve customs duty payable by us, which will be invoiced to the sender.

Warranty

The Warranty relating to the instrument is outlined in our Terms and Conditions of Sale paragraph 6.

i. The Seller 's products are carefully inspected and submitted to its standard tests.

ii. The Seller warrants all its products to be free from defects in workmanship and materials under normal conditions of use and service provided always:

a. That if any of the goods so manufactured is alleged to be defective in workmanship and material and is returned carriage paid, and protected against damage in transit to the Seller's works at Huntingdon within 12 months from the date of despatch and if after examination by the Seller that goods or part of them are found to be so defective then the Seller will repair or replace them free of charge and will return them to the Buyer, carriage paid.

b. Where any part of the goods manufactured by the Seller is repaired or replaced under the terms of the foregoing warranty, such warranty shall thereafter be limited to a period of six months from the date when the goods shall have been re-delivered to the Buyer.

c. This warranty does not apply to any defects caused by wear and tear, incorrect installation abnormal conditions of working, accident, misuse or neglect.

d. That save as in this clause herein before expressed, the Seller shall not be under any liability for negligence or otherwise in respect of defects in goods delivered or for any injury, damage or loss resulting from such defects and the Seller's liability under this clause shall be in lieu of any warranty or condition implied by law as to the quality or fitness for any particular purpose of such goods.

e. This warranty is expressly in lieu of all other warranties, guarantees or liabilities expressed or implied by any of the Seller's Representatives or Agents.

Please see our separate Product Warranty sheet for deliveries to the mainland UK.

WARNING: Before proceeding to Operating Instructions, ensure you are familiar with the contents of the pages marked 'Safety Information'. This instrument must only be used by competent persons.

1. Introduction

1.1 RECEIPT OF PRODUCT

1.1.1 RECEIPT AND UNPACKING

This instrument received a final test and inspection prior to despatch from the factory. The following instructions are given for the re-assembly of the instrument, adjustments and its correct use. If the instrument is received before preparations for installation are completed, it should be stored in a clean, dry place and not exposed to dirty or damp conditions.

1.1.2 RECEIPT

Immediately upon receipt of the instrument, make a careful examination for evidence of damage encountered in transit. If any damage is found or suspected, notify both the carrier and Bright Instrument Company Limited.

1.1.3 PACKING

All packing must be carefully removed and parts checked against the enclosed packing list. If any damage or discrepancy is noted, please inform our agent/distributor, or

bright Instrument Company Limited direct, immediately. At least two people are required during the unpacking. When removing the main instrument from the packaging, grip the instrument on the underside (one person to each side) and lift out the microtome. Do not lift by the sledge or attempt to separate the sledge from the casting within the case as damage can result.

1.2 ASSEMBLY & INSTALLATION

1.2.1 POSITIONING

The instrument should be positioned on a level, sturdy surface at a height convenient for the operator. It may be used with its long axis parallel to the bench, at right angles or obliquely. Ensure it has been positioned away from direct, hot sunlight and is in a location completely free from draughts.

2. Operating Instructions

On receipt of your new Bright instrument, please refer to section 1.1 (Receipt and Unpacking) and section 1.2 (Assembly and Installation).

As part of its policy of continual improvement, Bright Instrument Company Limited, reserves the right to incorporate changes, or make additions to, without prior notice. There may, therefore, be minor details differences between the information in this manual and your instrument. These differences will not affect the safety and use of the instrument.

Refer to Fig. 1.

2.1 OPERATING HANDLE [FIG. 1.3]

Semi automatic advance – when pushed towards the knife the sledge will move along the runners and will also advance the specimen the selected amount (thickness). When pulled back the specimen retraction mechanism is activated.

2.2 THICKNESS CONTROL [FIG. 1.5]

A knob, calibrated in microns, is used to select the thickness of sections to be cut from 1µm – 40µm, in 1µm steps. Always set the

thickness by turning the knob anticlockwise. If the thickness has to be reduced then turn clockwise past the required thickness, then anticlockwise.

2.3 COARSE ADVANCE/TRIM CONTROL

Quickly raises or lowers the specimen 450µm per turn. As this control is always engaged, it can be used at any time.

2.4 SPECIMEN HOLDER

Specimens are clamped in the vice [7] or alternative holder if fitted. The specimen holder can be raised and lowered after releasing the clamp lever [21].

2.5 KNIFE CLAMPS

Two screws, turned by a lever [10], are used to fix the knife in the knife clamp and the knife clamp in the knife block [9]. The cutting angle of the knife is adjustable from 0-40°. A scale is provided on the knife block. Slew angles of the knife can be obtained by loosening the knife block clamp levers [12] and the knife clamp levers [10] and moving knife to slew angle required.

2.6 KNIFE GUARDS

Each knife guard [1] can be moved to the central position to cover the working area of the knife, or to the outer position while section cutting. The black knobs secure the guards in the chosen position.

2.7 SIDE PILLARS (FIG. 1.13 & 1.16)

In normal use, these pillars slope inwards slightly. For large area sections they can be unbolted from the base, swapped left to right and refitted, so that they slop outwards, so providing more space.

3. Operation

The microtome should be installed on a sturdy bench at a height convenient for the operator. It may be used with its long axis parallel to the bench, at right angles or obliquely.

There are many variations of the preparation procedure according to the type of specimen to be sectioned, the size of the specimen and how the specimen is prepared.

The following general procedures can be applied to all uses:

Refer to Fig. 1.

3.1 FITTING THE OBJECT HOLDER

Pull the sledge away from the knife holders. Secure the required object holder by placing it in the holder in the sledge slide [19]. Set to correct height and lock by tightening clamp lever [21].

Note that the clamp lever has a ratchet with its movement limited to prevent the lever being left in positions where it could impact on other parts during sectioning.

3.2 FITTING AND ADJUSTING THE KNIFE

NB: The term 'knife' used here also includes disposable blade holder.

- a. Slacken the knife clamp levers (10) just enough to let the knife slide into the knife clamps from the side.
- b. Insert the knife, taking care to avoid touching the edge against the metalwork.
- c. Check that the knife lies flat on the pad pieces in the knife clamps and that the heel of the knife is not caught up on the slot in the knife clamps.
- d. Screw the knife clamp levers down just sufficiently to steady the knife in position.
- e. Slacken the knife block clamp levers [12]. Set the knife holders to the desired slew angle, ensure the knife clamps still cover the ends of the knife. Set the knife to the desired cutting angle and tighten the knife clamping levers.

f. Check that the knife is still at the desired slew angles and tighten the knife block clamp levers.

NB: To ensure that the knife clamps are correctly aligned in the holders, the knife block clamp levers must always be slackened before the knife clamping levers are tightened.

3.3 TRIMMING THE SPECIMEN

Fit the specimen securely into the appropriate specimen holder on the microtome.

To trim excess material from the surface of the specimen block:

- a. First move the sledge towards the knife and adjust the specimen height using the coarse advance so that the specimen is just below the knife.
- b. Either set the thickness control to cut thick sections, eg: 20µm, and move the sledge back and forth repeatedly to trim the specimen.

3. Operation Cont.

3.3 TRIMMING THE SPECIMEN (CONT.)

c. Or set the thickness control to zero and alternately raise the specimen slightly using the coarse advance and move the sledge forward then backwards. This method is quicker but should only be used if the operator is experienced in the use of base sledge microtomes.

3.4 SECTION CUTTING AND COLLECTION

Select the desired section thickness. Operate the sledge back and forth a few times to remove any surface roughness on the specimen block caused by trimming.

Cut sections using slow. Steady forward movements of the sledge. Wax-embedded specimens should form a ribbon of sections on the knife.

Sections can be removed either singularly or as a ribbon using forceps. Wax sections are usually floated onto warm water to soften and flatten them. They can be collected on microscope slides as follows:

a. Dip a microscope slide vertically into the warm water some distance from the sections.

b. Carefully bring the slide close to the section so that the sections edge contacts the slide in the appropriate position.

c. Now raise the slide vertically from the water.

3.5 HINTS ON SECTIONING

a. Ensure the knife is sharp and clean. During use, the knife should be cleaned occasionally to remove built-up wax.

b. Wax embedded specimens usually cut more easily if they have been chilled. It is common practice to trim a batch of wax blocks, then place them face down on a cold plate or crushed ice to cool them. This way they can be returned to the microtome and sections cut while they are still cold.

c. A slow, steady cutting action is needed to obtain the best results. However, different specimens may benefit from different cutting speeds, so experimentation will sometimes bring improved results.

e. If the section ribbon is excessively folded, creased or compressed on the knife, first, float it onto cold water and flatten it with the aid of a small artists brush. Now collect sections with a microscope slide and carefully re-float onto warm water.

e. After collection, dry the wax sections onto the slides using either an oven or a hotplate. Using temperatures 10° - 20° above the melting point of the wax, sections will flatten and stick to the slide without being damaged.

NB: For more detailed instructions on the preparation, cutting and subsequent staining of paraffin wax sections, see any conventional text book of histological technique.

4. Maintenance

The only routine maintenance required is regular cleaning and lubrication.

Refer to Fig. 1.

4.1 CLEANING

Wipe off sectioning debris etc with a paper towel. Alcohols (industrial methylated spirits, ethanol or methanol) may be used. Xylene may be used sparingly to remove built-up wax, but ensure surplus Xylene is wiped off.

Avoid harsh solvents such as acetone.

4.2 LUBRICATION

After cleaning, oil both the sliding surfaces of the sledge base [Fig.1.17] with

Part No. 57425 Microtome Sledge Oil. Now move the sledge several times over the full length of travel to distribute oil.

The Slide Blocks Dovetails [Fig.1.6] should also be lubricated on a regular basis with

Part No.57425 Microtome Sledge Oil.

4.3 DECONTAMINATION

It is the responsibility of the user to ensure that a decontamination procedure is employed which is appropriate to the nature of the work carried out.

The 8000 Sledge Microtome is constructed of materials which are sensitive to hypochlorite (bleach) solutions. These are corrosive to many metals and should be avoided.

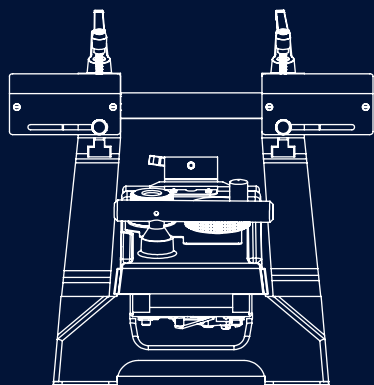
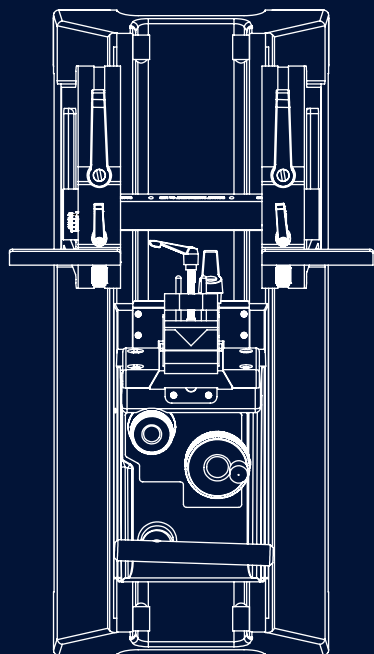
4.4 REMOVING THE SLEDGE

If the sledge has to be removed for any reason, great care must be taken to prevent damage to the sliding surfaces of either the sledge or the base.

- Remove the end stops [1.15]
- Slide the sledge off carefully [1.18]

Refitting is the reversal of removal.

TAKE NOTE: The two components are heavy and fit closely.



5. Specification

Construction

Cast mechanite, precision machined and finished with durable solvent and detergent proof coating

Specimen Advance

0 - 40µm in 1µm increments, retraction operates on return stroke. Manual gross advance/rewind facility

Cutting Stroke

270mm

Specimen Orientation

±8° horizontal and vertical (optional)

Maximum Specimen

Size 250mm x 210mm

Specimen Holders

Specimen vice or quick release holder for cassettes, supercassettes and hardboard squares.

Knife Holders

Support arms reversible with slew facility. Angle tilt with indicator scale and full width knife guards. Single side double clamp facility is available as an optional feature

Safety Features

Handle designed to ensure maximum distance away from knife edge. Knife guards cover full width of knife

Dimensions

H325 x W260 x D610mm

Packing

Net weight: 40kg
Gross weight: 50kg
Packing dimensions:
H400 x W920 x D550mm
Shipping volume: 0.202m³

Weights vary according to specification of instrument

8000 Retracting Sledge Microtome

Order List 2019/20

PRODUCT	
Code	Description
8000-01	8000 Retracting base sledge microtome (with standard blade) <div> <div>Complete with:</div> <ul style="list-style-type: none"> • 1 - 40µm feed screw with 1µm increments. • Manual gross advance/rewind facility. • Angled, tilted knife holder with indicator scale. • Full width integral knife guards. • Automatic retraction of approx. 50µm on return stroke. • Standard vice. • Fixed adaptor. </div> <div> <div>Standard accessories include:</div> <ul style="list-style-type: none"> • Knife cleaning brush • Set of Allen keys • Knife, cleaning brush • Microtome oil • Operating manual </div>
8000-02	8000 Retracting base sledge microtome (Same as 8000-01 but without standard blade)

OPTIONAL FEATURES	
Code	Description
50533	Quick release wax cassette holder, with out orientation.
318	A simple to use holder for wax cassettes. Accepts standard size wax cassettes (26x31x5mm). Can be specified instead of standard vice at no extra charge.
54147	Sledge quick release supercassette holder for holding wax supercassettes (75x52x19mm).
51637	Quick release holder for hardboard squares.
51407	Single side double clamp knife holder.
51473	Orientating tilt adapter +/-8° angle.

OPTIONAL FEATURES	
Code	Description
CRYOSTAGE - REFRIGERATED FREEZING STAGE	
8000-208-01	Cryostage Freezing Stage for 220/240V AC, 50/60Hz <div> <div>Complete with:</div> <ul style="list-style-type: none"> • 130 x 90mm stage. • Freezing to -30°C. • Heater for easy removal of specimen debris. </div> <div> <div>Standard accessories include:</div> <ul style="list-style-type: none"> • Cryo-M-Bed embedding compound. • Spare set of fuses. • Operating manual. </div>
8000-208-02	Cryostage Freezing Stage for 110/115V AC, 50/60Hz Same features & accessories as 8000-208-01
SOLID STATE FREEZER WITH PELTIER DEVICE	
53024-01	Solid State Freezer for 220/240V AC, 50/60Hz <div> <div>Complete with:</div> <ul style="list-style-type: none"> • 40 x 40mm stage. • Freezing to -25°C • Temperature control is by current limit to Peltier device. • Safety cut-out to detect low water pressure. </div> <div> <div>Standard accessories include:</div> <ul style="list-style-type: none"> • Cryo-M-Bed embedding compound. • Cooling block removal tool. • Allen Key. • Spare set of fuses. • Operating manual. </div>
53024-02	Solid State Freezer for 110/115V AC, 50/60Hz Same features & accessories as 53024-01
200-012	Solid State Filters
231-001	Cooling Water Re-circulator (for Solid State Freezer (240v 50/60Hz only)). Removes the reliance on close proximity to a sink and water supply while preventing water loss and is subsequently environmentally friendly.

8000 Retracting Sledge Microtome

Order List 2019/20

ACCESSORIES	
Code	Description
52498*	Standard vice.
51495*	Fixed adapter.
52985	CO ₂ (gas) object holder and knife freezer.
51719	Object holder, 73 x 54mm.
51720	Object holder, 100 x 66mm.
51836	Object holder, 130 x 90mm.
51717	Object holder, 250 x 110mm.
50235	Steel knife with box, C-profile, 240 x 33 x 13mm. 22° angle, tapped to accept holder for Shandon knife sharpener.
53605	Knife sharpening back for 50235.
50233	Steel knife with box, D-profile, 240 x 33 x 13mm. 22° angle, tapped to accept holder for Shandon knife sharpener.
50234	Tungsten carbide tipped knife with box, 228 x 38 x 6mm. Suitable for bone sections. NB: Needs to be resharpened at our factory.
57675	Holder for feather blades with box. 240mm, complete with pack of 50 disposable Feather blades.
50241	Pack of 50 disposable Feather blades.
51675	Handle for 50235 and 50233 knives.
51460-1	Knife raising block, one pair. (Note: Item required if ordering Sledge with Solid State Freezer).
52306	8000 Knife guard.
51497	End stops left hand.
51498	End stops right hand.
133014	Rubber bumper stops.

ACCESSORIES	
Code	Description
53051-1	Ratchet wheel.
53052-1	Pawl.
57713-1	Bright Cryospray 134, 300ml aerosol can.
57713	Bright Cryospray 134, 300ml aerosol cans x 12.
53581-1	Bright Cryo-M-Bed, 120ml bottle.
53581	Bright Cryo-M-Bed 120ml bottle carton of 6.
57344*	Knife cleaning brush.
57808	Anti-static brush, 12mm.
57425	Microtome oil, 200ml.
57151/2/3/4*	Allen keys, set of four.
53575	Spare fuse set for 53023-01 & 53024-01.
53576	Spare fuse set for 53023-02 & 53024-02.
53577	Spare fuse set for 8000-208-01.
53578	Spare fuse set for 8000-208-02.

Material Safety Data Sheets

Microtome Lubricating Oil 57425

MATERIAL SAFETY DATA SHEET

1. Mic Lubricating Oil 57425 Product Information

Trade/Type:	Oil Type 'C'
Container:	Plastic Bottle (200ml).
Uses:	For lubrication of 8000 microtomes.
Description:	Lubricating Oil.

2. Mic Lubricating Oil 57425 Product Information

Information on ingredients:	Highly refined white oil containing anti-wear, anti-corrosion and anti-oxidation additives.	
Physical and chemical properties:	Form:	Liquid.
	Odour:	Negligible.
	Colour:	Water White.
	Water Solubility:	Insoluble
Stability and reactivity:	Stable:	Yes
	Conditions to avoid:	Strong oxidising agents
	Materials to avoid:	No special precautions. Store out of direct heat and avoid extremes of temperature. DO NOT leave container unsealed.
	Will not occur. Hazardous Decomposition/Combustion Products: Hydrocarbons, oxides of carbon, traces of oxides of nitrogen and sulphur.	
Ecological information:	Soil:	Wash thoroughly, with soap and water.
	Water:	Fumes may irritate respiratory tract.
	Air:	Harmless if swallowed in small amounts. DO NOT induce vomiting
	DO NOT allow to enter drainage systems, rivers or waterways.	
Hazards Identification:	This product is NOT classified as hazardous for supply or conveyance.	
Transport Information:	Not classified as dangerous to transport.	
Disposal Considerations:	Dispose of waste in accordance with local authority requirements.	
Handling and Storage:	No special precautions. Store out of direct heat and avoid extremes of temperature. DO NOT leave container unsealed.	

Microtome Lubricating Oil 57425

MATERIAL SAFETY DATA SHEET

2. Mic Lubricating Oil 57425 Product Information (Cont.)

Toxicological Information (Health information):	Skin:	Prolonged contact may cause defatting of the skin resulting in cracking and soreness.
	Respiratory:	Low volatility make inhalation unlikely at ambient temperatures.
	Ingest:	May cause nausea, vomiting and diarrhoea.
	Eyes:	May cause transient irritation.
First aid procedures:	Skin:	Wash thoroughly, with soap and water.
	Respiratory:	Fumes may irritate respiratory tract.
	Ingest:	Harmless if swallowed in small amounts. DO NOT induce vomiting.
	Eyes:	Flush copiously for at least 15 minutes. If irritation persists SEEK MEDICAL ADVICE
Fire fighting measures:	Extinguish fires with foam, dry powder, CO2, sand, earth or water fog.	
Accidental release measures:	Avoid spillages entry into drains and waterways, contain and absorb with sand, earth or mineral absorbent.	
Exposure controls:	OES: 5mg/m ³ (8hour TWA) and 10mg/m ³ (10 minute reference period) (Ref:EH40/1999).	
Regulatory information:	This product is a preparation and is NOT classified according to EEC Guideline 88/3709.	

References & Drawings

Figure 1. Front & Side View of Microtome

- | | | |
|--------------------------|-----------------------------|----------------------|
| 1. Knife Guard | 9. Knife Block | 16. Slide Pillar R/H |
| 2. T-Nut | 10. Knife Clamp Lever | 17. Sledge Base |
| 3. Operating Handle | 11. Knife Clamp | 18. Sledge |
| 4. Rewind Knob | 12. Knife Block Clamp Lever | 19. Sledge Slide |
| 5. Thickness Knob | 13. Side Pillar L/H | 20. Orientating Head |
| 6. Slide Block | 14. Anti-lift Plate | 21. 0/11 Clamp Lever |
| 7. Orientating Head Vice | 15. Bump Stop | 22. Rubber Feet |
| 8. Knife Guard Knob | | |

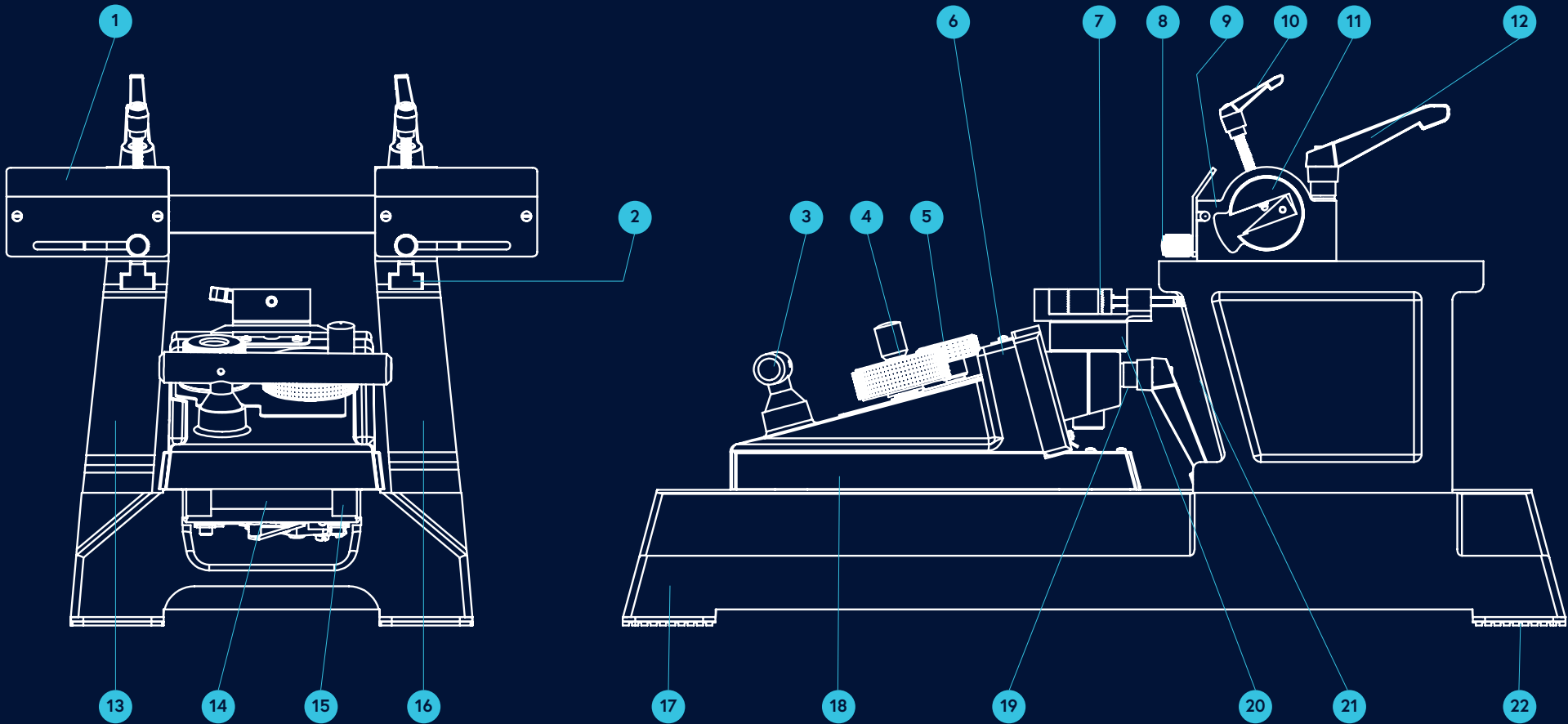


Figure 2. Bottom View of Microtome

1. Lead Screw Assembly
2. Thickness Plate
3. Spindle Assembly
4. Rapid Advance Assembly
5. Link Arm
6. Main Arm
7. Ball Joint

8. Lock Nut
9. Stop Screw
10. Rear Anti-Lift Plate
11. Sledge
12. Operating Handle
13. Rewind Knob
14. Rewind Handle

15. Slide Block R/H
16. Cap Head Screw
17. Clamp Lever
18. Sledge Slide
19. Slide Adjustment Screw
20. Slide Block L/H
21. Front Anti-Lift Plate

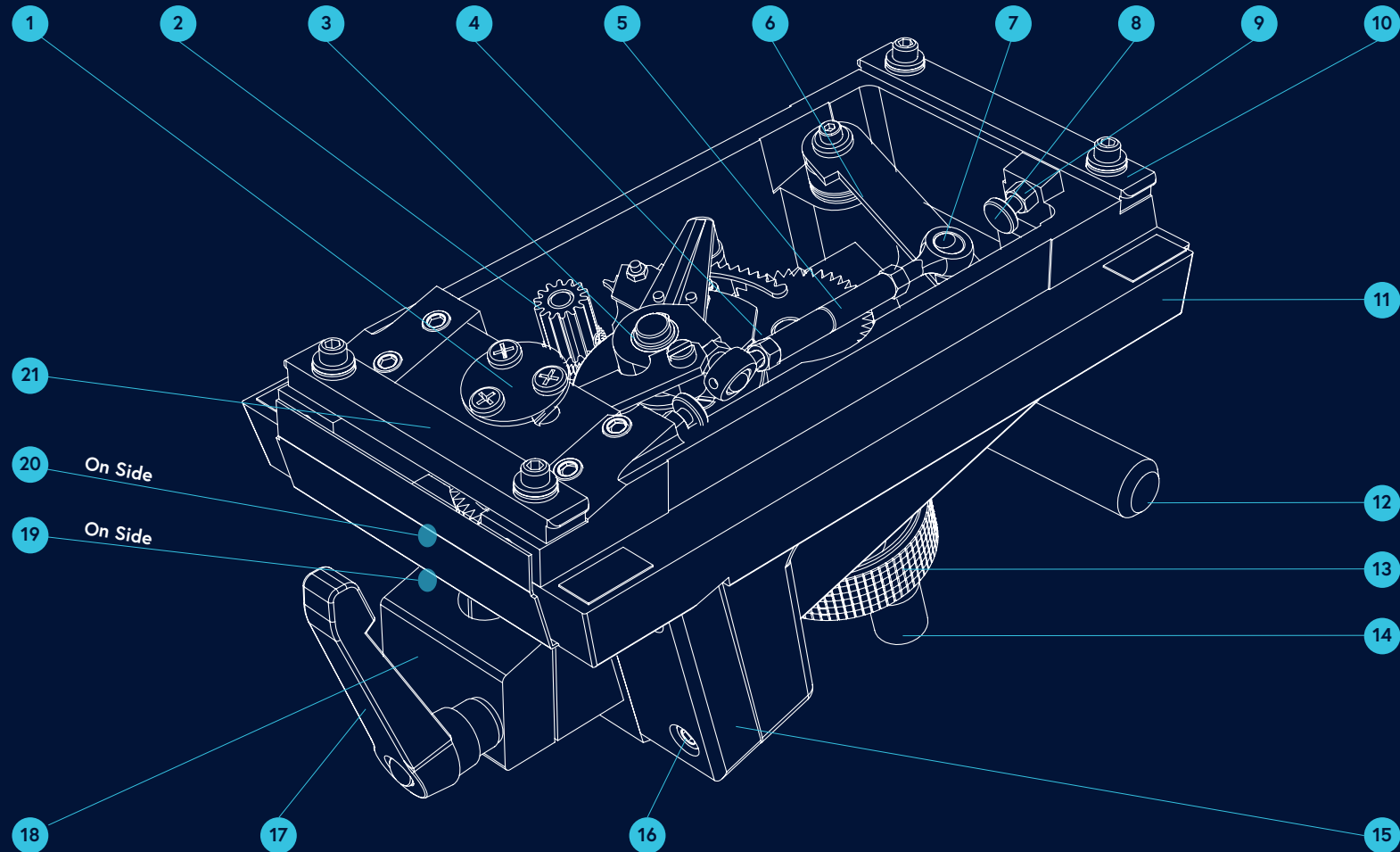


Figure 3. Knife Holder

1. Knife Holder
2. Knife Clamp Lever
3. Knife Clamp Screw
4. Knife Block Clamp Lever
5. Knife Block Clamp Screw
6. Knife Block
7. T-Nut
8. Knife Guard Rod
9. Knife Guard Spacer
10. Knife Guard Locking Knob
11. CSK Screw
12. Knife Guard

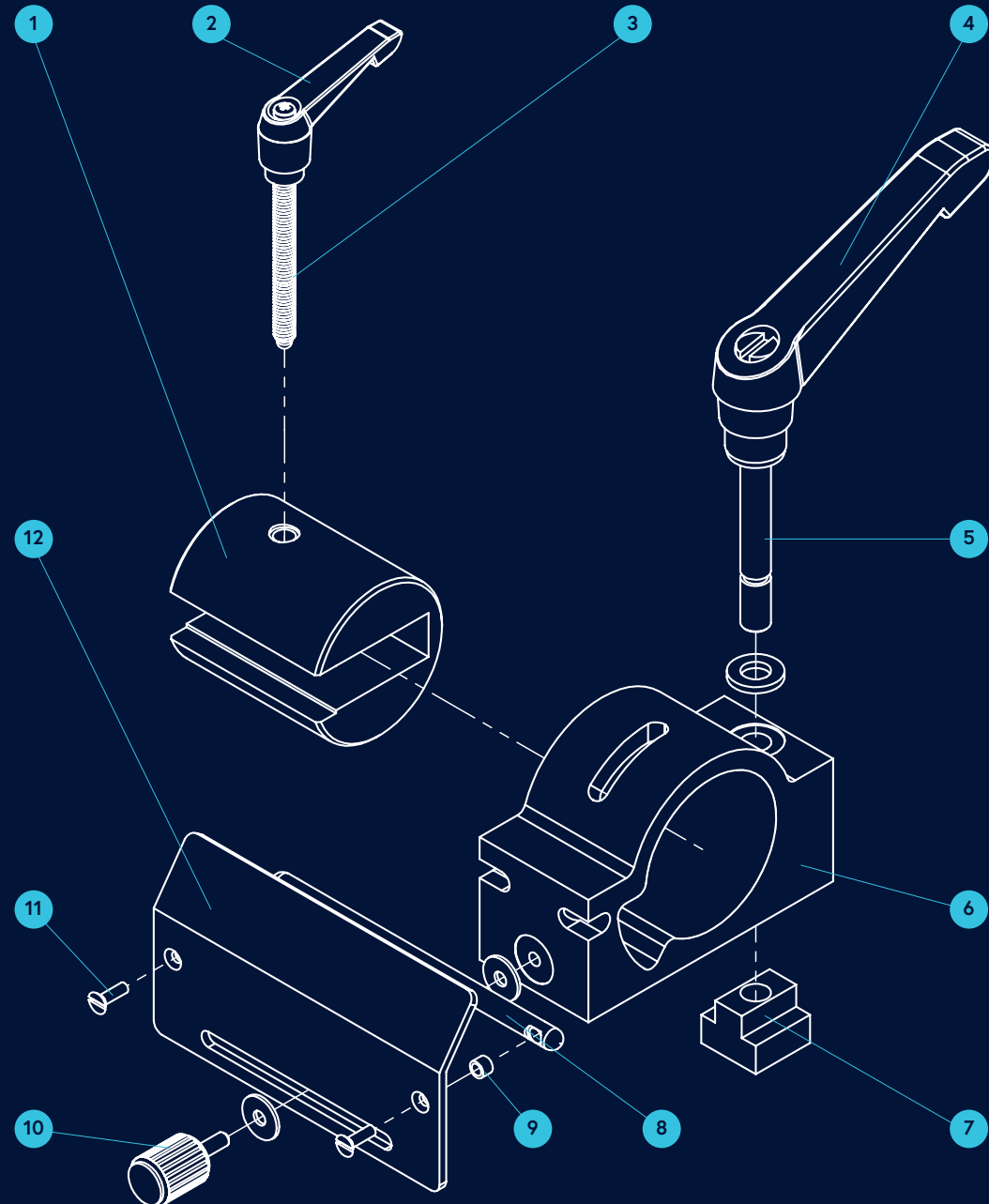
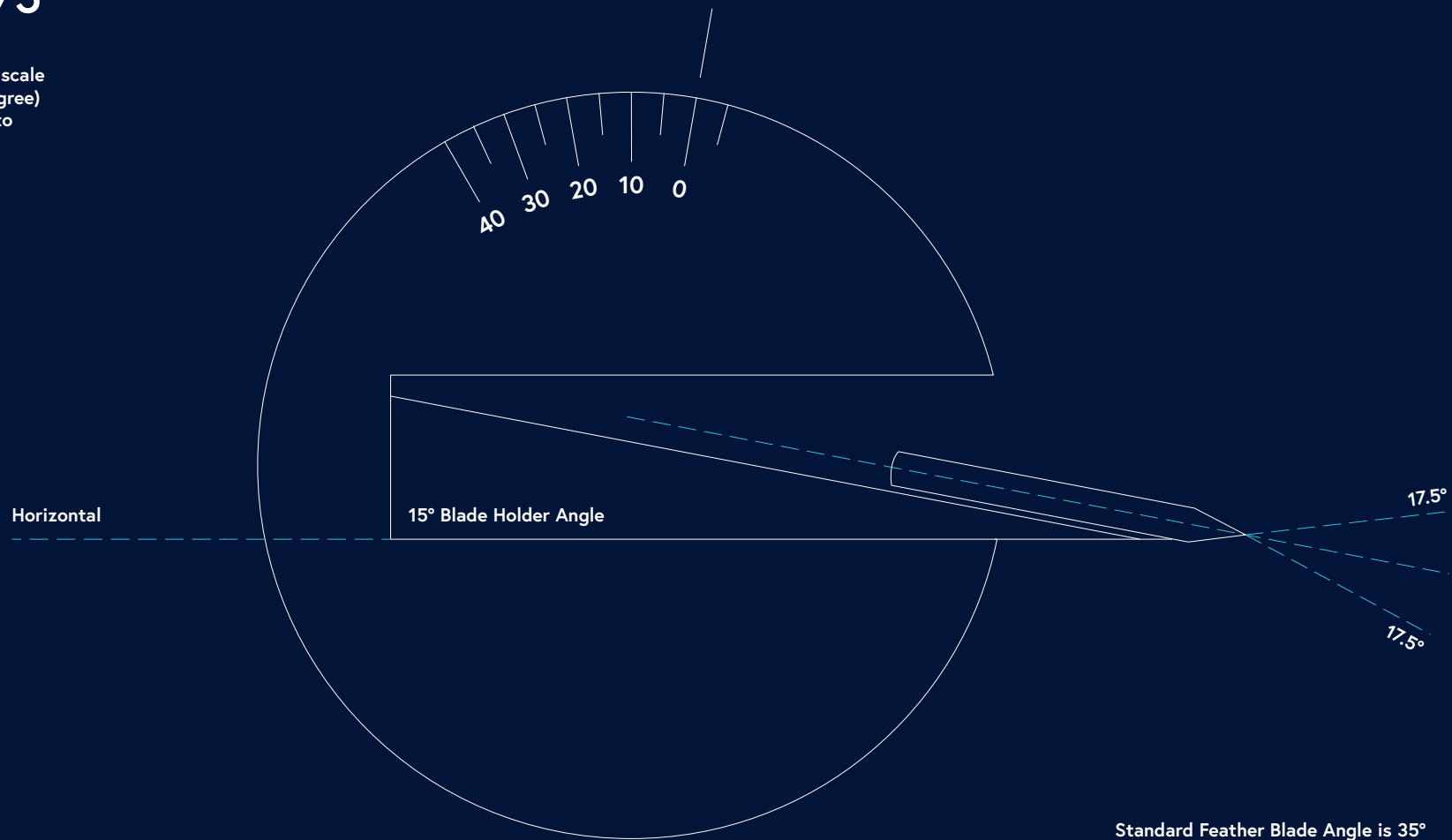


Figure 4. Setting Blade Angle: Feather Blade Holder Part No. 57675

Setting blade angle to 5° on the scale will give 2.5° (two and a half degree) blade clearance. (This is similar to 5040 setting)

Sketch shows blade angle set to 0° on the Scale.





Wolf Laboratories Limited

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Use the above details to contact us if this literature doesn't answer all your questions.

Pricing on any accessories shown can be found by keying the part number into the search box on our website.

The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct. If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.

