



SM210
SPINDLE MOULDER
OPERATION AND MAINTENANCE
INSTRUCTIONS



M. SEDGWICK & COMPANY LIMITED
Stanningley Field Close, Leeds, U.K. LS13 4QG
Tel. +(44) 113 257 0637 Fax. +(44) 113 239 3412

MACHINE SERIAL NO. SM210



EC Declaration of Conformity

The manufacturer:

M. Sedgwick & Co. Ltd

Stanningley Field Close, Leeds LS13 4QG

United Kingdom

Telephone +44 113 257 0637

www.sedgwick-machinery.co.uk

Email: admin@sedgwick-machinery.co.uk

declares that the **Sedgwick SM210 Spinde Moulder**, when installed, maintained and used in applications for which it was designed, and in compliance with the manufacturer's instructions, complies with the provisions of the following European Union legislation, wherever applicable:

2009/127/EC Machinery Directive

2014/30/EC Electromagnetic Compatibility Directive

BS EN ISO 19085-1:2017 Safety of Machinery. Basic Concepts, General Principles of Design. Basic Terminology, Methodology.

EN ISO 19085-6:2017 Single spindle vertical moulding machines ("toupies")

EN 60204-1:2018 Safety of machinery. Electrical equipment of machines. General requirements

Signed for and on behalf of the manufacturer:

A handwritten signature in black ink, consisting of a stylized 'M' followed by a large, sweeping flourish that extends to the right.



Managing Director
M. Sedgwick & Co. Ltd, Jan 2021

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Introduction

This Instruction Manual is designed for you in accordance with current UK regulations and EU law, in particular the European Machinery Directive 2006/42/EC.

It describes how to operate the machine properly and safely. Be sure to read carefully and follow the safety instructions provided as well as any local accident prevention regulations and general safety regulations. Before beginning any work on the machine, ensure that this manual, in particular the chapter entitled "Safety" and the respective safety guidelines, has been read in its entirety and fully understood. This manual is an integral part of the machine and must always be kept accessible. If the machine is sold, rented, lent or otherwise transferred to another party, a copy of the manual must accompany it.

All those appointed to work on or with the machine must have fully read and understood the manual before commencing any work. This requirement must be met even if the appointed person is familiar with the operation of such a machine or a similar one or has been trained by the manufacturer. The manufacturer cannot be held liable for damages resulting from a failure to follow the instructions set out in this manual. Should you have any questions regarding this manual, please contact the manufacturer.

1.0 Design and Purpose

The Sedgwick SM210 Spindle Moulder is a hand fed machine designed to profile wood and other analogous materials. Such operations may include:

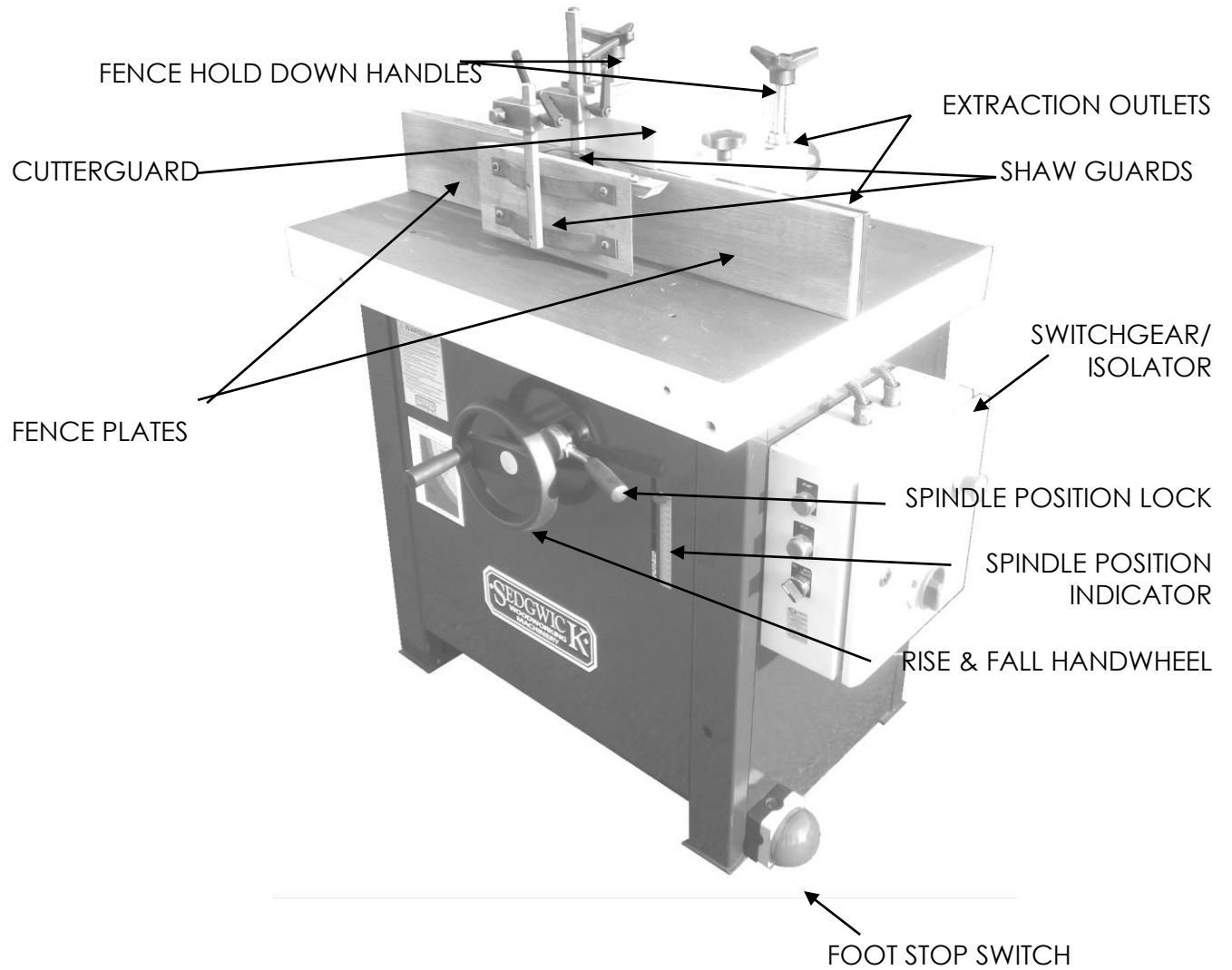
1. Straight Moulding e.g., rebating, bevelling, and grooving.
2. Circular Moulding (**optional Ring Fence and Cage Guard required**).
3. End Grain Work e.g., Tenoning and Finger Jointing (**optional Sliding Table required**).



The machine is not designed for any other purposes except as set out above. The operator of the machine shall be solely liable for any damage that results from improper use of the machine.

The machine should not be modified in any way without the written consent of the manufacturer. Please also refer to Section 11.0 regarding use of unauthorised spare parts.

1.1 Illustration



1.2 Machine Specification

	SM210
TABLE SIZE L x W	850 x 650mm
TABLE HEIGHT	880mm
MAX CUTTERBLOCK DIA.	125mm
MAX PROFILING CUTTER DIA.	200mm
MAX CUTTER WEIGHT	4Kg
MAX RETRACTABLE TOOL SIZE	150 x 105mm
SPINDLE DIA.	30mm (Optional 1 1/4")
SPINDLE LENGTH	125mm
SPINDLE SPEEDS rpm	3000/4500/6000/8000
SPINDLE STROKE	100mm
FENCE PLATES (H x L)	125x425mm
DUST EXTRACTION OUTLETS	150 & 100mm
TOTAL AIR VOLUME REQUIRED (Straight work)	$\geq 1\ 100\ \text{m}^3\text{h}^{-1}$
VOLTAGE/FREQUENCY	3 PHASE+EARTH; 400/230v – 50/60 Hz 1 PHASE+N+EARTH; 230V - 50/60 Hz
MOTOR RATING	3 PHASE 3Kw IE2 (S1) 1 PHASE 3Kw
MOTOR FULL LOAD CURRENT IN AMPS	3 PHASE 6.8A 1 PHASE 18.7A
STARTING CURRENT IN AMPS	3 PHASE 26.4A 1 PHASE 92.4A
REQUIRED FUSE SIZE IN AMPS	3 PHASE 20A/ph 1 PHASE 40A
REQUIRED CABLE SIZE	3 PHASE 2.5mm ² 1 PHASE 4.0mm ²

1.3 Shipping Details

DIMENSIONS (m/c only) LxWxH	1020x680x1420mm
NETT WEIGHT	230 kg

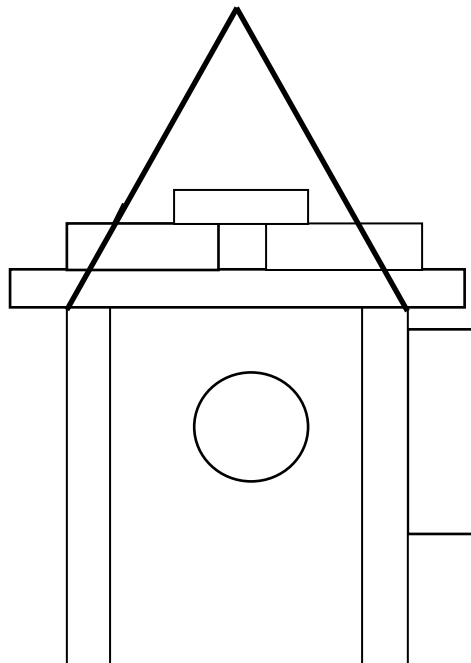
2.0 Machine Handling

The following section offers a guide to transporting, assembling, and installing the machine, which should be done following an adequate risk assessment. Movement, adjustment, or installation of the machine should not be attempted without proper training in the handling of heavy machinery.



There is a risk of physical injury when moving the machine. The machine could be damaged or written-off if not handled properly during transportation.

Always use a sling within the safe working load of the machine weight. Machine weights are provided above. Sling underneath either side of the machine table, ensuring that you do not catch the starter etc. Take care not to lift the machine by the slide bar on the left-hand side of the machine table (if fitted) as damage to this will inhibit the movement of the sliding table. Do not walk or stand under the machine during lifting.



Upon arrival, check that the machine has not suffered any damage during transit. Reuse or recycle any packaging materials (e.g., wooden pallet) and where not possible to do so, dispose of them in accordance with local refuse requirements.

2.1 Positioning

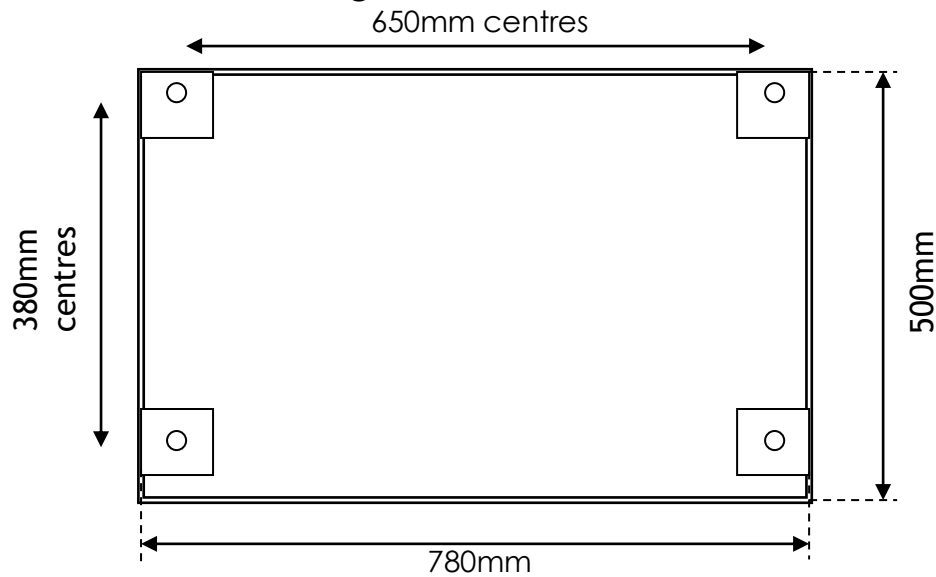
First ensure that there is ample power supply available, together with good lighting and ventilation.

Second ensure that there is sufficient unobstructed space around the machine to enable the work being done at it to be done without risk of injury to persons employed.

The chosen floor space should be in good and level condition to enable the machine to be anchored at four points. Holes for M10 foundation bolts (not supplied) are provided at either corner of the inside of the fabricated body. Remove the machine's side guard, score marks through these holes, drag the machine out of the way, and drill the necessary holes and insert fixing plugs. Finally, make sure that the machine is not rocking. Pack under the feet of

the base if it is. This will keep the machine from rocking and generating vibration during the cut.

2.2 SM210 Foundation Drawing



Remove the protective rust preventative using turpentine or paraffin. Do not use any solvent, petrol, or gas oil, which might dull the paint or oxidise the paintwork. Lightly oil cleaned surfaces to prevent rusting.

2.2 Storage

Keep the machine sealed in its original packaging until required for assembly/installation and be sure to observe the machine handling advice on the outside of the packaging.

Store under the following conditions:

- Store indoors in a dry and dust-free environment.
- Do not expose to toxic substances or direct sunlight.
- Store in ambient temperatures and ensure environment is not damp; avoid exposure to condensation.
- If storing for a period of several weeks, apply a coat of oil to all machine parts that might rust before storing and check condition before operating for the first time after being in long-term storage.

2.3 Disposal

If disposing of the machine, separate all components into piles of the same material e.g., steel, to recycle. The main structure is made of cast iron and steel and can therefore be safely dismantled and recycled. Always comply with local environmental regulations when disposing of machinery.



Be aware of your environmental obligations. Carefully consider the disposal of any electrical components e.g., motors, starters, and ensure any lubricants etc. are treated as hazardous waste and disposed of safely in accordance with environmental laws.

3.0 Connection to a Dust Extraction System

All employers are duty bound under the Factories Act 1961, The Health and Safety at Work Act 1974 and the Control of Substances Hazardous to Health Regulations 1988 to control wood dust in the workplace.

Wherever possible this should be achieved by measures other than the provision of personal protective equipment.

To effectively exhaust these machines, they should be connected to a dust extraction unit with a minimum air volume with the chart below. A 125mm-dia outlet is located at the rear of the fence horseshoe. A 100mm-dia outlet is provided for extraction below the cutter-well.

Always switch the dust extraction system on before switching on the machine.

	Recommended air flow rate m ³ h ⁻¹
Straight work	≥1 100
Curved work	≥2 000
Tenoning	≥1 400

4.0 Electrical Installation



Electrical wiring should only be carried out by a fully qualified electrician taking in account the following safety instructions.

- The motor, starter, and isolator have been wired in at the factory and tested before despatch. All that is required is to connect the power supply to the isolator.
- Check that the supply details on the motor nameplate correspond with the site supply.
- It is important that the correct cable size is used to avoid a voltage drop at the motor terminals. If the motor is operated on a voltage outside, plus or minus 6% of the spot voltage, then premature failure will occur.
- Do not wire single-phase machines into a 13 amp plug socket.
- It is important to check rotation of the spindle which should be anti-clockwise when viewed from the front of the machine.

Should you encounter problems on start-up check for the following likely causes:

Symptom

Machine does not start at all.

Check

Isolator is switched to ON and all STOP buttons are out.
Overload button is reset.
Starter coil/contactors is operational.
There are no loose connections.
There are no fuses blown.
Supply is reaching the starter.
Supply is reaching the motor.
Voltage between the phases at starter and motor.

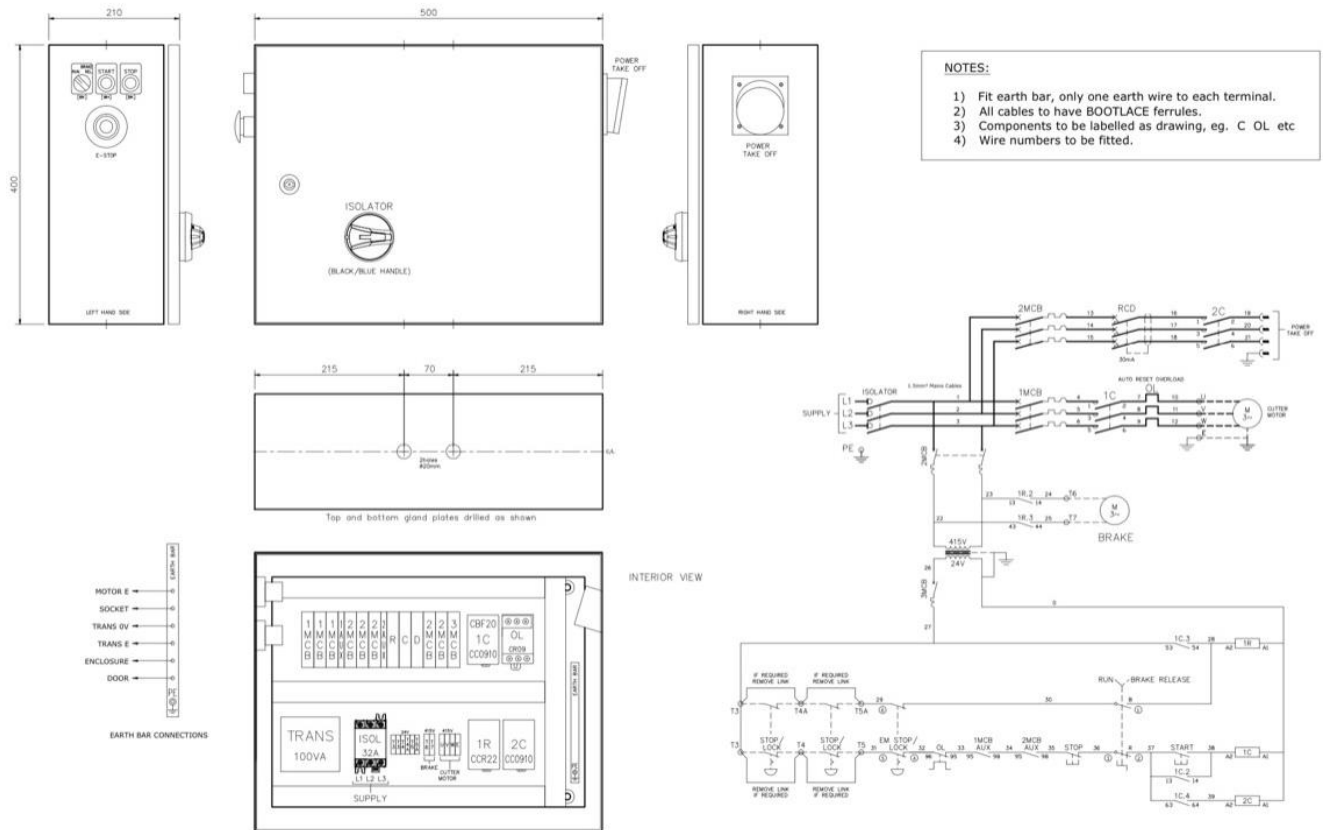
Motor runs but trips.

Overload setting in starter.
Current drawn without load applied.
Current drawn under load.
Supply voltage without load and on moment of switch on.
Allowed variation plus/minus 6%.
Supply voltage under load.
Supply voltage with motor off.
Supply to all three phases at isolator, starter and at motor.
Note that it is possible for 3 phase machines to operate with only 2 phases of the supply. This is known as single phasing. Check all fuses.

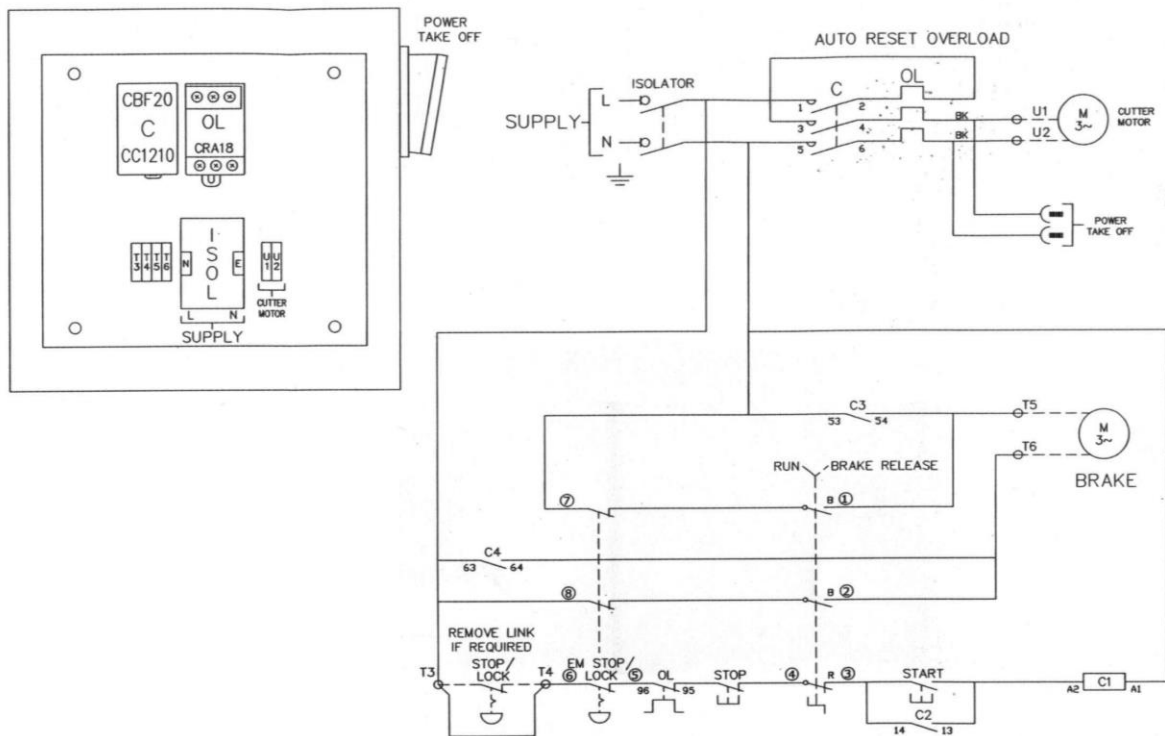
Motor attempts to start then trips.

The machine is not jammed, and the spindle is free to rotate.
Winding resistance of each motor phase (values should all balance).
Insulation resistance between windings and earth.
The correct cable size has been used to install the machine (long runs of cable can cause voltage drop).

4.1 Three Phase Wiring Diagram



4.2 Single Phase Wiring Diagram



5.0 Switch Gear



5.1 The Padlockable Isolator

With this switch in the OFF position the machine is effectively isolated from the supply to allow personnel safe access for maintenance or repair work and to prevent dangerous restarts. To prevent unauthorised use of the machine the switch can also be secured in the OFF position using a padlock.

To operate the machine first turn the isolator to the ON position.

5.2 Start / Stop Buttons

The motor is then started by pushing the green (power on) button on the starter panel and stopped using the red (power off) button. The mushroom headed lock-off stop switch, once pressed will remain locked in the off position. To restart the machine, it is necessary to release the off button by twisting it in a clockwise direction.

5.3 Circuit Protection

In case of a mains failure the starter is fitted with no volt release protection and will not restart without being switched on again. The starter is also fitted with an overload protection device. An electrical overload occurs where an electric motor is subjected to a greater load than it was designed for. This can be caused by short circuit, by incorrect installation, or by misuse (including poor machine maintenance). The inbuilt breaker will therefore help prevent damage to the motor should such a situation occur. The motor cannot be restarted until the breaker has reset itself.

5.4 Brake Release Switch

Machines fitted with an electro-magnetic brake unit are also equipped with a 'Brake Release' switch. This switch makes it possible to release the brake mechanism, allowing the operator to rotate the spindle when changing or adjusting the cutting knives. To operate the switch first turn the isolator to ON, release the mushroom headed lock-off stop switch, and turn the brake release to 'BRAKE RELEASE'. It is not possible to start the motor with the switch in this position. To start the motor, turn the switch back to the RUN position.



5.4 Emergency Foot Operated Latching Stop Switch

This switch is provided for use in emergency situations only. We do not recommend that it is used in lieu of the stop switch on the front of the starter panel. The foot switch once pressed will remain locked in the off position. To restart the machine, it is necessary to release the switch by pulling it towards you.

6.0 Machine Setting

Details on the correct setting of the guards, fences, and other safety devices, are detailed in the following sections of this manual. Prior to these operations however the following checks should be carried out:

1. Isolate the machine before setting up or making any alterations.
2. Ensure that the arbor mounting, cutterblock and cutters are clean and free from grease, rust preventative, rust and wood residue etc.
3. Check visually for any cracks or distortion in the cutters and replace any suspect components.
4. Check that the cutters are mounted correctly for anti-clockwise rotation when viewed from the front of the machine.
5. Fence assembly and spindle guards are securely fastened to the table.
6. The spindle runs free (check by slowly turning it by hand).
7. The timber is free of grit, nails or other foreign bodies.
8. The table is free of spanners, rules etc., and that all tools are returned to their rightful place.

ENSURE THAT ALL STOCK IS CLEAR OF THE BLADE BEFORE START-UP

ENSURE THAT THE SPINDLE HAS REACHED FULL SPEED BEFORE PRESENTING THE WORKPIECE TO IT. IT IS ESSENTIAL THAT THE MACHINE IS SWITCHED OFF WHEN LEFT UNATTENDED.

6.1 The Spindle Rise and Fall

To adjust the spindle height, first untighten the Spindle Lock positioned directly behind the handwheel. Rotate the handwheel clockwise for up, and anti-clockwise for down. Always make final adjustments to the spindle height against gravity and re-tighten the Spindle Lock prior to start-up.

Stiffness in the rise and fall movement could be caused by:

1. The Spindle Lock not releasing or being released.
2. Dirt or rust between the barrel and the bearing housing.
3. A lack of lubrication.
4. Badly worn gears (usually the result of an effort to force the rise and fall mechanism when stiff).
5. Dirt between the gear teeth.
6. Offcut wedges between the slideways.

6.2 The Spindle Unit

The loose top spindle onto which the cutters are mounted is attached to the main spindle by a draw bar. To remove the loose top spindle, first isolate the machine. Open the cabinet door. Using the two 19mm spanners, one set on the flats of the loose spindle, the other on the bolt head at the bottom of the spindle pulley, untighten the bolt. This enables the loose top spindle, complete with cutters, spacing sleeves, and lock nut to be removed as a unit from the machine without disturbing their setting. Use only the spanners supplied with the machine. Never add extra leverage as this strains the bolts and leads to excessive wear. If several months pass between spindle changes it is good practice to wipe a light film of oil over the spindle base before installing it in the arbor.

6.3 Direction of Rotation

The machine spindle is designed for one direction of rotation only. The rotation should be anticlockwise when viewed from the top.

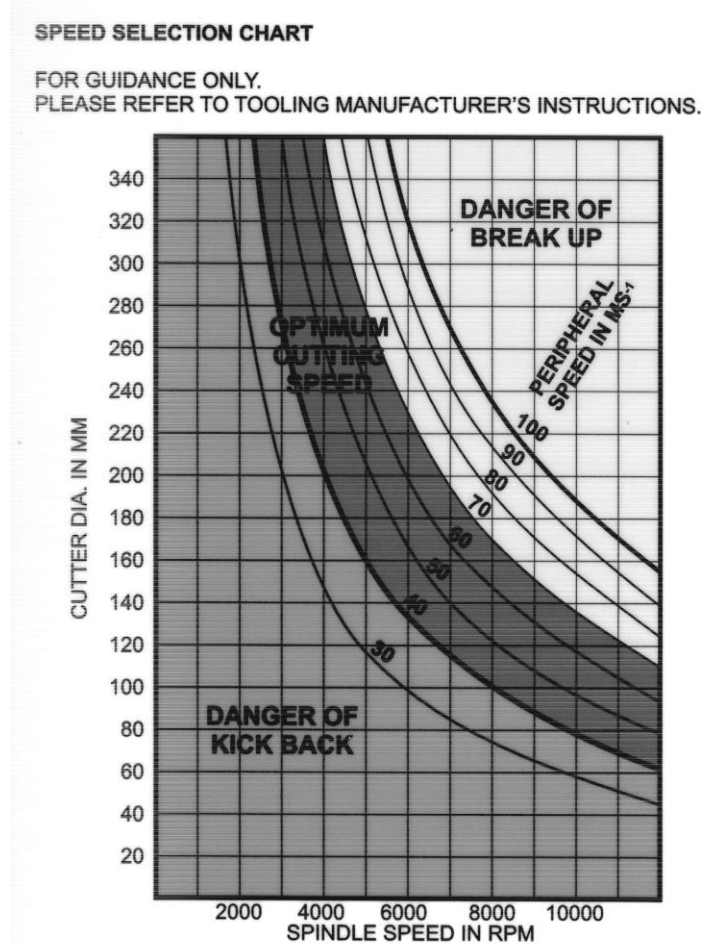
It is most important that the tooling is fitted to the machine to operate in the correct direction of rotation. The operator shall ensure that the workpiece is fed to the tools against the direction of spindle rotation. To reduce the risk of kickback, always start the machine before presenting the workpiece. Ensure that the machine is switched off when left unattended.

6.4 Table Inserts

Use the table rings provided to reduce the gap between the table and the spindle to a minimum. Correct use of the table rings to give the smallest possible hole reduces the risk of the workpiece dipping and catching the edge as it passes over the gap.

6.5 Speed Selection

The relationship between the tool diameter, the cutting length and the maximum rotational speed of the spindle is important. This can be determined from the following graph:

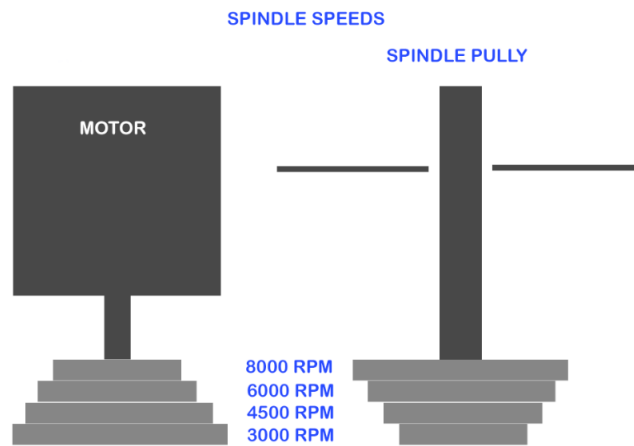


To obtain the different spindle speeds required for the various diameters and types of cutter equipment simply alter the position of the drive belt again the pulley ratio.

This unit is totally enclosed within the main frame and is accessed via the door on the left of the machine's body.

It is important that all spindle motion has ceased, and the machine has been electronically isolated before opening this door.

The motor is foot mounted to a hinged platform, which is adjustable for position along a slotted shaft in which the locking lever runs. To change the selected speed the lever must be unlocked, and the motor plate pulled forward to release the tension on the drive belt. The poly-vee belt may then be relocated on the pulleys, the motor plate pushed away to re-tension the belt, and the lever re-locked. Always ensure that the belt is fully engaged within the full set of grooves for each speed setting on both motor and spindle pulleys before starting the machine.



7.0 Tool Selection

Only tools conforming to EN847-1:1997 and marked MAN should be fitted to this machine (refer to manufacturer's sales literature).

Only use tooling with the manual feed cutter blocks usually mark with 'MAN'.

LIMITED CUTTER PROJECTION TOOLING

Where possible, *always* use limited cutter projection tooling.

The following information is contained in the HSE Information Sheet 'PUWER 98: Selection of tooling for use with hand-fed woodworking machines':

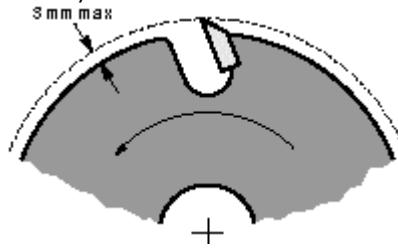
Limited cutter projection tooling (sometimes referred to as chip thickness limitation tooling) significantly reduces:

- the severity of injury if a machine operator's fingers contact the rotating tool;
- the risk of workpiece kickback.

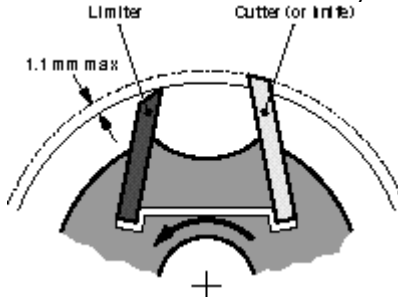
Most accidents at woodworking machines are due to the operator's hands or fingers encountering the rotating cutters. Amputation usually results. Between 1993 and 1996 there were 165 injuries (amputations and severe lacerations) at machines where limited cutter projection tooling could have been fitted. It is estimated that limited cutter projection tooling would have reduced the seriousness of injury in 90% of these accidents. By reducing the risk of kickback, this type of tooling can also help prevent many other serious injuries.

On round form tools, limited cutter projection should be achieved by restricting the projection of the cutter beyond either:

- the round profile of the tool body



- or a 'limiter' (also called a deflector or counter knife) which mirrors each cutter



Note: Limited cutter projection tooling should be used in addition to the normal guards, protection appliances (jigs etc) and safe working practices, not as an alternative.

7.1 Tool Setting

For safety reasons the cutterhead should whenever possible be mounted to run from underneath the stock so that the stock will cover the cutterhead and shield your hands. Set the cutterblock as low on the spindle arbor as possible. Always use cutters that are a matched pair, and mount them directly opposite each other ensuring that they have the same projection and are dynamically balanced. The majority of problems experienced on spindle moulding machines arise from out of balance cutters, with the resulting bad feature of excessive vibration, which tends to produce a poor finish on the article being machined. Ensure that the correct number of spacers is used to effectively clamp the cutters.

7.2 Tool Handling

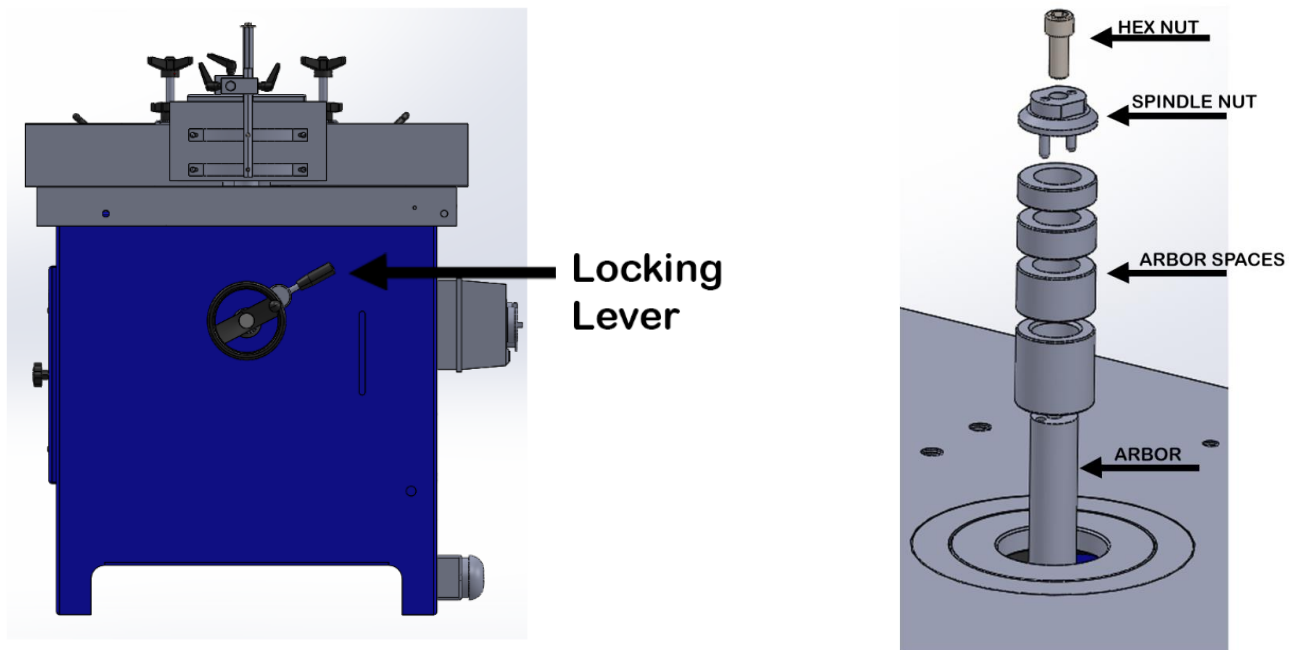
Care should be exercised when handling tools, wherever practicable use a tool carrier or wear protective gloves.

7.3 Tool Repair

Repair of tools should be carried out in accordance with the manufacturer's instructions. People who carry out repair of tools should be adequately trained and have knowledge of the design requirements (eg BS EN 847-1: 1997) and levels of safety to be achieved.

7.4 Tool Changing

Raise the spindle to the maximum height and lock off the rise and fall using the lever next to the rise and fall hand wheel (clockwise to lock). Using a 30mm spanner and M8 hex key untighten the hex bolt from the top of the arbor and remove the bolt and spindle nut and put them safely to one side. Fit the cutter block by sliding it onto the arbor (check the rotation of the block) and using the spacers and the spindle nut to clamp the cutter in place. Tighten the spindle nut and hex nut. Make sure that it is tightened securely.



8.1 The Main Fence Guard

The Sedgwick SM210 Spindle Moulder incorporates a plain table and a cast-iron 'Horseshoe' type fence guard.

Adjustment and Use

For coarse adjustment, the complete fence assembly freely moves as one. The two Fence Hold-Down Handles effectively clamp the assembly to the table through slotted holes in the horseshoe. The table has been drilled and tapped for several different locations. The fence plates can be independently adjusted by releasing the locking levers at the sides of the horseshoe, and operating the hand-wheels at the rear, remembering then to re-tighten them once adjusted.

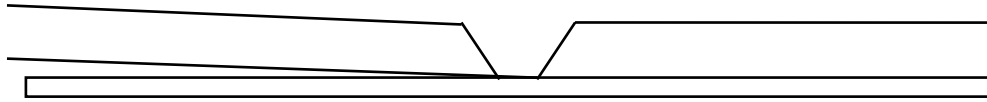
The gap between the two halves of the straight fence must be wide enough to give clearance for the cutterblock yet narrow enough to limit unnecessary exposure of the cutters. Similarly ensure that the leading end of the workpiece does not foul the edge of the take-off half of the fence. These risks may be eliminated using a false fence.

A 'false fence' is a board fixed to the two half fences and spanning the gap between them, it is cut away just sufficiently to allow the cutters to project by the necessary amount. The exact size of false fence required will depend upon the work being done and it may be

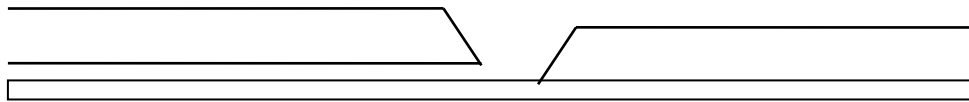
necessary to fit a different false fence for every job carried out. Care should be taken in the making of a false fence. It is recommended that the cutter opening shall be made by a controlled screw adjustment on the fence on to the cutter and not by pushing the fence on to the cutter by hand.

The following faults in fences can occur and should be checked:

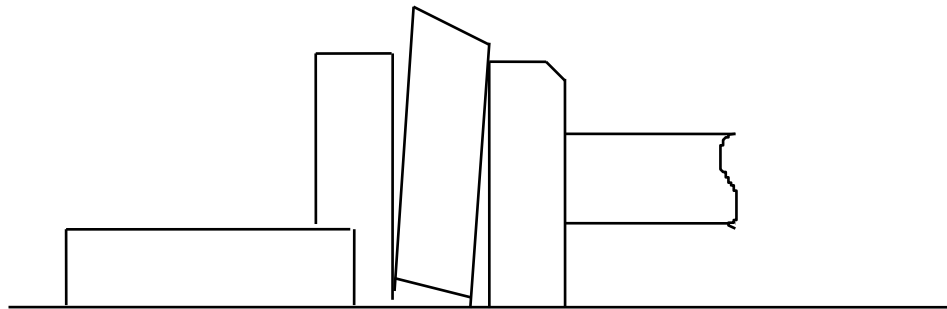
- A) Fences out of alignment. Chippings packed behind the front fence plate and back fence can cause this.



- B) Fences are parallel but not level with one another. Use the fine adjustment screws to bring them level.



- C) Fences are not square against the table. Chippings at the base of the fence plate can cause this.



8.2 The Cutterguard

The yellow hood on top of the horseshoe assembly is designed to enclose the cutting area just above the workpiece. It is important that this is always secured in position when using the horseshoe as it provides protection from ejected cuttings or cutters which might be thrown off the workpiece or cutterblock while in operation.

Check that the hood is securely in position before switching on.

8.3 The Shaw Guards

The Shaw Guards are a valuable aid when machining straight work where the moulding extends over the full length of the workpiece. They serve the dual-purpose of steadying the workpiece, preventing vibration which could cause kick-back, and enclosing the cutting area.

Work of this type is done with the aid of the straight fence, and in most cases the workpieces are of regular rectangular section throughout their length. The workpieces can, therefore, be guided in the volume formed between the Table, Shaw Guard, and fence. The vertical and

horizontal sprung pressure pads are arranged to form a tunnel through which the workpiece is fed, pressing the workpiece down against the table and sideways against the fence plate. When machining thin panels, the top spring shaw guard only may be necessary, providing its width is adequate.

As a precaution **never stand directly in line with the workpiece being fed into the machine.**

8.4 Pushsticks

It is essential that the operator take all reasonable safety precautions when feeding material to be worked into the SM210. In this respect correctly fashioned and used push sticks and push blocks are an aid.

These can be made from timber readily available in the workshop.

9.0 Limitations of Use and Safe Working Practises

Training and instruction is a central requirement of the Provision of Use of Work Equipment Regulations 1998 (PUWER). No hand-fed spindle moulder can be operated by any person under the age of 18 without them having first completed an approved course of training. The regulation does realise that young persons may need to operate one of these machines as part of a course, and such use is permitted provided that it is carried out under the supervision of a person who has thorough knowledge and experience of the machine and of its safeguarding requirements.

It is essential that all operators of Spindle moulder are adequately trained in the use, adjustment, and operation of the machine. This covers in particular:

- The dangers associated with the operation of the machine.
- The principles of machine operation, correct use and adjustment of the fence, blade and safeguards.
- The correct selection of tooling for each operation.
- The safe handling of the workpiece when cutting.
- The position of the hands relative to the cutters and the safe stacking of workpieces before and after cutting.

Persons who install this machine for use at work have a duty under the Health and Safety at Work Act 1974 to ensure, as far as is reasonably practicable, that nothing about the way in which it is installed makes it unsafe or a risk to health at any time during setting, use, cleaning, and maintenance. This includes such aspects as correct assembly, electrical installation, construction of enclosures, and the fitting of guards and ventilation equipment. When installing this machine consideration must be given to the provision of adequate lighting and working space.

Repairs and maintenance must only be undertaken by competent technicians. Ensure that all power supplies are isolated before maintenance work begins. Instructions for routine maintenance work are included in this manual. Operations at vertical spindle moulding machines have a history of serious accidents, most of which could have been avoided had the operator taken better precaution. Most straight work accidents are caused through failing to use false fences and shaw guards, while stopped and curved work accidents are mainly the result of failing to use backstops and jigs or workpiece holders. Because of the wide variety of work which can be undertaken on a vertical spindle moulding machines no one type of safeguard can be considered effective for all conditions. Each operation should be considered separately, and the best practicable safeguard selected. The following operations will require additional guarding to that supplied as standard with the machine:

Stopped Work (Straight work where the cut extends over part of the length of the workpiece)

To prevent access to the tool during stopped work it is necessary to use in conjunction with the fence, table and fence pressure pads equipped with special shoes depending upon the workpiece dimensions.

The cutters must break into the solid face, instead of starting the cut at the beginning of the workpiece, and/or have to break out before reaching the end. In order to prevent kickback back and/or front-end stops should be fitted to the fence, table or table extensions.

Unless the workpiece is large enough to provide safe and adequate hand hold a jig or work holder must be used together with a guard which protects the cutters. The jig should permit the workpiece to be located quickly and accurately and to be held firmly in position. The most convenient means of holding the workpiece is to use manually operated quick acting clamps, which operate with either a toggle or a cam action. Back and/or front stops fixed to the fence or table allow for greater control of the jig and a lead in and out may be provided by means of a template on the jig.

Bevel Cutting

In addition to the use of the fence and demountable power feed unit or pressure pads, it is important to ensure firm support of the workpiece by using a special jig or adjustable canting fence in order to prevent access to the tool during bevel cutting.

Climb Cutting

To avoid the possibility of workpiece ejection, it is necessary to avoid climb cutting whenever possible.

Tenoning

In order to feed the workpiece safely past the tool during tenoning it is necessary to use a travelling table and tenoning hood. (This can not be done with the base machine alone).

9.1 Warning of Residual Risks

Although all practical measures have been taken to ensure the safety of this machine, its safe use finally depends upon the operator's careful handling. Provided that the operator adheres to his training and follows the instructions in this manual, the likelihood of an accident is very low.

9.2 Warning Labels

The warning label fixed to the machine gives the following advice. Please ensure that all operators read it carefully.

Ensure that you fully understand the manufacturer's instruction manual and have received sufficient training in the use of this machine and the safety precautions to be observed.

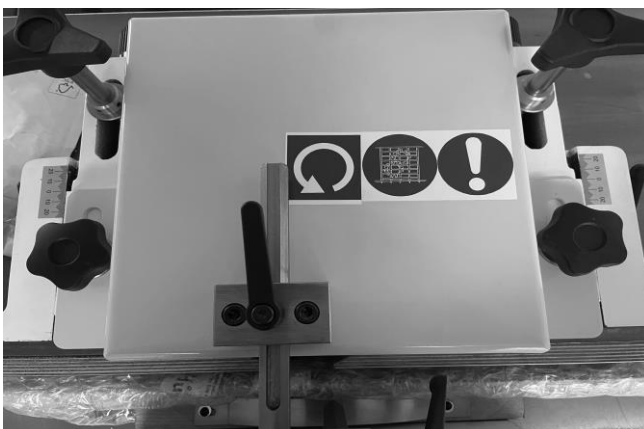
BEFORE OPERATING THIS MACHINE ENSURE THAT:

All guards and fences are securely fitted and correctly set in accordance with the current regulations.
 Tooling is of the correct type, sharpness, and direction of cut and is securely fastened.
 Correct spindle speed and feed is selected (for the cutter equipment) where appropriate.
 Loose clothing is either removed or fastened and jewellery removed.
 Suitable jigs and push sticks are available for use where appropriate.
 The working area is well lit, clean, and unobstructed.
 Extraction equipment where appropriate is switched on, properly adjusted, and working efficiently.

DURING MACHINING:

Wear suitable protective equipment where necessary, e.g. goggles, ear defenders and dust mask.
 Ensure all moving parts of the machine are stationary before setting, cleaning or making any adjustments.
 Ensure all power sources are isolated before any maintenance work commences.

A further two warning labels can be found on the front of the machine and on top of the guard as seen below:



9.3 Noise

Noise levels can vary widely from machine to machine depending on conditions of use. Persons exposed to high noise levels, even for a short time, may experience temporary partial hearing loss and continuous exposure to high levels can result in permanent hearing damage. The Woodworking Machines Regulations require employers to take reasonably practicable measures to reduce noise levels where any person is likely to be exposed to a continuous equivalent noise level of 90 dB(A) or more over an 8 hour working day. Additionally, suitable ear protectors must be provided, maintained, and worn.

Machines identified as generating unhealthy noise levels should be appropriately marked with a warning of the need to wear hearing protection and it may be necessary to designate areas of the workplace as 'Ear Protection Zones'. Suitable warning signs are specified in the Safety Signs Regulations Act 1995. It may be necessary to construct a suitable enclosure, for which professional advice should be sought.

Further information and references to practical guidance are contained in free leaflets available from The Health & Safety Executive.

Using correctly designed extraction hoods and a compatible system the compound effect on this machine was to increase the readings by 1dB(A).

The following noise levels were recorded at a distance of one metre from the machine (operator side) using varying feed rates and depths of cut.

TIMBER	DEPTH OF CUT	NOISE LEVEL dB(A) @ 1M
None	No load	72
Softwood	38mm	85
Softwood	50mm	85
Hardwood	63mm	85

The figures quoted for noise are emission levels and not necessarily safe working levels. Whilst there is a correlation between emission levels and exposure levels, this cannot be used reliably to determine whether further precautions are required. Factors that influence the actual level of exposure to the work force include the duration of exposure, the characteristics of the workroom, the other sources of dust and noise, etc., i.e. the number of machines and other adjacent processes. Also, the permissible exposure levels can vary from country to country. This information, however, will enable the user of the machine to make a better evaluation of the hazard and risk.

The list below outlines some of the variables which directly affect the noise level of the machines:

VARIABLE	RELEVANT FACTOR	EFFECT
Timber	Species	Hard stiff timber can mean more noise (approx. 2dB(A) difference when cutting oak and pine) & more transmitted noise.
	Width	Wide work pieces radiate noise over a greater area increasing the noise level.
	Thickness	Thin workpieces generally vibrate more increasing the noise level.
	Length	Long workpieces transmit noise away from the cutting area towards the operator.
Tooling	Width of Blade	This affects the windage noise and increases roughly in proportion to the

	Blade Sharpness	width of cut. Dull and worn blades exert more force on the timber thus creating more noise.
	Balance	Out of balance blades mean vibration and changes in cutting conditions, resulting in increased noise levels.
Extraction	Air Velocity/ System Design	Resonant conditions can lead to high noise levels, excessive turbulence and chip impact can increase noise levels substantially

The figures quoted are emission levels and are not necessarily safe working levels. Whilst there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether further precautions are required. Factors that influence the actual level of exposure of the workforce include the characteristics of the work room and the other sources of noise, etc., i.e., the number of machines and other adjacent processes. Also, the permissible exposure level can vary from country to country. This information, however, will enable the user of the machine to make a better evaluation of the hazard and risk.

10.0 Maintenance Instructions

10.1 Cleaning and Lubrication

To ensure long life, maximum reliability and optimum performance, the following monthly maintenance and lubrication schedule should be carried out, otherwise the machines warranty could be invalidated.

Improper maintenance can cause serious injury or damage. For this reason it should only be carried out by authorised, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions.

Work on electrical fittings may only be carried out by qualified personnel and in strict observance of the safety instructions.

Note. Electrically isolate the machine and ensure that all spindle movement has ceased before carrying out any of the operations.

Keep the table clean and protected. Coating the cast iron with beeswax will reduce friction between the table and workpiece and inhibit corrosion. Avoid products that contain silicone, anti-slip additives, or abrasives. Avoid contact with anything moist. Do not set drinks on the tabletop or leave green wood on it. These will leave permanent marks. Any surface rust can be removed with auto rubbing compound and a wool bonnet. Work slowly and carefully; use the rubbing compound liberally. If the saw is to be stored for any length of time, lightly oil any surface that may rust before storing. The oil can be removed later with mineral spirits or other solvent.

Always check that the table rings are correctly seated on the keeper plates when carrying out maintenance, or when tool changing. The rings should sit level with the tabletop without any rock in them. Too high at the front and timber will catch on the front edge of the rings before entering the blade, too low and timber is in danger of catching on the inside lip of the table and being kicked back by the cutters. The underside of the table has been precision machined, negating the need for adjusting screws. Should the rings not sit properly after a thorough clean they may have been damaged and should be replaced.

We recommend that two people remove the rear access panel when it is necessary to do so. The panel is secured with four allen bolts which are captive on the main stand. After loosening them the panel can be lifted and taken off and the bolts will remain attached to the body. To reattach the panel, guide the bolt heads through the holes, let the panel drop into position and tighten the bolts.

Clean the interior of the machine regularly. A build-up of dust or chips around the motor and controls can cause motor failure and will impair movement of the rise & fall controls.

When lubricating the control mechanisms first check them for sawdust accumulation. Use a pitch remover and a wire brush to remove any build-up. Once clean, lubricate moving parts using a lubricant that does not pick up a lot of sawdust. Powdered graphite, hard wax or white lithium sprays are ideal. Do not use an oil-based product. These will collect sawdust and congeal into a gummy substance, making working parts hard to operate. Drive belts will also deteriorate if they encounter oil.

Arbor and Bearings

The spindle needs very little maintenance, but it should be checked for wear, burrs and any play in the bearings that the arbor rides in.

First inspect the loose top spindle and arbor threads for dirt, burrs or raised nicks. Slight imperfections can be carefully removed with a fine-cut file.

The main spindle bearings are sealed for life and require no lubrication. To check their condition, turn the arbor by hand while feeling for any roughness. Grasp the arbor and gently push side to side to check for any play. Roughness or slack in the bearings means that they need to be replaced.

Vee Belt and Pulleys

➤ The SM210 is driven via one Polyvee Drive Belt 762 J4.

To prevent loss of power and/or belt slip the belt should be correctly tensioned and regularly checked for wear.

When the belt begins to show signs of wear replace it - a frayed belt will cause vibration.

Excessive belt wear, vibration and noise may be the cause of poorly aligned or loose pulleys. Check alignment by placing a straight edge across the faces of the two pulleys. If necessary, adjust the motor pulley by loosening the allen screw locking the pulley onto the shaft. If you cannot get the pulleys to align it may be because the shafts are not in line. Loosen the motor mounting bolts and shift the motor until you get the required results. Position the pulley as near as possible to the motor bearing. If it is set too far along the motor shaft it will put unnecessary strain on the shaft and bearings.

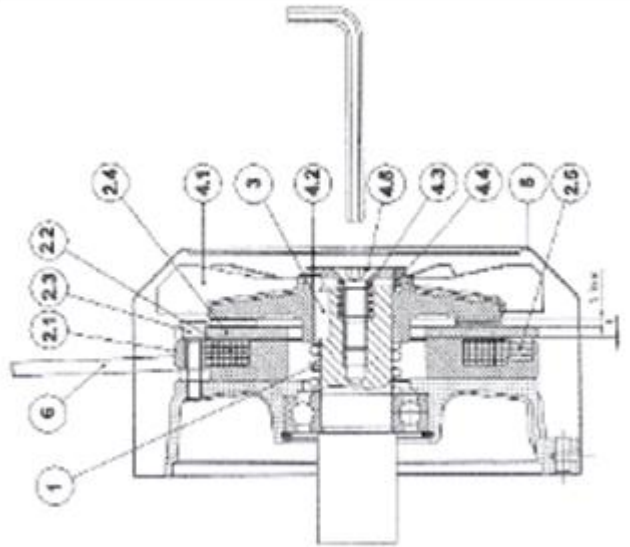
10.2 Brake Motor Installation & Maintenance

Installation

It is the responsibility of the machine installer to ensure that:

- The brake functions correctly after final installation.
- Earthing has been carried out according to local regulations before the connection to the mains.
- The supply of motor, rectifier/brake, and auxiliary equipment (if any) has been made using cables of suitable section to avoid overheating and/or too high voltage drop.
- In case of inverter supply the wiring instructions of the inverter manufacturer have been correctly followed for the motor and a separate supply (directly from the mains) has been provided for the rectifier/brake.

Note: due to poor supply characteristics we do not recommend use with phase converters.



Maintenance

***Brake reliability & lifetime is dependent upon good periodic maintenance.

- All maintenance work on brake motors should be carried out by qualified personnel, always with the machine out of operation, disconnected and secured against starting.
- Low-torque DC brake motors (with electromagnetic braking in case of supply failure) have a fixed braking torque; it is not possible to adjust the stopping times of these motors.

If a brake motor is running excessively hot it is likely to be caused by the brake not releasing. This is probably because of one of the factors below:

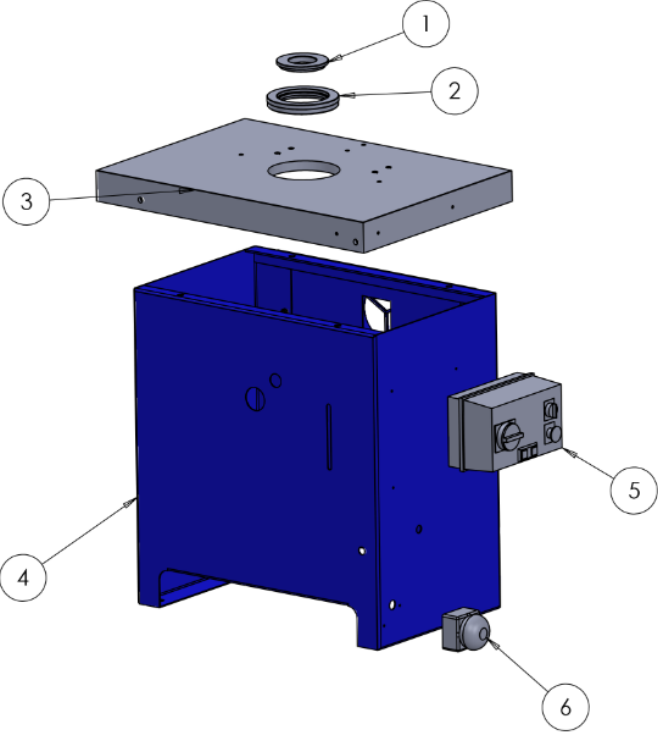
- | | |
|----------------------------------|---|
| • Brake airgap setting incorrect | • Poor rectifier supply connection |
| • Use with phase converter | • Dust, wood chipping etc locking the mechanism |
| • Blown or damaged rectifier | • Worn or damaged parts |

Air-gap Adjustment

1. Tighten down the hexagon head bolt in the centre of the fan cover completely (without forcing) then unscrew by one third of a turn (except for the TE/TESH motors which need adjusting by one half of a turn). For a more accurate setting remove the fan cover & tighten down the hexagon head bolt, again without forcing, then unscrew until the airgap (between 2.1 & 2.3) is between 0.3mm & 0.5mm.
2. We recommend the occasional use of an air jet to eliminate dust or other particles that may have settled on the braking surface.
3. After several air-gap adjustments verify that the thickness of the friction surface is no less than 1mm, if it is then replace the fan with an original manufacturer's part.

11.0 SM210 Parts List

MACHINE IDENTIFICATION: Your Machine has an individual serial number stamped on the top face of the machine table. This number can also be found on the front cover of this manual. Always quote your machine serial number when applying for spare parts etc.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	SM3-004	TABLE RING INNER	1
2	SM3-003	TABLE OUTER RING	1
3	SM3-002	SM3 TABLE	1
4	SM3-BODY	SM 210 MACHINE STAND C/W DOOR & PANEL	1
5	ELETRICAL BOX		1
6	FOOT STOP SWITCH		1

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SM210 - RISE AND FALL/ DRIVE MECHANISM ASSEM

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	SM3-030	MOTOR PULLEY	1
2	SM3-019	MOTOR PULLEY SPACER	1
3	WASHER FOR MOTOR M8 X 40MM		1
4	RECTANGULAR_PARALLELE_C_BSI		1
5	M8 X 30 X 22		1
6	BRAKE MOTOR LOW TORQUE		1
7	M8 - W - N		4
8	HEX SCREW M8 X 30MM		4
9	PLAIN WASHER, 8 mm, NARROW		6
10	SM3-006		1
11	SM3-020	SM RISE & FALL BARREL	1
12	SM3-014	BOTTOM BEARING COVER	1
13	SM3-031	MOTOR MOUNTING BRACKET(90 FRAME)	1
14	SM3-033	BELT TENSION STRAP	1
15	SM3-022	RISE AND FALL SCREW	1
16	SM3-021	RISE AND FALL HANDWHEEL HOUSING	1
17	SM3-032	MOTOR PIVOT SHAFT	1
18	SM3-034	BELT TENSION HANDLE	1
19	RETAINER COLLAR FOR M20 BAR		2
20	THREAD BAR MOTOR LOCK		1
21	SM-021	GM GEAR WHEEL	1
22	M12 LOCKING LEVER		1
23	LOCKING LEVER KNOB		2
24	HMEC		1
25	HEX JAM NUT, M20 X 2.5 -D-N		2
26	PLAIN WASHER, 20 mm, NARROW		1
27	PLAIN WASHER, 12 mm, NARROW		1
28	HEX BOLT M8 X 1.25 X 40 -D-N		1
29	HEX JAM NUT, M8 X 2.5 -D-N		1
30	SPRING PIN ISO 8752 - 4 X 30ST		4
31	HEX CAP SCREW_AM		2
32	PLAIN WASHER, 8 mm, REGULAR		1
33	HEX CAP SCREW, M8 X 1.25 X 12 -D-N		1
34	BELT		1
35	SM3-024	BARREL CLAMP SCREW	1
36	SM3-026	RISE AND FALL LOCK BOSS	1
37	SM3-025	LOCKING LEVER	1
38	HEX JAM NUT, M12 X 1.75 -D-N		2
39	SM-024	GM GEAR PINION	1
40	SM3-095	SM3 RISE AND FALL POINTER	1
41	SM3-023	HANDWHEEL SHAFT	1
42	WHEEL HANDLE		1
43	SPRING PIN - 4 X 30ST		1
44	HEX SCREW_AM		2

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	SM3-010	BEARING HOUSING	1
2	SM3-011	MAIN SPINDLE	1
3	SM3-012	MAIN SPINDLE LABYRINTH SEAL	1
4	SM3-013	TOP BEARING NUT	1
5	SM3-018	BEARING SHOULDER WASHER	1
6	SM3-040	LOOSE TOP SPINDLE	1
7	SM3-056	LOOSE TOP SPINDLE NUT	1
8	SM3-057	TOP SPINDLE BOLT	1
9	SM3-041-46	TOP SPINDLE SPACERS	1
10	SM3-041-46	TOP SPINDLE SPACERS	1
11	SM3-041-46	TOP SPINDLE SPACERS	1
12	SM3-041-46	TOP SPINDLE SPACERS	1
13	SM3-041-46	TOP SPINDLE SPACERS	1
14	SM3-041-46	TOP SPINDLE SPACERS	1
15	BEARING		1
16	BEARING		1
17	PLAIN WASHER, 12 mm, NARROW		1
18	M12		1
19	SM3-015	MAIN SPINDLE PULLEY	1
20	SM3-016	MAIN SPINDLE PULLEY NUT	1
21	SM3-017	PULLEY SPACER	1

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