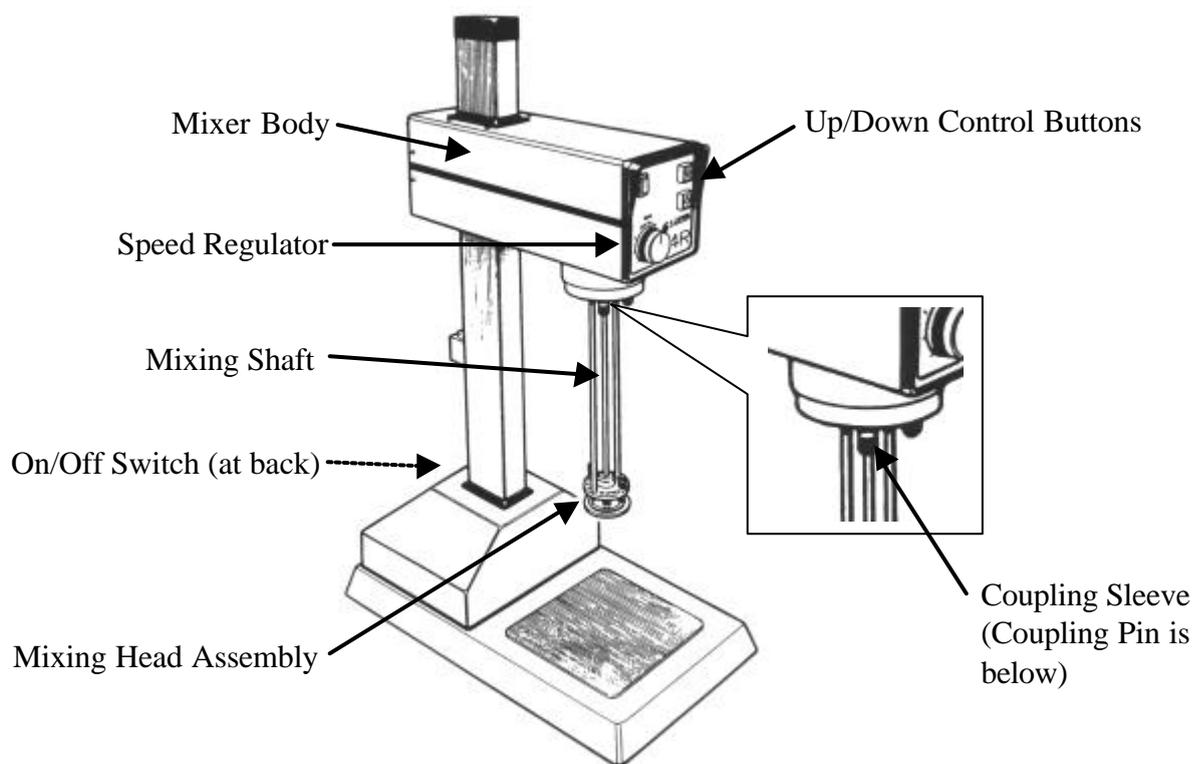


Silverson L4RT High Shear Mixer

Do not use the Silverson L4RT High Speed Mixer unless you have been trained in its use. These instructions are for guidance only. Please read all relevant hazard assessments.



Safety

The points below **must** be observed to prevent serious injury to the operator or damage to the mixer:

- Always turn the speed regulator to zero, and switch the machine off, when not in use.
- Always switch machine off when adding or removing attachments.
- Never touch any moving parts.
- Always operate mixer with mixing head assembly completely submerged in liquid, to prevent overheating and seizure of the mixing assembly.
- Before operation, ensure shaft coupling sleeve is secure and covers the coupling pin.
- Always make sure that no obstructions are below the mixing head when lowering the mixer body.
- Make sure liquid to be mixed is in a large enough container.
- The mixer is not explosion or flame proof, so always use in a well ventilated area if flammable solvents are present.
- Users should be aware that extended high speed mixing could cause significant heating of mixtures.
- Mixing of volatile solvents or toxic ingredients should only be done in a fume cupboard. Significant dusting of powders can occur.
- Always start mixer at lowest speed, and then gradually increase speed until desired setting, to prevent splashing.
- Clean mixing head and assembly as soon as possible after use, to prevent corrosion.
- The mixer is splash proof, but not waterproof. Never immerse unit in water or spray with hose.
- Take care when changing mixing heads, as the rotor blades may be sharp.

General

The Silverson L4RT High Speed Mixer is used for mixing liquid/liquid or liquid/solid mixtures at speeds of up to 8000 rpm.

The mixer body is raised or lowered electrically. It will stop automatically at the higher and lower limits of movement (although it will **not** automatically stop if it hits an obstruction between its upper and lower limits).

Several accessories are supplied with the mixer, which can be interchanged depending on what mixing conditions are required [see below].

Accessories



General Purpose Disintegrating Head

Suitable for general mixing or disintegration of solids.



Square Hole High Shear Screen

High shear screen suitable for emulsion and fine colloid suspension preparation.



Emulsor Screen

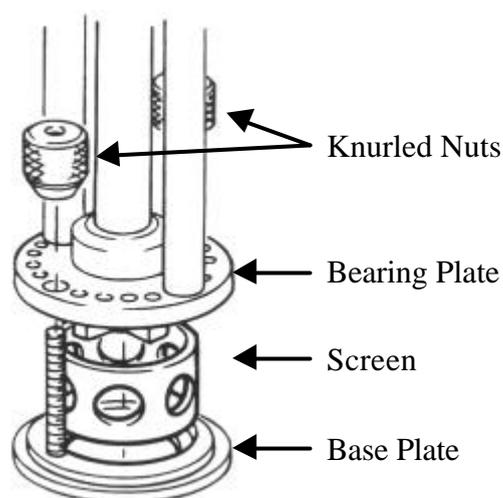
Lower shear screen suitable for liquid/liquid and emulsion preparations.



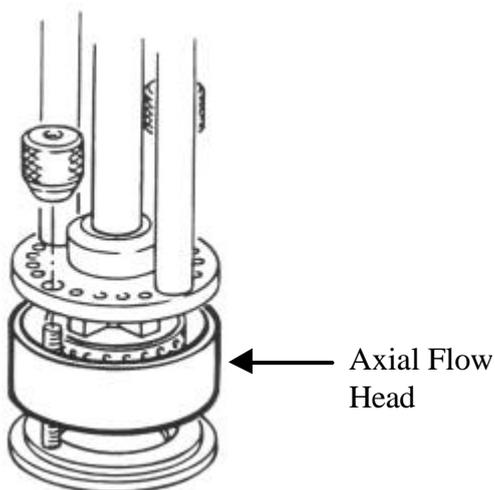
Axial Flow Head

Used in addition to one of the above screens to force liquid flow upwards. This can reduce aeration or help maintain large suspensions, but high mixing speeds can cause liquid to be ejected from the mixing vessel.

Cleaning and Changing Screens / Flow Head on Standard Mixing Assembly



- To clean the mixing assembly after low viscosity preparations it may be sufficient to just run the mixer in a cleaning solution or solvent (followed by a rinsing solution or solvent).
- If a more thorough clean is required, or you wish to change the screen or flow head, follow the steps below.
- Unscrew both knurled nuts.
- Remove base plate (take care, rotor blades may be sharp).
- Change screens and/or flow head. Take care not to bend or scratch the precision machined parts.
- Replace base plate, and screw down knurled nuts.
- Make sure knurled nuts are fastened tightly (by hand) and no parts are loose.



- If the Axial Flow Head is required, fit it as shown in the diagram.
- The Axial Flow Head is not fitted as standard, and should only be used when needed.
- The Axial Flow Head should fit securely between the bearing plate and the base plate.
- Care should be taken when operating the mixer using the Axial Flow Head, as it may force material vertically out of the mixing vessel at high speeds.

Operation

Make sure you have read and understood all the safety points at the beginning of this document before starting.

The mixing head assembly must always be completely submerged in liquid. The vortex generated by mixing at high speeds will lower the level of the liquid at the mixing head; so don't forget to allow for this (the PTFE bush is lubricated by the liquid, so running the mixer dry will cause overheating and seizure of the mixing assembly).

- Make sure the correct screen is attached and that the knurled nuts are fastened tightly (by hand). Make sure the Axial Flow Head is not attached unless you specifically need to use it.
- First check that the **Speed Regulator Control** is turned to the **0** position (turned fully anti-clockwise – you will hear a click as it turns off)
- Turn the wall electrical socket on.
- Switch on the mixer using the **On/Off Switch** (at the back, on the right).
- Make sure there are no obstructions above or below the mixing body and mixing head assembly, then move up or down using the **Up/Down Control Buttons**.
- Place a mixing vessel (containing material to be mixed) underneath the mixing head assembly. Make sure the bottom of the mixing vessel is below the lowest position of the mixing head, and that the sides of the vessel will not come into contact with the mixing head.
- The vessel should be large enough to contain the vortex and splashing generated, especially if using the Axial Flow Head. Care should be taken when using glass vessels; metal or plastic are preferred.
- Carefully lower mixing head into vessel, making sure liquid completely covers mixing head assembly, as mentioned above.
- Only switch mixer on or off whilst mixing head is in liquid. Slowly turn **Speed Regulator Control** clockwise until mixer rotor begins to turn.
- Turn slowly until desired speed is matched by the speed on the digital display. Watch the vortex as you increase the speed to make sure there is no splashing. Moving the vessel off centre will help to reduce the vortex size. At high speeds considerable suction forces may be generated between the bottom of the mixing head and the mixing vessel; the vessel may need to be clamped if small or light.
- High speed mixing can generate significant temperatures; mixing using volatile solvents or toxic materials should only be done in a fume cupboard. Significant dusting of powders can occur.
- When finished, clean the shaft and mixing head assembly. Make sure **Speed Regulator Control** is set to **0** and the unit is switched off both at the **On/Off Switch** and at the wall socket.



**INSTALLATION, OPERATING
& MAINTENANCE
INSTRUCTIONS MANUAL**

FOR

**HIGH SHEAR
LABORATORY MIXER**

MODELS: L4R, L4RT & L4RT-A

Silverson Machines Inc . 355 Chestnut Street . East Longmeadow . MA . 01028

Tel:(413) 525 4825 . Fax:(413) 525 5804



IDENTIFICATION

This Manual is supplied in conjunction with:

Mixer Model Number: _____ Serial Number _____

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I.0 INTRODUCTION

The purpose of this manual is to provide you with the information need to set up and operate your Silverson Laboratory Mixer.

With over 50 years of manufacturing experience Silverson has established an unequalled reputation for quality and reliability and we want you to get the best possible performance from your mixer.

IMPORTANT: Please read this manual carefully before attempting to set up or operate your machine. Neither Silverson Machines or their representatives can accept responsibility for damage or injury resulting form improper set up or use. If you have any questions, please contact our Technical Service Department or our representatives, who will be pleased to help you.

I.1 WARRANTY

Silverson Machines Inc. offers comprehensive after-sales services. If any major fault develops, the mixer should be returned for repair and / or service.

The nature of the fault should be fully described and the model and serial number of the machine quoted in any accompanying correspondence.

Repair or replacement under warranty will be effected without charge for up to 1 year from the date of purchase provided that the foregoing provisions are complied with.

The mixer must only be shipped suitably packed with the approval of Silverson Machines or their accredited representatives.

I.2 TECHNICAL SERVICE

Spare parts and advice regarding the operation of your machine can be obtained from the service department:

SILVERSON MACHINES INC.

TEL: (413) 525 4825

P.O. BOX 589

FAX: (413) 525 5804

355 CHESTNUT STREET

EAST LONGMEADOW, MA 01028

or our appointed agents.

IMPORTANT: If you require spare parts or after sales service or assistance, please specify the machine model number and serial number; these are the numbers on the name plate attached to the rear panel of the mixer body.

| | |
|--|----------------------|
|  | |
| Silverson Machines Inc. P.O. Box 589, 355 Chestnut Street, East Longmeadow, MA 01028 Tel: (413) 525 4825 | |
| HEAVY DUTY LABORATORY MIXER EMULSIFIER | |
| Model | Serial No. |
| <input type="text"/> | <input type="text"/> |
| ISOLATE BEFORE REMOVING COVER | |
| Made in England | |

*Note: When returning a unit for inspection/repair, ship the mixer: **ATTN: REPAIRS**, with a letter including your name, telephone number and description of problem.*

2.0 SAFETY



2.0 SAFETY

2.1 Throughout this manual you will find safety signs which are classified according to the relative seriousness of the hazard situation. The determination is based on what could happen as a result of exposure to the hazard. There are three hazard classifications which are denoted by the signal words **DANGER, WARNING** or **CAUTION**. Signs which are denoted as **NOTICE** indicate that the machine may be damaged if care is not taken when performing the procedure.



DANGER: INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.



WARNING: INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.



CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



NOTICE: indicates that the machine may be damaged if care is not taken when performing the procedure.

2.2 **PRIOR TO UNPACKING THE LABORATORY MIXER:** To avoid damaging the mixing unit refer to chapter 3.1 of this Manual for step by step instructions for unpacking the unit.

2.3 Please observe the Health and Safety regulations applicable to your particular location; these vary from country to country but their substance is the same - avoid all hazards to personnel and property.

2.4  **WARNING: DO NOT USE THE MACHINE IN A HAZARDOUS AREA WHERE A FLAMMABLE OR EXPLOSIVE ATMOSPHERE MAY BE PRESENT. THIS MACHINE IS NOT EXPLOSION PROOF / FLAME PROOF.**

2.5  **WARNING: NEVER TOUCH ROTATING PARTS. FAILURE TO OBSERVE THIS MAY RESULT IN BODILY INJURY.**

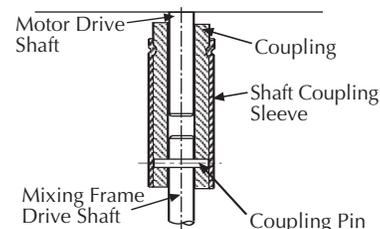
CAUTION: Use special care when handling the Mixing Assemblies - THEY MAY BE SHARP!

2.6  **WARNING: IF USING SOLVENTS TO CLEAN COMPONENTS, USE IN A WELL VENTILATED AREA AND AVOID INHALATION OF FUMES. KEEP AWAY FROM SOURCES OF IGNITION :- NO SMOKING.**

2.7 Never use parts other than those supplied or recommended by Silverson Machines Inc. The use of such parts will nullify any warranties and may cause premature wear or more seriously may cause component failure and possible injury.

2.8 Check that the voltage, phases and cycles (Hz) on the electrical data plate located on the rear panel of the mixer body are compatible with the available electricity supply.

2.9  **WARNING: BEFORE STARTING THE MIXER ALWAYS ENSURE THAT THE SHAFT COUPLING SLEEVE IS IN ITS CORRECT OPERATING POSITION AND THAT THE COUPLING PIN IS CAPTIVATED BY THE SLEEVE AS SHOWN.**



2.10  **WARNING: ALWAYS DISCONNECT THE MACHINE FROM THE ELECTRICITY SUPPLY BEFORE CARRYING OUT ANY MAINTENANCE WORK. SILVERSON MACHINES SHOULD BE CONSULTED BEFORE CARRYING OUT ANY MAINTENANCE WORK WHICH IS NOT DESCRIBED IN THIS MANUAL.**



Any electrical operation should only be carried out by a suitably qualified electrician.

2.11  **WARNING: NEVER CARRY OUT ANY MAINTENANCE WORK OR REMOVE THE MIXING ASSEMBLY OR HEAD/SCREEN WHILE THE MACHINE IS RUNNING OR IS STILL CONNECTED TO THE ELECTRICAL SUPPLY. FAILURE TO OBSERVE THIS MAY RESULT IN BODILY INJURY.**

3.1 UNPACKING (Refer to Fig I)



NOTICE: When lifting the machine from the packing case do not lift by the tube (B). Take care to avoid any movement of the tube while unpacking the machine as damage to the coupling may occur.

3.1.1 Stand the machine on its base on a table or workbench of convenient height.

3.1.2 Cut tension strap (A)



NOTICE: The weight of the motor unit is now supported by tube (B). This must not under any circumstances be removed by forcing it in any direction.

3.1.3 Peel off the yellow tape which is wrapped around both tube (B) and sleeve (D).

3.1.4 Grip tube (B) firmly with one hand and with the other hand turn the sleeve (D) in the direction of the red arrow; continue turning the sleeve until it is screwed down to its lowest position.

3.1.5 Next cut the adhesive tape which is securing the wood brace (C) at each end. Take care not to damage the machine.

3.1.6 Lift tube (B) together with sleeve (D) vertically upwards taking care not to pull sideways when carrying out this operation. You should now be able to slide out the wood brace (C).

3.1.7 Now the tube (B) and sleeve (D) may be lowered and in the lowest position the lower end of the tube be gently pulled towards the front of the machine base, the upper end of sleeve (D) should disengage easily from the motor unit without imposing any strain whatsoever on the motor shaft or its coupling.

3.1.8 Finally there is a loose flat steel washer which will fall away freely with the removal of the tube. We suggest that this washer, together with the tube/sleeve and wood brace be stored away ready for re-use in order to transport the mixer in the future.

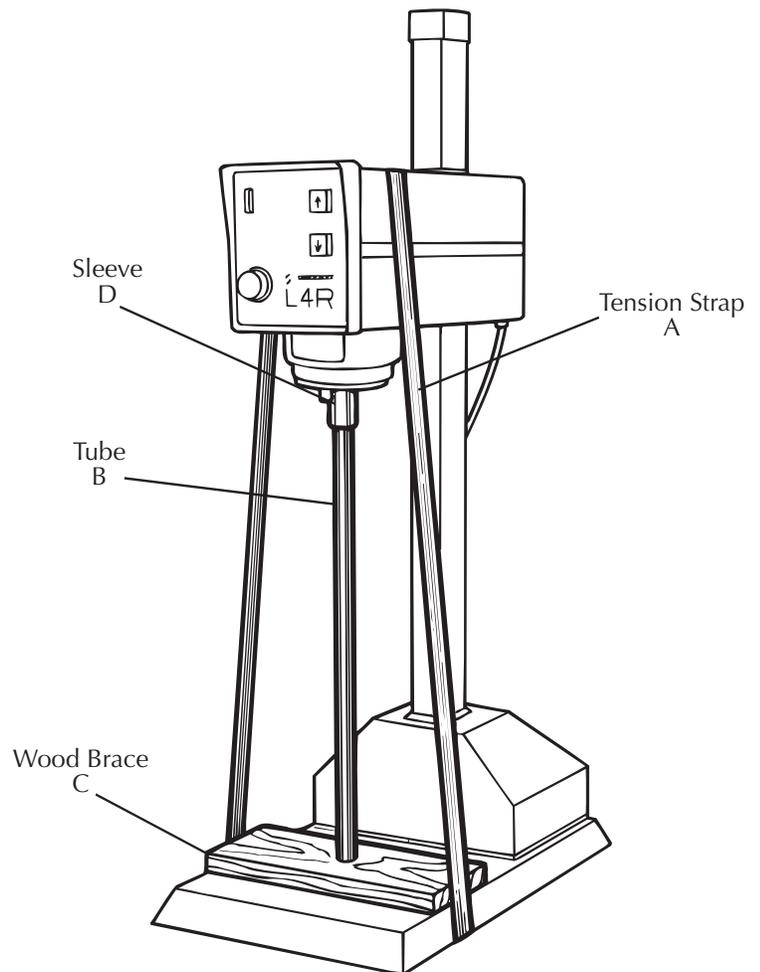


Fig.I Unpacking the Mixer

3.0 INITIAL SET UP



3.2 ELECTRICAL CONNECTION

3.2.1 The machine must be connected to an AC power supply outlet with an earthed socket. The voltage indicated on the electrical data plate located on the rear panel of the mixer body must be compatible with the mains voltage of your electrical supply.



ELECTRICAL DATA PLATE



WARNING: ANY ELECTRICAL OPERATIONS OR MAINTENANCE SHOULD ONLY BE CARRIED OUT BY A SUITABLY QUALIFIED ELECTRICIAN.



WARNING: DO NOT USE THE MACHINE IN A HAZARDOUS AREA WHERE A FLAMMABLE OR EXPLOSIVE ATMOSPHERE MAY BE PRESENT. THIS MACHINE IS NOT EXPLOSION PROOF / FLAME PROOF.

3.3 ATTACHING THE MIXING ASSEMBLIES (Refer to FIG. 2)

- 3.3.1 Unscrew and remove the two knurled nuts (H).
- 3.3.2 Slide the coupling sleeve (E) up the drive shaft coupling (F) to reveal the coupling pin (G).
- 3.3.3 Use a piece of rod of suitable diameter to push out the coupling pin (G). (The tip of a ball point pen will suffice!)
- 3.3.4 Locate the mixing assembly (J) onto the two studs ensuring that the mating surfaces are clean.
Note: Where there is insufficient clearance refer to Para. 5.1 and raise the mixer body.
- 3.3.5 Refit the knurled nuts (H) with the narrow end positioned against the flange.
- 3.3.6 Correctly align the drive shaft coupling (F) and shaft and rotor (K) and insert the coupling pin (G).
- 3.3.7 Slide the coupling sleeve (E) down the coupling until the clip engages into the groove of the coupling thus captivating the coupling pin (G).

FOR THE REMOVAL OF THE MIXING FRAME ASSEMBLIES APPLY THE ABOVE FITTING PROCEDURE IN REVERSE. WHEN REMOVING THE TUBULAR MIXING FRAME ASSEMBLIES CARE SHOULD BE TAKEN WHEN EXTRACTING THE PIN (G) TO SUPPORT THE MIXER FRAME DRIVE SHAFT (K).

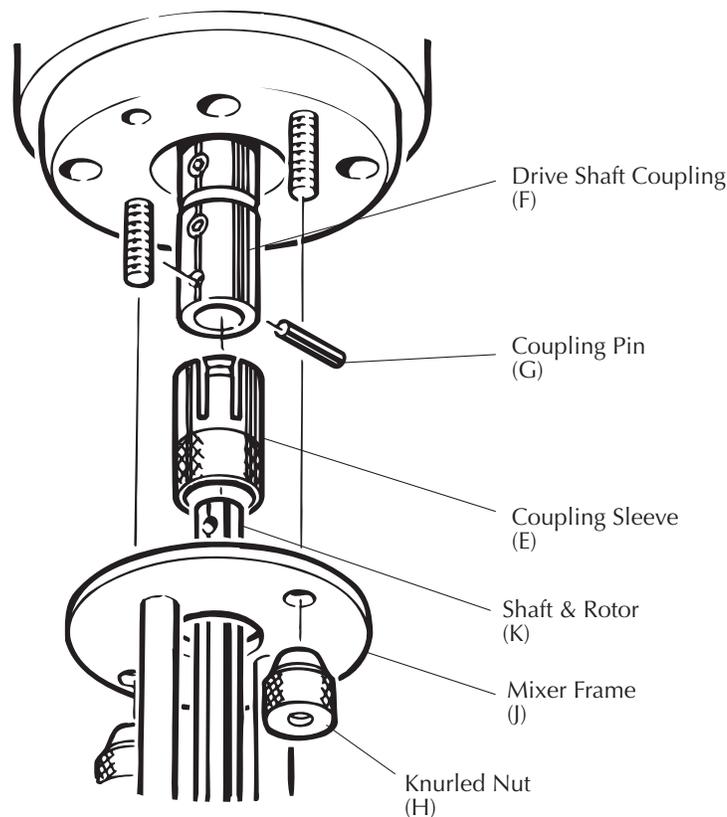


Fig.2 Fitting the Standard Mixing Assembly

4.0 DESCRIPTION



4.1 GENERAL

The L4R models are the most popular machines in Silverson's range of laboratory mixers and are ideal for routine laboratory work, research & development, QA analysis and small scale production in all industries. The L4RT and the L4RT-A models have a digital tachometer which gives a constant speed readout and can be invaluable for applications where process validation and reproducibility are required. The L4RT-A has the additional facility of switching the digital display to show the motor ampere load.

The L4R, L4RT and the L4RT-A are suitable for the widest range of applications - mixing, emulsifying homogenizing, disintegrating, dissolving - with an efficiency and flexibility unmatched by other machines. With a capacity from 1ml up to 12 litres and the ability to mix in-line with flow rates up to 20 litres/minute, it offers excellent reproducibility when scaling up to full scale production and provides an accurate and easy means of forecasting the performance of larger Silverson machines under full-scale working conditions.

Motor -

(1/3 hp), 110 Volt, single phase, 60 Hz. Nominal maximum speed 8000 rpm (6000 rpm under full load)

6.1 max rated amp draw @ full load.

Speed Control -

Infinitely variable electronic speed control with integral on/off switch.

Electric Rise And Fall Bench Stand -

The mixing unit may be effortlessly raised and lowered using the push-button control on the drive unit.

Construction -

All wetted parts are in grade 316 stainless steel with the exception of the bushing which may be bronze alloy or PTFE. The L4R models are finished in a tough, easy to clean, non-chip, white nylon coating. The flat base is covered by a removable non-slip mat which is resistant to most solvents.

The mixer consists of three sub assemblies: the mixer body, the stand base assembly and the column unit. A selected mixing assembly and workhead/stator is then attached to the mixer drive.

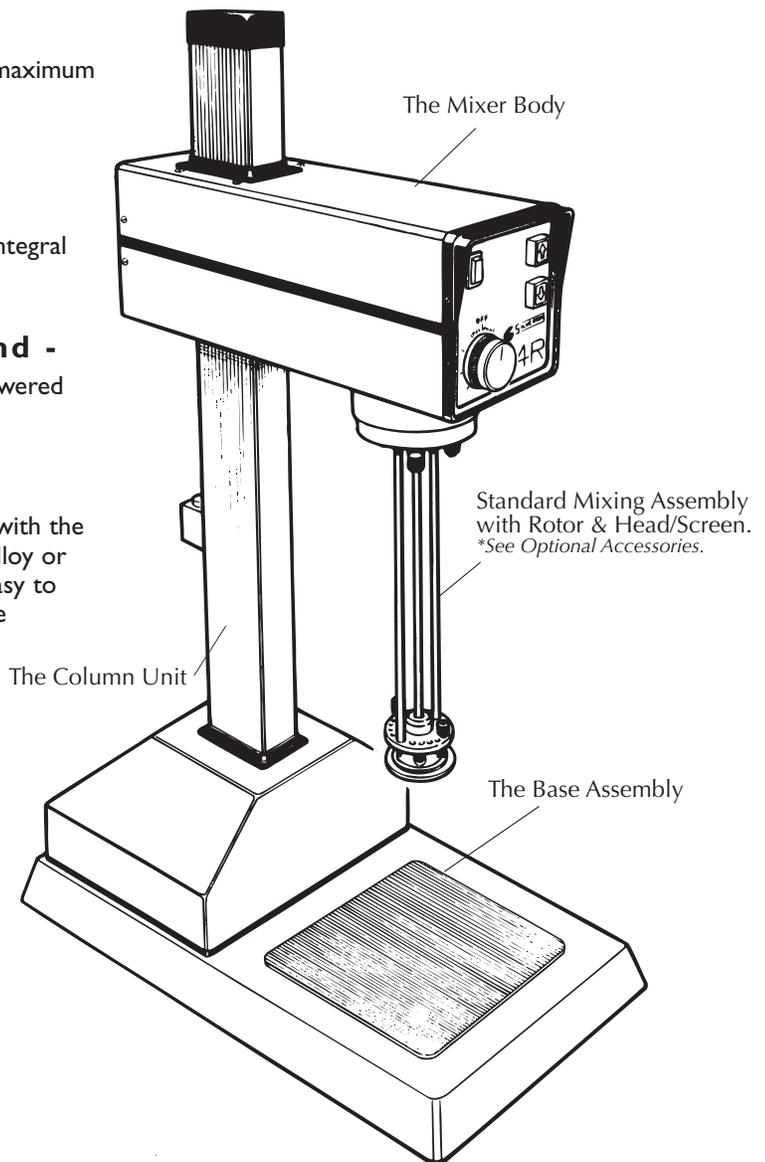


Fig.3 The L4R, L4RT & L4RT-A Mixer Assembly

4.1.1 THE MIXER BODY

The mixer drive body consists of a lower casing and a top cover to which the front and rear end panels are attached. This body is mounted to a carriage assembly which when electrically operated travels vertically up/down the column unit.

The mixer body houses the mixer motor, control units, the fuse and electrical wiring for these components. Sealing strips and bezels are fitted to the body casing.

The front panel carries the rise and fall control push buttons, the combined on/off switch and speed control and the 'power on' indicator lamp. On the L4RT and L4RT-A the digital tachometer is also located on the front panel.

The rear panel carries the fuse holder and the serial number plate.

4.1.2 THE STAND BASE ASSEMBLY

The base assembly, to which the column unit is mounted, serves as a platform for mixing containers, a removable non-slip mat is also provided.

The rise and fall motor and its associated capacitor(s), the rise/fall limit switch, the combined 'power on' switch with integral safety cut-out device and the electrical wiring for these components are located at the base of the column and housed inside the base cover.

A sealing strip and bezel are fitted to the cover plate to form a splash proof enclosure.



WARNING: THE ENCLOSURE IS NOT WATERPROOF, HOSE PROOF OR WEATHERPROOF.

4.1.3. THE COLUMN UNIT

The mixer body and the base assembly are connected by the column unit which houses components for the rise/fall mechanism.

A spring-loaded stop plunger is fitted to the rear of the column; this is a fail safe device which inhibits the downward travel of the mixer body in the unlikely event of drive chain failure.

4.2 ACCESSORIES

The L4R, L4RT and the L4RT-A are normally supplied with a standard two arm mixing assembly and a selection of interchangeable workheads/stators as shown on FIG. 4. All of the optional accessories described in the following paragraphs are interchangeable with the standard mixing assembly and available as optional extras. Silverson Machines, Inc. will be pleased to advise and quote for your specific requirements. When interchanging mixing assemblies please refer to the initial set up section of this manual for instructions. The Operation section of this manual recommends which workhead/stator should be used with certain mixing techniques and details how to change the workhead/stator.

4.0 DESCRIPTION

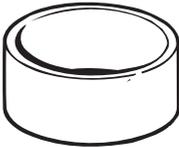
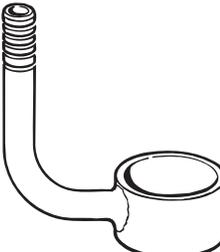


4.3 STANDARD MIXING ASSEMBLY

4.3.1 MIXING ASSEMBLY (FIG. 4)

The standard mixing assembly is of a two arm construction with a central detachable drive shaft and rotor, bushing and base plate; the material of the bushing will be either bronze alloy or PTFE as per customer specification.

This assembly is supplied complete with a square hole high shear screen, general purpose disintegrating head, standard emulsor screen and an axial flow head. Optional extras for this unit include the vertical slotted disintegrating head, diagonal slotted disintegrating head, fine emulsor screen and the pump head. Its mixing capacity, depending upon the product viscosity, is up to 12 litres.

| HEADS / SCREENS | |
|---|---|
| Standard | Optional |
|  |  |
| General Purpose Disintegrating Head | Fine Emulsor Screen |
|  |  |
| Square Hole High Shear Screen | Vertical Slotted Disintegrating Head |
|  |  |
| Emulsor Screen | Diagonal Slotted Disintegrating Head |
|  |  |
| Axial Flow Head | Pump Head |

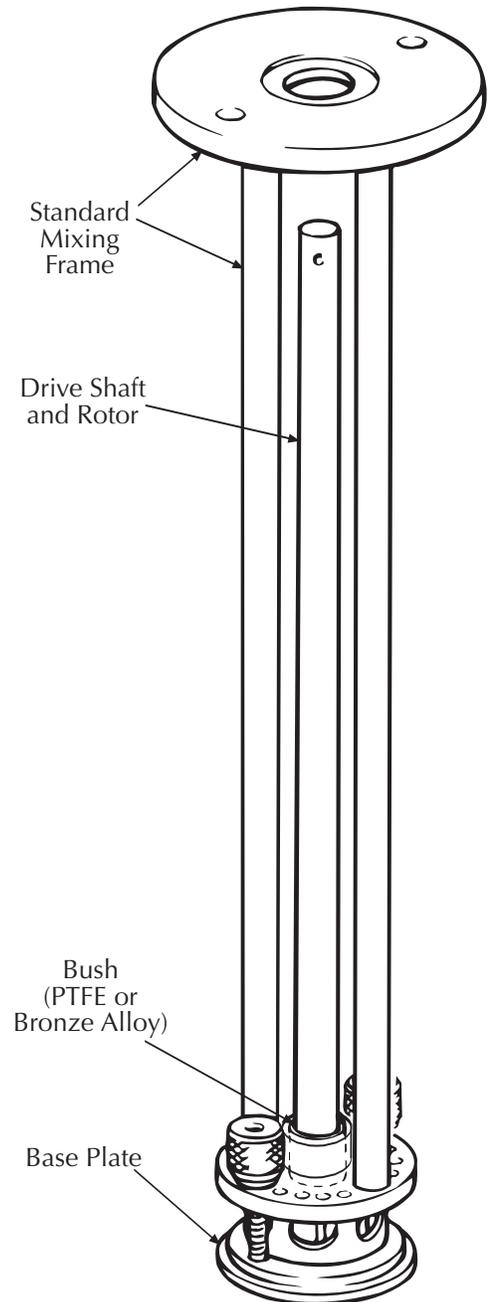


FIG.4 Standard Mixing Assembly

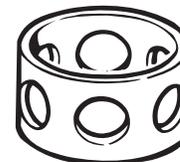
4.4 WORKHEADS / STATORS

A comprehensive range of heads/stators and screens is available for all Silverson High Shear Mixers.

These easily interchangeable heads/screens offer great versatility by allowing the machine to be adapted to perform a wide range of mixing operations. These include emulsifying, homogenizing, disintegrating, dissolving, dispersing, blending, particle size reduction and de-agglomerating. Changing from one head or screen to another is quick and simple; refer to the operating section of this Manual for details.

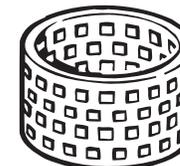
4.4.1 GENERAL PURPOSE DISINTEGRATING HEAD (GPDH)

This is the most versatile of all the heads, giving an exceptionally vigorous mixing action. Ideal for general mixing applications, its uses also include the disintegration of solids and the preparation of gels and thickeners, suspensions, solutions and slurries.



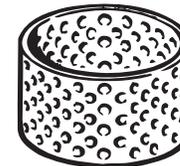
4.4.2 SQUARE HOLE HIGH SHEAR SCREEN (SQHS)

The configuration and fine internal tolerances of this stator provide exceptionally high shear rates which are ideal for the rapid size reduction of soluble and insoluble granular solids. It is also suitable for the preparation of emulsions and fine colloidal suspensions.



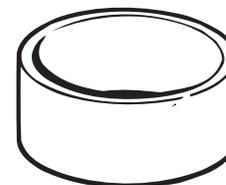
4.4.3 EMULSOR SCREEN (EMSC)

Suitable for liquid/liquid preparations and especially useful for all emulsions. Available in fine and medium (standard) perforations.



4.4.4 AXIAL FLOW HEAD (AFLH)

This head expels material vertically upwards instead of horizontally and is used in certain circumstances where aeration needs to be minimized. It may also be used to maintain heavy insoluble solids in suspension. Any of the other interchangeable heads and screens (excluding the pumphead) can be fitted inside the Axial Flow Head and used in conjunction with it. Refer to the operating section of this Manual for instructions.



While the Axial Flow Head offers certain benefits in particular circumstances we do NOT recommend that it is used 'as standard'.

Use of the Axial Flow Head may prevent the mixer from being run at high speeds as the upwards vertical flow of material out of this head may throw liquid up and out of the vessel - particularly on low viscosity products or low volumes.



CAUTION: When using the Axial Flow Head always start the machine at the lowest possible speed and increase it gradually until the desired flow pattern is achieved. High speeds may result in materials being thrown up and out of the vessel. Excessive splashing and spillage may occur.

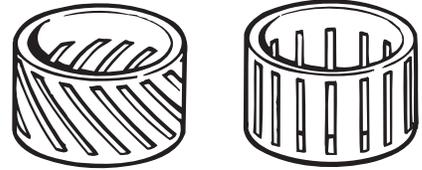


4.0 DESCRIPTION



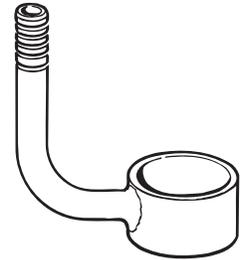
4.4.5 SLOTTED DISINTEGRATING HEAD (SLDH) (OPTIONAL ACCESSORY)

The slotted disintegrating head may be supplied as an optional extra. It is used for the disintegration of fibrous materials such as animal and vegetable tissue, as well as the disintegration and solubilization of 'elastic' materials such as rubbers and polymers. Vertical and diagonal slotted heads are available.



4.4.6 PUMP HEAD (PHSO) (OPTIONAL ACCESSORY)

The pump head converts the mixer into a non-positive pump which with the use of a flexible hose and valve can be used to fill individual containers.



NOTICE: When using the pump head **DO NOT** allow the mixing vessel to become sufficiently empty for the head and bearing bushing to run 'dry'.



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury
NOTICES are given to alert to situations which may result in damage to the Mixer.

4.5 OPTIONAL ACCESSORIES - TUBULAR MIXING ASSEMBLIES

4.5.1 TUBULAR FRAMES (FIG. 5)

A range of interchangeable tubular mixing units is available as detailed below. The units have capacities from 1-500 ml and are suitable for use in narrow-necked containers.

1" Tubular: Supplied with interchangeable screw-on General Purpose Disintegrating Head and Square Hole High Shear Screen or Integral Open-ended, Vertical Slotted Disintegrating Head for tissue homogenization. Interchangeable, screw-on Slotted Disintegrating Heads are available as extras.

Mixing unit outside diameter = 1 (25mm). Overall length = 9.1/2" (240mm)

3/4" Tubular: Generally as the 1" above.

Mixing unit outside diameter = 3/4" (19mm). Overall length = 8.1/4" (208mm).

Length of 3/4" diameter section = 6" (151mm).

5/8" Micro: Mixing unit of solid one-piece construction with Integral General Purpose Disintegrating Head or Open-ended, Vertical Slotted Disintegrating Head.

Mixing unit outside diameter = 5/8" (16mm). Overall length = 6.1/4" (160mm).

Length of 5/8" diameter section = 4" (102mm).

3/8" Mini-Micro: Generally as 5/8" Micro above.

Mixing unit outside diameter = 13/32" (10.3mm). Overall length = 4.11/16" (119mm).

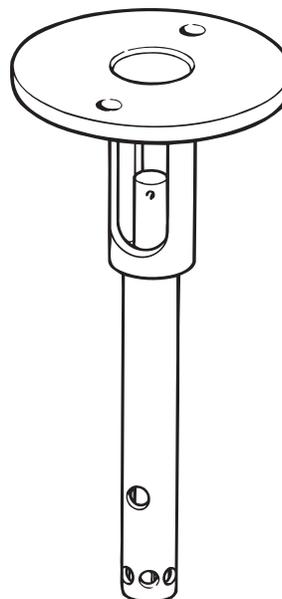
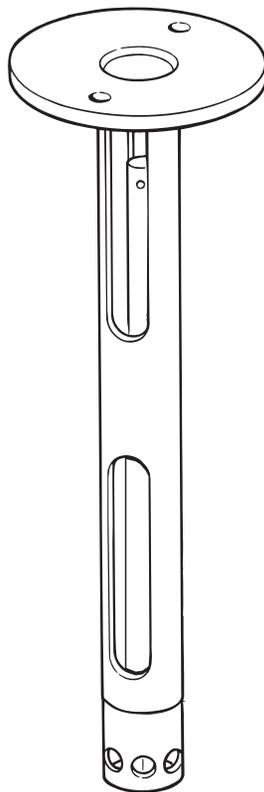
Length of 5/8" diameter section = 2.7/16" (62mm).

| | 1" Tubular | 3/4" Tubular | 5/8" Micro | 3/8" Mini-Micro |
|--|--------------------|--------------------|------------------|------------------|
| CAPACITY - Depending on Viscosity | 50ml. up to 500ml. | 20ml. up to 250ml. | 5ml. up to 50ml. | 1ml. up to 10ml. |

1 and 3/4 Tubular

5/8 Micro and 3/8 Mini Micro

| HEADS / SCREENS | |
|---|---|
| Standard | Optional |
|  |  |
| General Purpose Disintegrating Head | Vertical Slotted Disintegrating Head |
|  |  |
| Square Hole High Shear Screen | Diagonal Slotted Disintegrating Head |



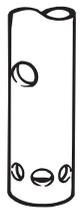
| STANDARD INTEGRAL HEADS |
|---|
|  |
| General Purpose Disintegrating Head |
|  |
| Open Ended Vertical Slotted Disintegrating Head |

Fig.5 Tubular Mixing Assemblies

4.0 DESCRIPTION



4.6 OPTIONAL ACCESSORIES - LABORATORY IN-LINE MIXING ASSEMBLY

4.6.1 Laboratory In-Line Mixing Assembly (FIG. 6)

The In-Line assembly fits on to the L4R and converts it into an In-Line mixer/homogenizer. The centrifugal action of the rotor in the high shear head/screen generates a non-positive pumping action which gives a throughput on water viscosity liquids of approximately 20 litres/minute, reducing as the viscosity increases. The pumping rate can be lowered by reducing the motor speed but it is better to insert a valve in the pipeline on the outlet side as reducing the speed also reduces the mixing efficiency.

The unit is suitable for use at atmospheric pressure only. It is not recommended for use on abrasive, corrosive or flammable materials.

Construction: All product contact parts in 316 stainless steel except the bushing (PTFE or bronze alloy) and mechanical shaft seal (carbon/stainless steel with viton elastomers) and the viton body 'O' rings.

Supplied complete with General Purpose Disintegrating Head and Square Hole High Shear Screen.

Options:

- ¥ Slotted Disintegrating Head and Emulsor Screens (fine and medium perforations).
- ¥ Multiport inlet feed manifold.
- ¥ Seal elastomers and body 'O' ring available in Kalrez/PTFE.

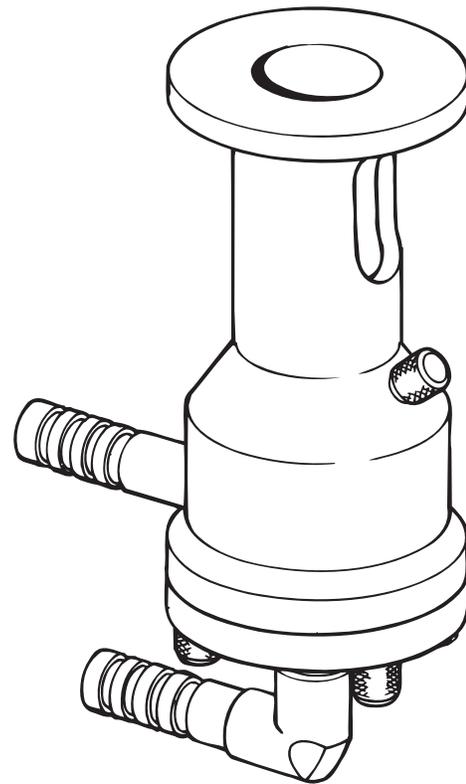
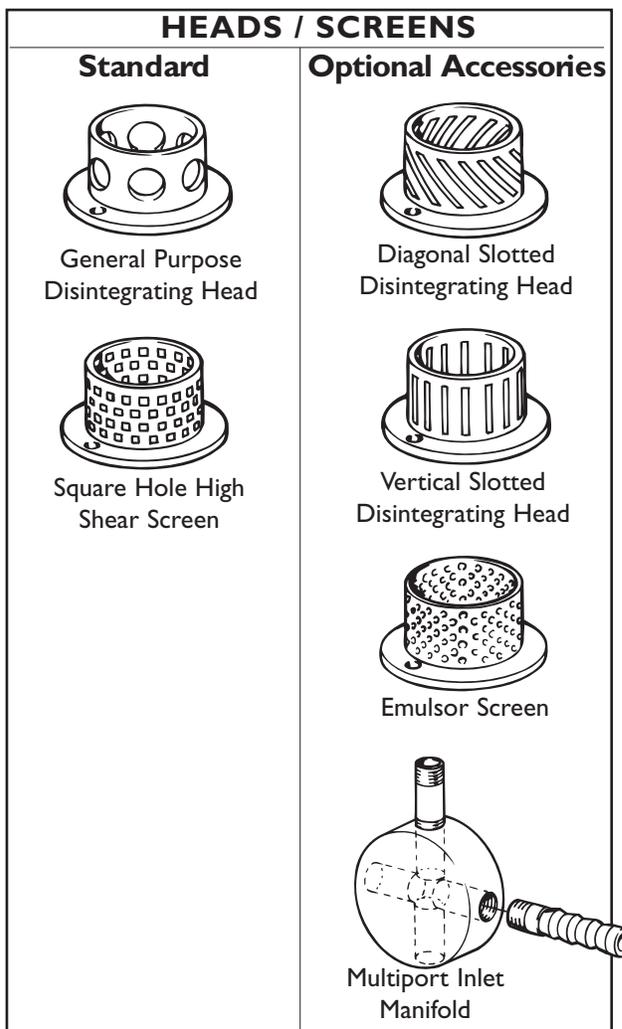


Fig.6 Laboratory In-Line Mixer Assembly

4.7 OPTIONAL ACCESSORIES - LABORATORY DUPLEX MIXING ASSEMBLY

4.7.1 Laboratory Duplex Mixing Assembly (Fig. 7)

The Duplex differs from the standard mixing assembly in having two heads facing in opposite directions; the upper head pulls materials down from the surface of the mix, while the lower head/screen draws material up from the base of the mixing container. The upper Coarse Tooth Disintegrating Head is designed to chop solid materials into small pieces and then expel them beneath the shroud. The lower head/screen simultaneously draws in these partially disintegrated solids and reduces their size further.

The combined use of two heads makes the Duplex ideal for applications where light or buoyant material (powders, rubbers and polymers, etc.) needs to be drawn down from the surface of a mix and rapidly dispersed. Because of the movement afforded by the two heads, the Duplex is also ideal for use on high viscosity materials. Supplied complete with upper Coarse Tooth Disintegrating Head and lower General Purpose Disintegrating Head

Options:

¥ Lower Slotted Disintegrating Heads, Square Hole High Shear Screen, Emulsor Screens and upper General Purpose Disintegrating Head.

Typical Applications:

¥ Rapid solution of rubbers and polymers into lubricating oils, non-flammable solvents and asphalt for the production of luboils, adhesives and bituminous compounds.

¥ Disintegration and dissolving solid resin for the production of varnish.

¥ Addition of powders into high viscosity liquids.

¥ Vegetable and meat puree/slurries

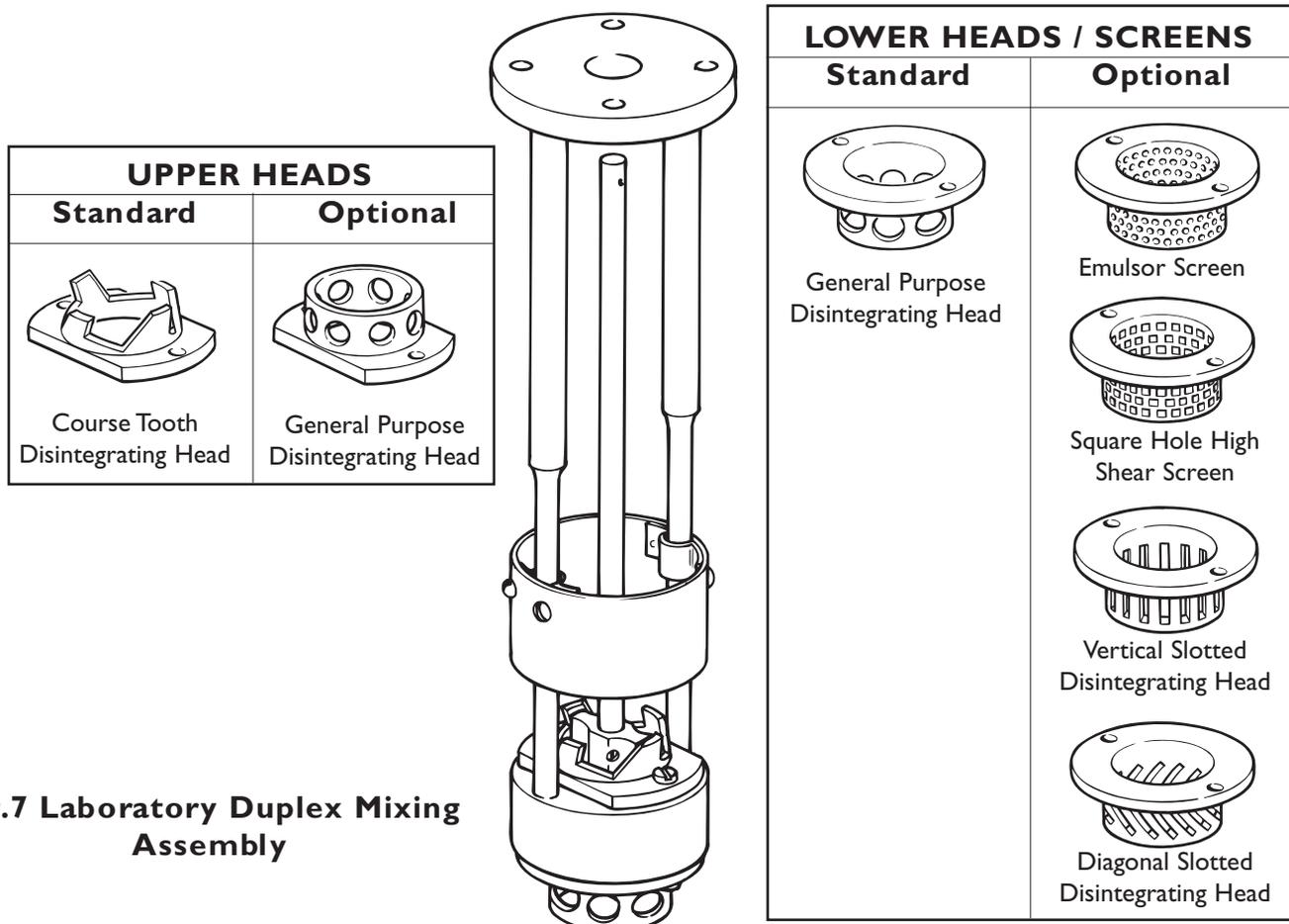


Fig.7 Laboratory Duplex Mixing Assembly

5.0 OPERATION



5.1 OPERATION (Refer to Figs. 8)*



NOTICE: The mixer frame must always be immersed so that fluid covers the entire working head/screen and the bearing bushing **BEFORE** the machine is switched on. If this precaution is not taken overheating and seizure of the shaft will result. **NEVER** allow the machine to run "dry". The manufacturer will not accept responsibility for damage if this precaution is not observed.



NOTICE: Before starting the mixer ensure that the knurled nuts retaining the mixer frame are tight and fitted correctly, ie. with the narrow end positioned against the flange.



CAUTION: Where the mixer is to be used in high ambient temperatures or to mix a very hot product (over 100;c) a cold air supply to the Mixer Body is recommended in order to cool the mixer motor. Contact Silverson Machines Inc. for advice.



WARNING: DO NOT USE THE MACHINE IN A HAZARDOUS AREA WHERE A FLAMMABLE OR EXPLOSIVE ATMOSPHERE MAY BE PRESENT. THIS MACHINE IS **NOT** EXPLOSION PROOF / FLAME PROOF.



WARNING: BEFORE STARTING THE MIXER ALWAYS ENSURE THAT THE SHAFT COUPLING SLEEVE IS IN ITS CORRECT OPERATING POSITION AND THAT THE COUPLING PIN IS CAPTIVATED BY THE SLEEVE AS SHOWN.



WARNING: NEVER TOUCH ROTATING PARTS. FAILURE TO OBSERVE THIS WARNING MAY RESULT IN BODILY INJURY.

5.1.1 Ensure that the combined on/off switch and speed control knob (A) is in the "OFF" position.

5.1.2 Connect to power supply and switch the power on by operating the switch located at the rear of the base assembly; the 'power on' indicator lamp (B) will now be illuminated.

5.1.3 By operating the rise/fall control push buttons (C), lower the mixer frame into a vessel containing sufficient liquid so that the entire working head/screen and bearing bushing are immersed.



WARNING: IF VESSEL BOTTOM IS HIGHER THAN THE BASE PLATFORM, DO NOT ALLOW THE MIXING ASSEMBLY TO STRIKE THE VESSEL BOTTOM WHEN LOWERING.

5.1.4 Activate the mixer by turning the combined on/off switch and speed control knob (A). **Gradually** increase the speed until a vortex appears in the liquid. On the L4RT and the L4RT-A the digital Display Unit (D) will indicate the RPM speed at which the mixer is running. The L4RT-A model has the additional facility of switching the display unit to indicate the ampere rating when the switch (E) is in the down position.



Caution: Spillages may occur if the mixing speed is increased too quickly. (FIG.9A)

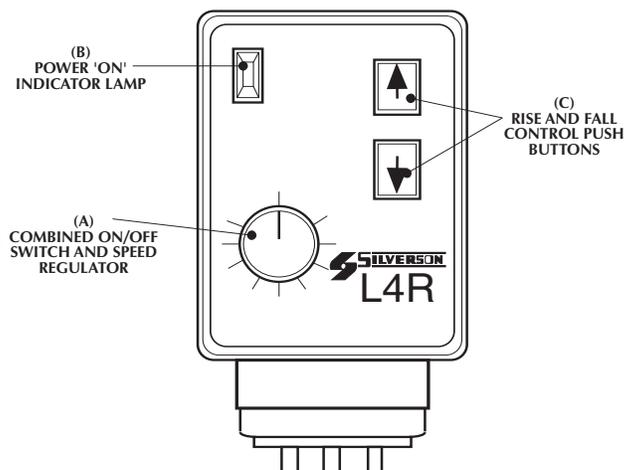
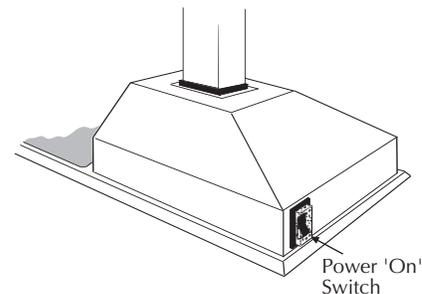
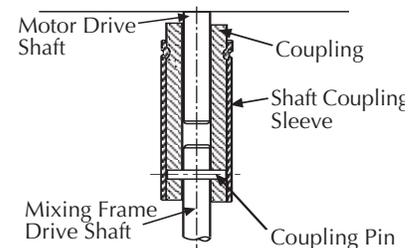


Fig. 8 Operating the Mixer

* See following page for views showing the L4RT and the L4RT-A Models.

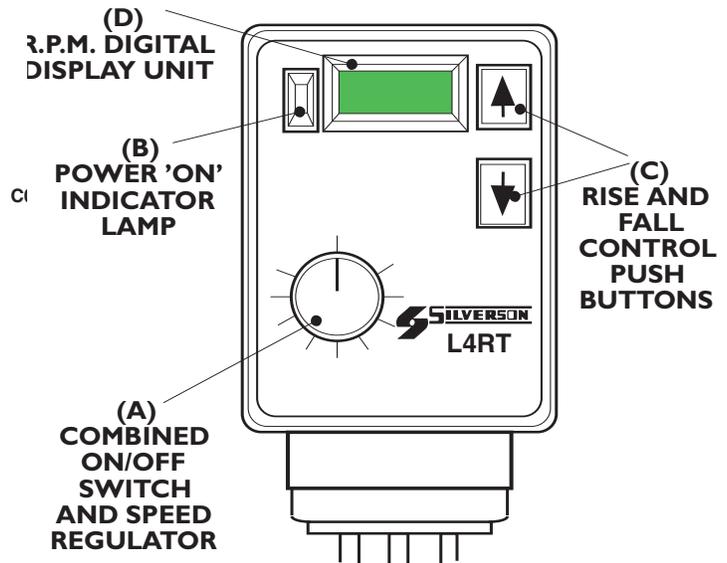
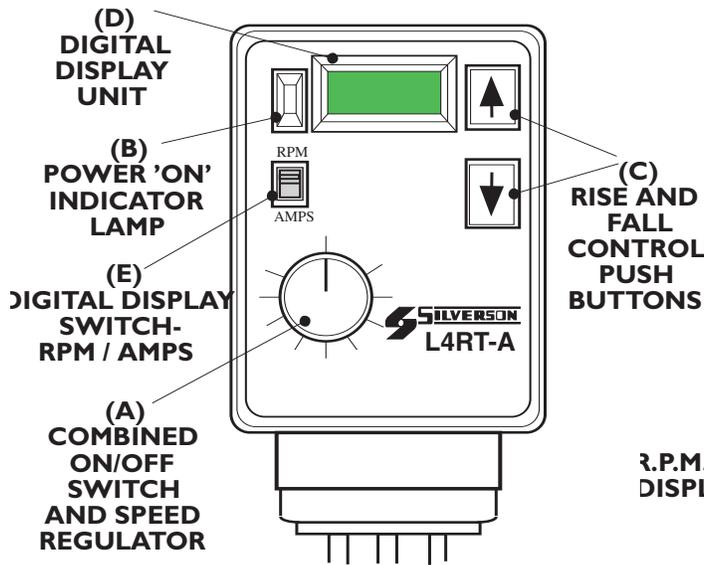
5.1.5 Should the electrical supply to the mixer be cut at any time an automatic cut-out device will activate causing the on/off rocker switch located at the rear of the Base assembly to switch into the 'off' position. This is to prevent accidents occurring should the electrical supply be re-connected while the mixer operator is unaware. To restart the mixer after a power supply failure follow the usual procedure listed above.

The mixer is designed for viscosities up to 10,000 centipoise approx. The motor maximum full load amp draw is 6.1 amps.



NOTICE: Continuous running above 6.1 amps can result in motor damage.

Note: The L4RT-A model allows you to constantly monitor the motor amps.



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury. **NOTICES** are given to alert to situations which may result in damage to the Mixer.

5.0 OPERATION



5.2 GENERAL GUIDELINES FOR MIXING (Refer to Figs. 9)

The following guidelines are designed to help you get the best results from your Silverson mixer. Due to the vast range of mixing operations for which your mixer can be used, it is impossible to cover every eventuality and the ideal mixing technique for your particular product will probably only be found after some experimentation. Should you require further advice then please contact Silverson Machines or their accredited agents who will be happy to help you achieve your required mixing results.

5.2.1 Positioning the Stator

The position of the stator within the vessel can affect the mixing performance of the machine. The recommended initial position is slightly off centre with the head/screen approximately 1"-2" (3-4 cms) off the bottom of the vessel.

A centrally positioned stator (FIG.9A) results in a deeper vortex and may cause aeration, splashing or spillage in less viscous mixes. Moving the head/screen off centre (FIG 9B) produces a smaller vortex enabling the mixer to operate at higher speeds without splashing or spillage.

The mixer head/screen can be raised or lowered to assist the movement of the surface liquid as the viscosity increases or decreases.

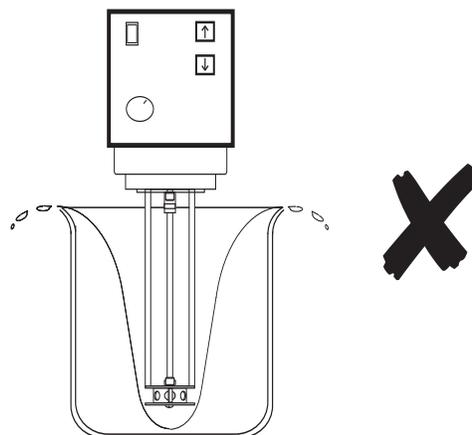


Fig.9A



CAUTION: Spillages may occur if the mixing speed is increased too quickly. (FIG.9A)

5.2.2 Setting the speed

Generally, the mixer should be run at the highest speed possible without causing excessive aeration, splashing or spillage. High speeds will give faster mixing times and the best end-results in terms of particle or globule size reduction. Reducing the speed reduces the mixing efficiency.

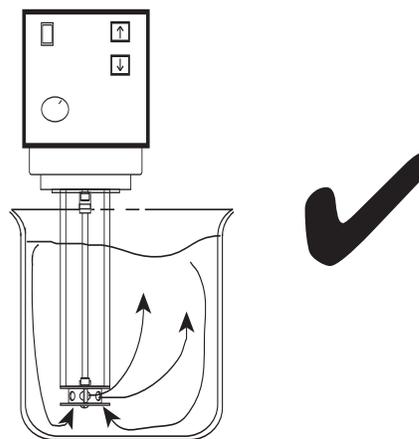


Fig.9B



WARNING: DO NOT USE THE MACHINE IN A HAZARDOUS AREA WHERE A FLAMMABLE OR EXPLOSIVE ATMOSPHERE MAY BE PRESENT. THIS MACHINE IS NOT EXPLOSION PROOF / FLAME PROOF.

5.3 DISINTEGRATING LARGE SOLIDS & AGGLOMERATES INTO LIQUIDS

*Note: If the particle size of the solids is too large for the standard mixing assembly they should be reduced in size prior to mixing. Alternatively, using a *Duplex mixing assembly could be considered.*

Recommended Stator: *General Purpose Disintegrating Head or Slotted Disintegrating Head (optional extra). *See also the Duplex Mixing Assembly.*

- A:** Lower mixing assembly into the liquid
- B:** Turn machine on
- C:** Increase speed to maximum without splashing
- D:** Ensure you have a suitable flow pattern
- E:** Add solids quickly but in a controlled manner. NB: Avoid pouring the solids onto the metal parts
- F:** Increase speed as the viscosity increases
- G:** Run until desired end-result is achieved

5.4 DISPERSING POWDERS INTO LIQUIDS

(See also Duplex mixing assembly)

Recommended Stator: *General Purpose Disintegrating Head or Square Hole High Shear Screen if particle size reduction is required.*

Method is as 5.3 above.

5.5 SMALL SOLID PARTICLE SIZE REDUCTION

Recommended Stator: *Square Hole High Shear Screen*

Method is as 5.3 above.

5.6 DISINTEGRATING SOLIDS INTO LIQUIDS

Recommended Stator: *General Purpose Disintegrating Head or Square Hole High Shear Screen . *See also the Duplex Mixing Assembly.*

Method is as 5.3 above.

5.7 BLENDING

Recommended Stator: *General Purpose Disintegrating Head*

Note: Add higher viscosity liquid into lower viscosity liquid where practical.

- A:** Lower mixing assembly into the liquid
- B:** Turn machine on
- C:** Increase speed to maximum without splashing
- D:** Ensure you have a suitable flow pattern
- E:** Add liquids quickly but in a controlled manner
- F:** Increase speed as the viscosity increases
- G:** Run until desired end-result is achieved



5.0 OPERATION



5.8 DISPERSING GUMS & THICKENERS

(See also Duplex mixing assembly)

Recommended Stator: *General Purpose Disintegrating Head or Square Hole High Shear Screen.*

- A:** Lower mixing assembly into the liquid
- B:** Turn machine on
- C:** Increase speed to maximum without splashing
- D:** Ensure you have a suitable flow pattern
- E:** Add gums & thickeners quickly but in a controlled manner. Do not add them slowly. NB: Avoid pouring the solids onto the metal parts
- F:** Increase speed as the viscosity increases

5.9 EMULSIONS

Recommended Stator: *Square Hole High Shear Screen or Emulsor Screen.
Fine Emulsor Screen - optional extra.*

Common emulsions are either oil into an aqueous phase or an aqueous phase into oil. An emulsification agent is required in order to produce a stable product.

- A:** Lower the mixing assembly into the continuous phase (water for an oil in water emulsion or oil for a water in oil emulsion).
- B:** Turn machine on
- C:** Increase speed to maximum without splashing
- D:** Ensure you have a suitable flow pattern
- E:** Add suspended phase (oil for an oil in water emulsion or water for a water in oil emulsion)
- F:** Increase speed as the viscosity increases
- G:** Run until desired end-result is achieved
- H:** The longer the mixer operates the more uniform the suspended particle size will be

5.10 TISSUE HOMOGENISATION

Use: Tubular mixing assembly with integral open ended Slotted Disintegrating Head

- A:** Add solids into liquid
- B:** Raise mixing container up to the mixing assembly
- C:** Ensure mixing assembly is submerged in the liquid
- D:** Position solids so they are at the base of the mixing assembly - just below the Slotted Disintegrating Head teeth
- E:** Turn machine on
- F:** Increase speed to maximum without splashing
- G:** Run until desired end-result is achieved

5.11 TUBULAR MIXING ASSEMBLIES

Operation as Standard Mixing Assembly.

5.12 LABORATORY DUPLEX MIXING ASSEMBLY

5.12.1 The Duplex differs from the standard mixing assembly in having two heads facing in opposite directions; the upper head pulls materials down from the surface of the mix, while the lower head/screen draws material up from the base of the mixing container.

The upper Coarse Tooth Disintegrating Head is designed to chop solid materials into small pieces and then expel them beneath the shroud. The lower head/screen simultaneously draws in these partially disintegrated solids and reduces their size further.

This combined use of two heads makes the Duplex ideal for applications where light or buoyant material (powders, rubbers and polymers, etc.) needs to be drawn down from the surface of a mix and rapidly dispersed. The added movement afforded by the two heads makes the Duplex ideal for use on high viscosity materials.

5.12.2 Typical Applications:

- ¥ Rapid solution of rubbers and polymers into lubricating oils, non flammable solvents and asphalt for the product of luboils, adhesives and bituminous compounds.
- ¥ Disintegration and dissolving solid resin for the production of varnish.
- ¥ Vegetable and meat pur e/slurries.
- ¥ Addition of powders into high viscosity liquids.

5.13 IN-LINE MIXING ASSEMBLY



NOTICE: The In-Line Mixing Assembly is suitable for use at atmospheric pressure only. Product should be pumped into an open vessel.



NOTICE: The In-Line mixing chamber must always be filled so that fluid covers the entire working head/screen and the bearing bushing **BEFORE** the machine is switched on. If this precaution is not observed overheating and seizure of the shaft will result. **NEVER** allow the machine to run "dry". The manufacturer will not accept responsibility for damage if this precaution is not observed.

A: Connect the suction tubing (minimum of 1/2" I.D.) to the bottom inlet and clamp tightly. This connection must be air tight to avoid introducing air into the fluid mixture and to prevent breaking the suction flow of the mixing chamber. Connect similar discharge hose of sufficient length and diameter to the outlet.

B: Fill the quench cup with sufficient coolant/lubricating fluid to cover the seal elements.

Note: A fluid compatible to that being mixed should be used.

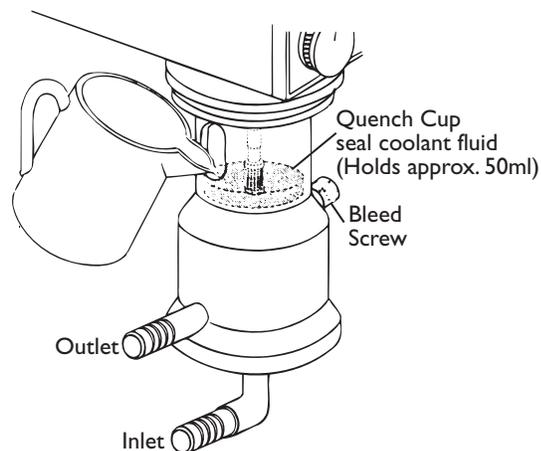
C: Best results are obtained using a beaker/vessel with a side/bottom outlet as a supply vessel.

D: Ensure liquid level in the supply beaker/vessel is above the level of the In-line assembly

E: Open bleed screw on the top right side of the mixing chamber to vent air while filling the suction line and mixing chamber.

F: Check that the coupling pin and sleeve are in place. Rotate the shaft by hand to ensure that everything rotates freely.

G: Turn mixer on and increase speed to maximum.
CONTINUED .../



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury. **NOTICES** are given to alert to situations which may result in damage to the Mixer.

5.0 OPERATION



IN-LINE MIXING ASSEMBLY Contd.../...

H: Ensure satisfactory circulation. You may want to install a flow control valve on the discharge side of the mixer to control the rate of flow and processing.

NOTICE: Do not add a control valve to the the supply side.

I: Add additional ingredients either directly into the beaker/vessel or into the In-line mixer assembly inlet by means of a laboratory pump.

Note: High viscosity materials can be mixed by using a laboratory pump to feed them into the In-line mixer assembly.

5.14 CLEANING

5.14.1 The L4R Mixer is in most cases self cleaning, a short run between successive mixing operations in water, detergent or an appropriate non-flammable solvent should be all that is necessary to clean the wetted parts. For more thorough cleaning, dismantling is easy and downtime minimal.

5.14.2 The housing and wetted parts can be cleaned with household cleaning agents providing that they do not contain solvents and are non-scratching. Do not scour the parts with sharp objects.



WARNING: IF IT IS NECESSARY TO USE FLAMMABLE SOLVENTS TO CLEAN MIXED PRODUCT OFF THE WETTED PARTS, THEN THE MIXING ASSEMBLY MUST BE REMOVED AND CLEANED IN A SAFE AREA, AWAY FROM THE MACHINE.



WARNING: THE MACHINE SHOULD NEVER BE SPRAYED WITH WATER OR IMMERSSED IN WATER.

5.15 CHANGING THE STATOR OF THE STANDARD MIXING ASSEMBLY

5.15.1 It is not necessary to remove the mixing assembly from the mixer body in order to interchange the stator.

5.15.2 Unscrew the knurled nuts and remove the base plate complete with the stator from the bearing plate.



WARNING: THE ROTOR BLADES MAY BE SHARP.

5.15.3 Exchange the stator as required.

5.15.4 Refit the base plate complete with the stator to the bearing plate and refit the knurled nuts.



NOTICE: When fitting a stator, note that there is a step or register in the underface of the bearing plate and the upper face of the base plate. It is important that both these surfaces and the edges of the replacement stator are clean and free of solid or dissolved materials. If cleanliness is not observed, the stator will not seat squarely and may foul the rotor.

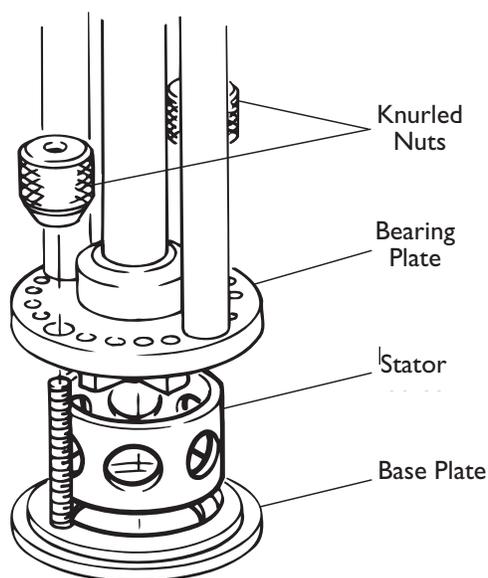


Fig.10 Changing the Stator

5.16 FITTING THE AXIAL FLOW HEAD TO THE STANDARD MIXING ASSEMBLY

- 5.16.1 It is not necessary to remove the mixing assembly from the mixer body in order to fit the axial flow head.
- 5.16.2 Unscrew the knurled nuts and remove the base plate complete with the stator from the bearing plate.



WARNING: THE ROTOR BLADES MAY BE SHARP.

- 5.16.3 Exchange the stator as required, locating it onto the inner register of the base plate.
- 5.16.4 Fit the axial flow head onto the outer register of the base plate.
- 5.16.5 Refit the base plate complete with the stator (as required) and the axial flow head to the bearing plate and refit the knurled nuts.



NOTICE: When fitting a stator, note that there is a step or register in the underface of the bearing plate and the upper face of the base plate. It is important that both these surfaces and the edges of the replacement stator are clean and free of solid or dissolved materials. If cleanliness is not observed, the head / screen will not seat squarely and may foul the rotor.

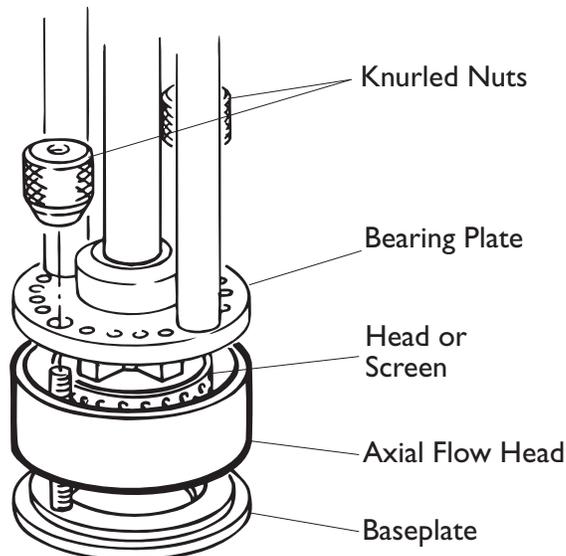


Fig.11 Fitting the Axial Flow Head

Notes:

1. The axial flow head is usually used in conjunction with a screen or disintegration head depending on the nature of the application.

2. If the axial flow circulation pattern is not required the axial flow head should be removed and processing carried out only with the appropriate stator.

*3. When the axial flow head is in use the motor speed should be reduced to a minimum when starting and gradually increased until the upward streams of liquid are just breaking the surface.



***WARNING: SEVERE AND POSSIBLY DANGEROUS SPILLAGE MAY OCCUR IF THIS PRECAUTION IS NOT TAKEN.**



5.0 OPERATION



OPTIONAL ACCESSORIES:

5.17 CHANGING THE STATOR ON TUBULAR MIXING ASSEMBLIES

NOTE: Stators can only be interchanged on certain 1" and 3/4" Tubular frames.

5.17.1 It is not necessary to remove the frame from the mixer body in order to interchange the stator.

5.17.2 The stator is removed by unscrewing from the base of tubular frame.

NOTE: The tubular frames have a left hand thread (To remove head/screen rotate in a clockwise direction when viewed from below)



Fig.12 Changing the Stator - Tubular Mixing Assemblies



WARNING: THE ROTOR BLADES AND STATOR MAY BE SHARP.

5.17.3 An alternative or replacement stator is fitted by reversing the above procedure.

5.18 CHANGING THE STATOR ON THE LABORATORY DUPLEX MIXING ASSEMBLY

THE LOWER STATOR:

5.18.1 It is not necessary to remove the duplex mixing assembly (1) from the mixer body in order to interchange the lower stator.

5.18.2 While supporting the head/screen, evenly unscrew the two slotted head screws (10) from the bearing housing and carefully lower the stator down over the lower rotor.



WARNING: THE ROTOR BLADES ARE SHARP.

5.18.3 An alternative lower stator is fitted by reversing the above procedure ensuring that the mating faces of the stator and bearing housing are clean.



CAUTION: When fitting a stator it is important that mating surfaces are clean and free of solid or dissolved materials. If cleanliness is not observed, the stator will not seat squarely and may foul the rotor.

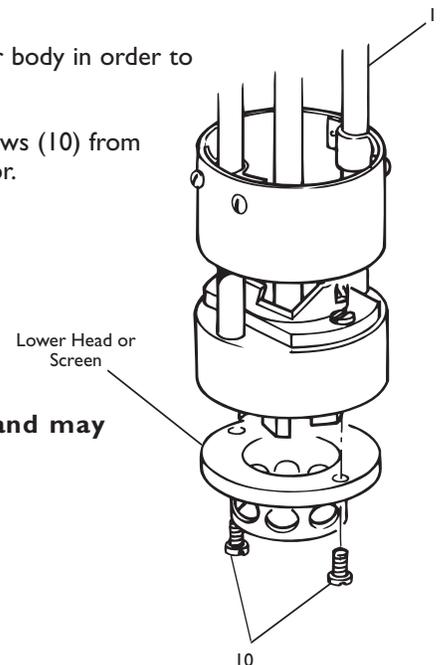


Fig.13 Changing the Lower Stator - Duplex



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury
NOTICES are given to alert to situations which may result in damage to the Mixer.

5.18 CHANGING THE STATORS ON THE LABORATORY DUPLEX MIXING ASSEMBLY

THE UPPER STATOR:

- 5.18.4 To remove the upper stator the duplex mixing assembly (1) must be detached from the mixer body - refer to the initial set up section of this Manual.
- 5.18.5 If the location of the shroud (7) obstructs the removal of the stator slacken the four screws (9) and carefully slide the shroud up the frame (1). Re-tighten the four screws to retain.

NOTE: It may be useful to note the position of the shroud (7) prior to moving it.

- 5.18.6 Slacken the two grub screws which retain the upper rotor to the drive shaft and withdraw the shaft through the bearing plate. Take care to retain the upper rotor once it is disengaged from the shaft.
- 5.18.7 Evenly unscrew the two slotted head screws (10) from the bearing housing and carefully raise and withdraw the stator from the frame (1).
- 5.18.8 An alternative upper stator is fitted by reversing the above procedure ensuring that the mating faces of the stator and bearing housing are clean.
- 5.18.9 Refit the drive shaft and upper rotor ensuring that the rotor is correctly positioned and secured firmly by the two retaining grub screws.
- 5.18.10 Re-position the shroud (7) if previously moved or displaced.
- 5.18.11 Refit the duplex mixing assembly (1) to the mixer body - refer to Para. 4.3



NOTICE: When fitting a stator it is important that mating surfaces are clean and free of solid or dissolved materials. If cleanliness is not observed, the stator will not seat squarely and may foul the rotor.

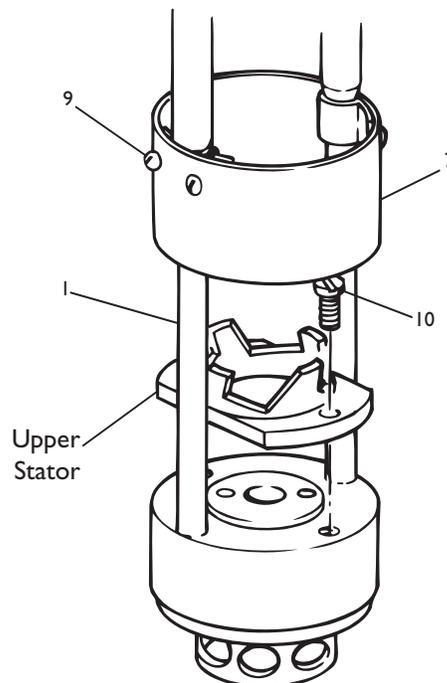


Fig.14 Changing the Upper Stator - Duplex



5.0 OPERATION

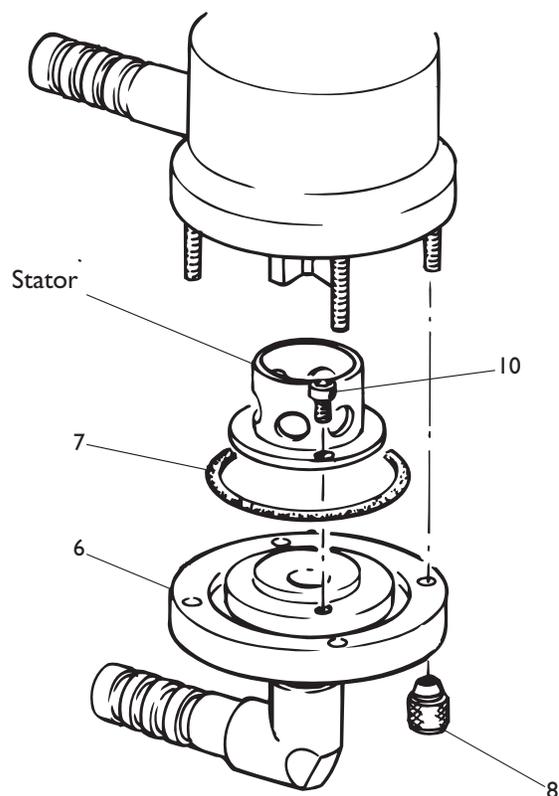


OPTIONAL ACCESSORIES -

5.19 LABORATORY IN-LINE MIXING ASSEMBLY - CHANGING THE STATOR

- 5.19.1 It is not necessary to remove the In-Line unit from the mixer body in order to interchange the stator.
- 5.19.2 While supporting the stator mounting plate (6) remove the four knurled nuts (8)
- 5.19.3 Carefully lower the mounting plate (6) vertically to avoid the stator striking the rotor blades.
- 5.19.4 Remove the two cap head screws (10) retaining the head/screen to the mounting plate (6).
- 5.19.5 Exchange the stator as required.
- 5.19.6 Inspect the 'O' ring (7) for wear and replace if necessary.
- 5.19.7 Reassemble the in-line unit by applying the above removal procedure in reverse.

CAUTION: When fitting a stator, note that there is a step or register in the underface of the mounting plate (6). It is important that these surfaces and the edges of the replacement stator are clean and free of solid or dissolved materials. If cleanliness is not observed, the stator will not seat squarely and may foul the rotor.



**Fig.15 Changing the Head/Screen
Laboratory In-Line Mixing Assembly**

6.0 MAINTENANCE PROCEDURES



WARNING: ALWAYS ISOLATE THE MACHINE FROM THE ELECTRICAL SUPPLY BEFORE PERFORMING MAINTENANCE PROCEDURES.

6.1 REPLACING THE BUSHING

All mixing assemblies have bushing (bronze alloy or PTFE). This bearing bushing is lubricated and cooled by the product being mixed. During operation the entire workhead/screen and bearing bushing must always be immersed in the fluid being mixed. Failure to do so will result in rapid overheating and seizure of the shaft.

The bushing is a wearing part which needs to be replaced at periodic intervals depending on the characteristics of the mix.

The bushing must be regularly inspected for signs of wear and replaced when necessary. Where there is any perceptible movement of the shaft within the bushing, the bushing should be replaced.



CAUTION: Failure to replace the bushing when required will cause considerable damage to the Mixer.

Note: Prior to carrying out the following instructions the mixing assembly must be disassembled and the drive shaft and rotor removed; specific instructions for the disassembly of each of the mixing assembly are given in the following paragraphs. Turn the mixing frame thro' 180; so that the bearing plate is uppermost.

PTFE BUSHING

6.1.1 The PTFE bushing (3) is a press-fit and can be easily prised out or pushed into the bearing plate.

BRONZE ALLOY BUSHING

6.1.2 Insert the *tool into the bushing so that the shoulder of the tool seats squarely onto the face of the bushing. Using a soft head (ie. rubber or hide) mallet tap the *tool through the bearing plate until the bushing is clear of the housing.

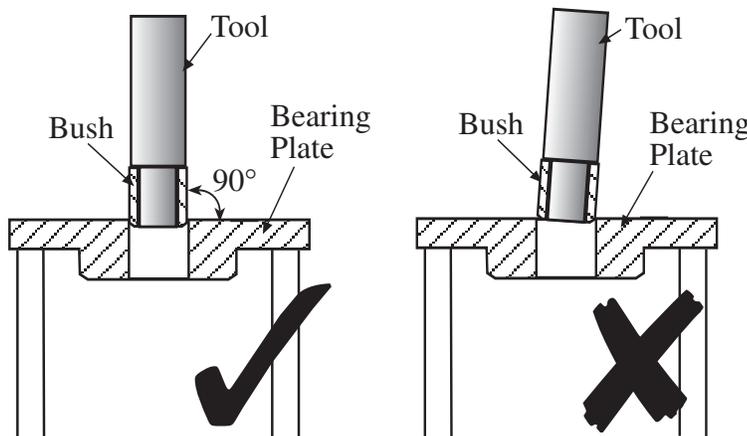


NOTICE: Take extreme care not to strike or scratch the mixing assembly.

6.1.3 Fit the replacement bronze alloy bushing over the *tool and position the bushing so that the leading, tapered edge is against the hole of the bearing plate. Using a soft head (ie. rubber or hide) mallet tap the bushing squarely into position taking great care not to strike or scratch the mixing assembly. It is imperative that the bushing is fitted squarely into the bearing plate.



NOTICE: If the bushing is not straight as it begins to enter the bearing plate remove it and discard; the bushing may not straighten itself as it is tapped fully home and will result in more serious damage due to the shaft not running true.



* Silverson Machines Tool Part Number SD505 (Standard)

* Silverson Machines Tool Part Number SD519 (3/8" Mini Micro Mixing Assembly only)



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury. **NOTICES** are given to alert to situations which may result in damage to the Mixer.

6.0 MAINTENANCE



6.2 REPLACING THE BUSHING OF THE STANDARD MIXING ASSEMBLY

6.2.1 With the mixing assembly removed from the Mixer unscrew the knurled nuts (6), remove the base plate (5) complete with the stator from the bearing plate.



WARNING: THE ROTOR BLADES MAY BE SHARP.

6.2.2 The drive shaft and rotor (2) can now be withdrawn from the frame through the bearing plate.

6.2.3 Remove and fit a replacement bushing (3 or 4) with reference to Paragraph 6.1.

6.2.4 Refit the drive shaft and rotor (2) into the mixing assembly.

NOTE: Inspect the condition of the drive shaft and rotor assembly (2) ; a replacement assembly should be fitted if there are signs of wear or damage.

6.2.5 Refit the base plate (5) complete with the stator to the bearing plate and refit the knurled nuts (6).



NOTICE: When fitting a stator, note that there is a step or register in the underface of the bearing plate and the upper face of the base plate (5). It is important that both these surfaces and the edges of the replacement stator are clean and free of solid or dissolved materials. If cleanliness is not observed, the head / screen will not seat squarely and may foul the rotor.

6.2.6 Refit the mixing frame to the mixer body (Ref. to Para.. 3.3)

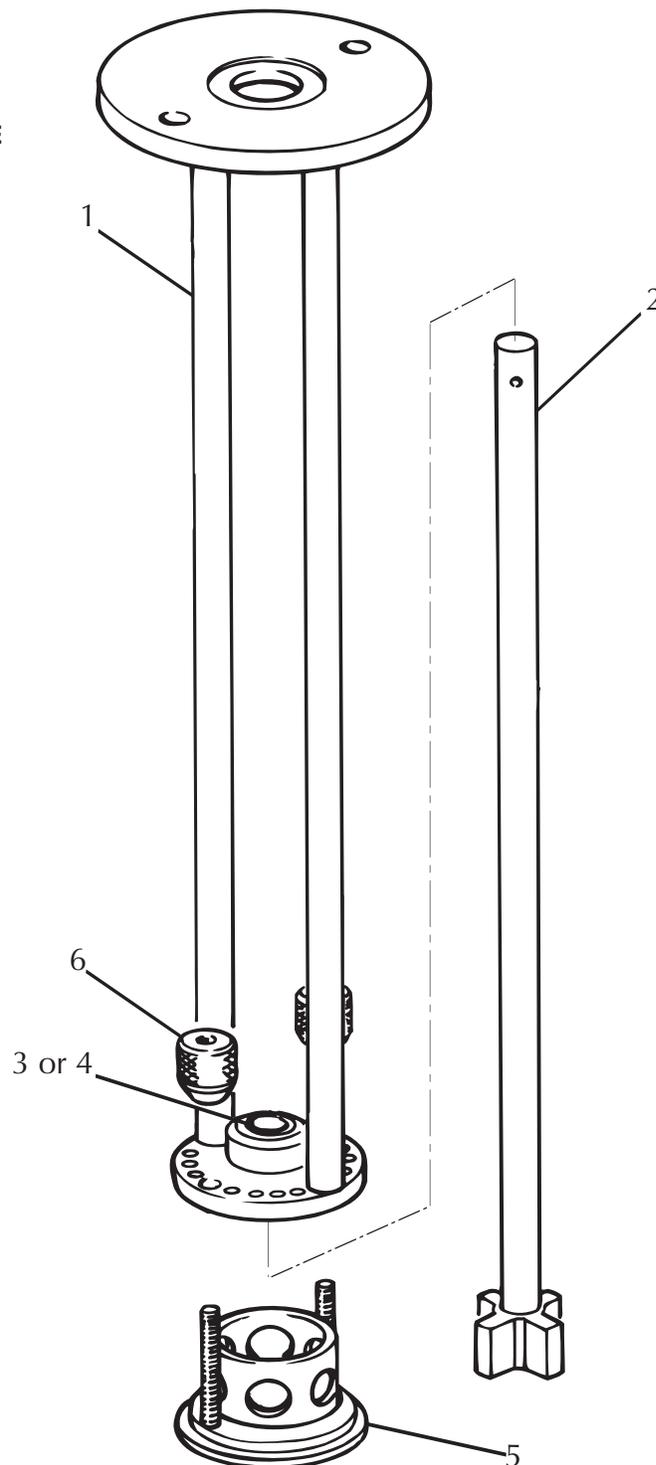


Fig.16 Replacing the Bushing of the Standard Mixing Assembly



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury
NOTICES are given to alert to situations which may result in damage to the Mixer.

6.3 REPLACING THE BUSHING OF THE 1", 3/4" and 5/8" TUBULAR MIXING ASSEMBLIES

- 6.3.1 Remove the stator from the tubular frame (1). (Refer to Para. 5.17)
- 6.3.2 Remove the tubular mixing assembly from the mixer body taking extra care to support the shaft and rotor (2) upon removal of the coupling pin. (Refer to Para. 3.3)



WARNING: THE ROTOR BLADES MAY BE SHARP.

- 6.3.3 The drive shaft and rotor (2) can now be withdrawn from the mixing assembly through the bushing (3 of 4).

6.3.4 PTFE BUSHING

The PTFE bushing (3) is a press-fit and can be easily prised out or pushed into the bearing plate.

BRONZE ALLOY BUSHING

Remove the existing bronze alloy bushing (4) by inserting a bar of suitable diameter through the top of the mixing frame (1) and carefully tapping the bushing clear, take care not to strike or scratch the mixing assembly.

Fit the replacement bronze alloy bushing (4) over the *tool and position the bushing so that the leading, tapered edge is against the hole of the bearing plate. Using a soft head (ie. rubber or hide) mallet tap the bushing squarely into position taking care not to strike or scratch the mixing assembly.

- 6.3.5 Refit the drive shaft and rotor (2) into the mixing assembly.

NOTE: Inspect the condition of the drive shaft and rotor assembly (2) ; a replacement assembly should be fitted if there are signs of wear or damage.

- 6.3.6 Refit tubular mixing assembly to the mixer body. (Refer to Para. 3.3)

- 6.3.7 Fit a stator as required. (Refer Para. 5.17)

* Silverson Machines Tool Number SD505.

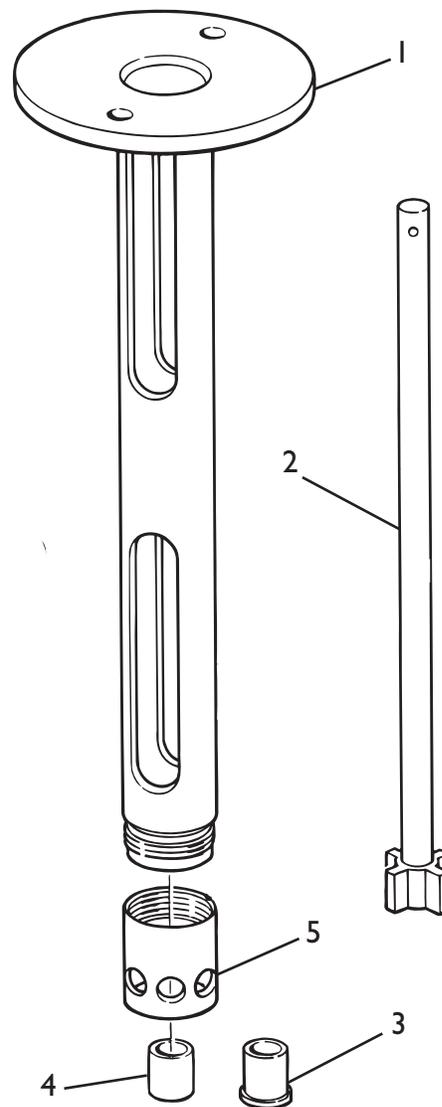


Fig.17 Replacing the Bushing of the 1 , 3/4 & 5/8 Tubular Mixing Assemblies



6.0 MAINTENANCE



6.4 REPLACING THE BUSHING OF THE 3/8" MINI-MICRO TUBULAR MIXING ASSEMBLY

6.4.1 Remove the tubular mixing assembly from the mixer body. (Refer to Para. 3.3)

6.4.2 With the rotor removal rod* inserted through the hole in the top of the drive shaft (2) locate the rotor removal tool* over the blades of the rotor (4). Using the rod* as a locking bar against the sides of the frame apertures, rotate the tool* to unscrew the rotor from the shaft. Once separated, the rotor (4) can be removed from the bottom of the tubular frame.

The shaft (2) is then withdrawn through the top of the frame.



WARNING: THE ROTOR BLADES MAY BE SHARP.

6.4.3 PTFE BUSHING

The PTFE bushing (3) is a push-fit and can be easily prised out or pushed into the bearing plate.

6.4.4 Refit the drive shaft and rotor (2) into the mixing assembly.

NOTE: Inspect the condition of the drive shaft and rotor assembly (2) ; a replacement assembly should be fitted if there are signs of wear or damage.

6.4.5 Refit tubular mixing assembly to the mixer body. (Refer to Para. 3.3)

****The rotor removal rod and tool are supplied with the tubular frame.**

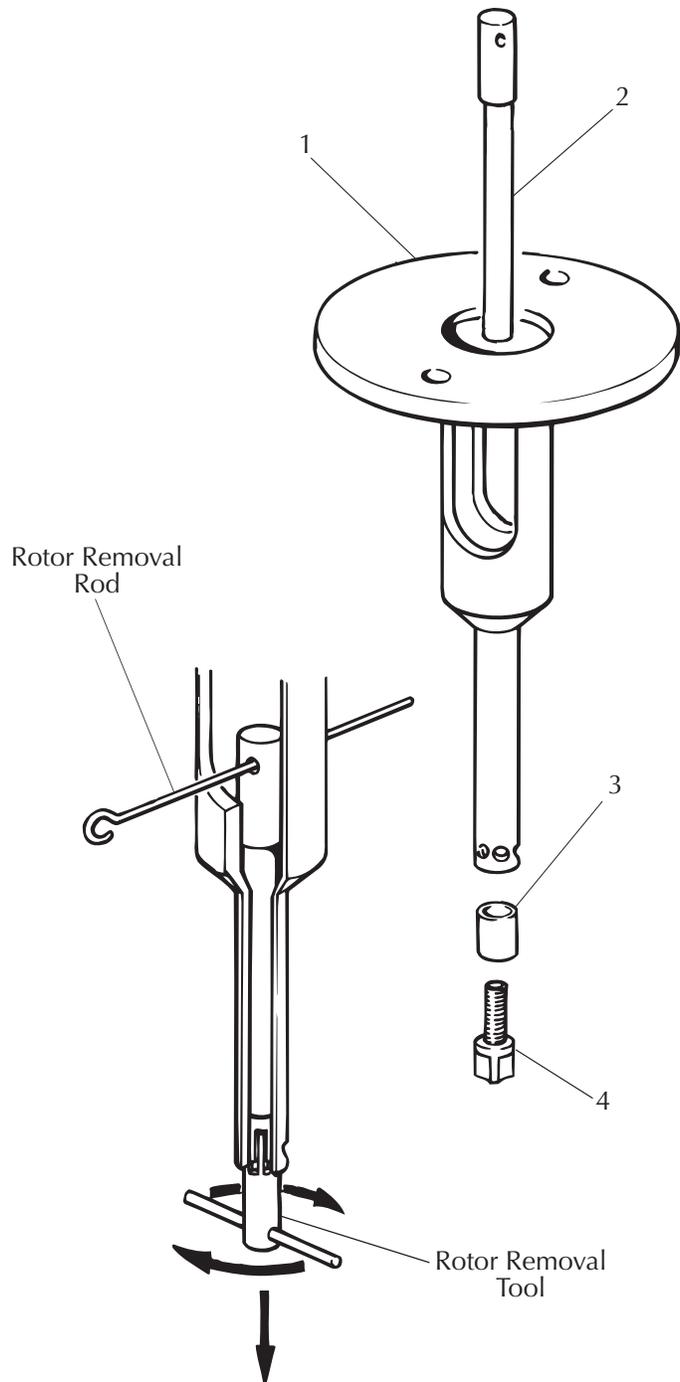


Fig.18 Replacing the Bushing of the 3/8 Mini-Micro Tubular Mixing Assembly



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury
NOTICES are given to alert to situations which may result in damage to the Mixer.

6.5 REPLACING THE BUSHING OF THE LABORATORY DUPLEX MIXING ASSEMBLY

6.5.1 Remove the duplex mixing assembly from the Mixer body, refer to Para. 3.3, taking care to support the drive shaft and rotors assembly (2) upon removal of the shaft retaining pin until the upper rotor (5) rests on the bearing housing.

6.5.2 The shroud (7) may be removed to increase accessibility:- Detach the two mounting brackets (8) by removing the four retaining screws (9) and slide the shroud (7) down over the bearing housing.

NOTE: Measure and record the position of the shroud (9) prior to displacement.

6.5.3 Slacken the two set screws (6) securing the upper rotor (5) until the rotor slides freely upon the drive shaft (2) and withdraw the drive shaft and lower rotor through the bearing plate. Take care to retain the upper rotor (5) once disengaged from the shaft.



WARNING: THE ROTOR BLADES ARE SHARP.

6.5.4 Remove the upper and lower stators - Refer to Para. 5.18

6.5.5 Remove and fit replacement bushings (3 or 4) with reference to Paragraph 6.1.

6.5.6 Refit the upper and lower stators - Refer to Para. 5.18

6.5.7 Refit the drive shaft and lower rotor (2) into the mixing assembly (1) and refit the upper rotor (5) by applying the removal procedure described in Para. 6.5.3 above, in reverse. Ensure that the screws are tight.

NOTE: Inspect the condition of the drive shaft and rotors (2 and 5) ; replacement parts should be fitted if there are signs of wear or damage.

6.5.8 Refit the shroud (7).

6.5.9 Refit the duplex mixing assembly to the mixer body. (Refer to Para. 3.3).

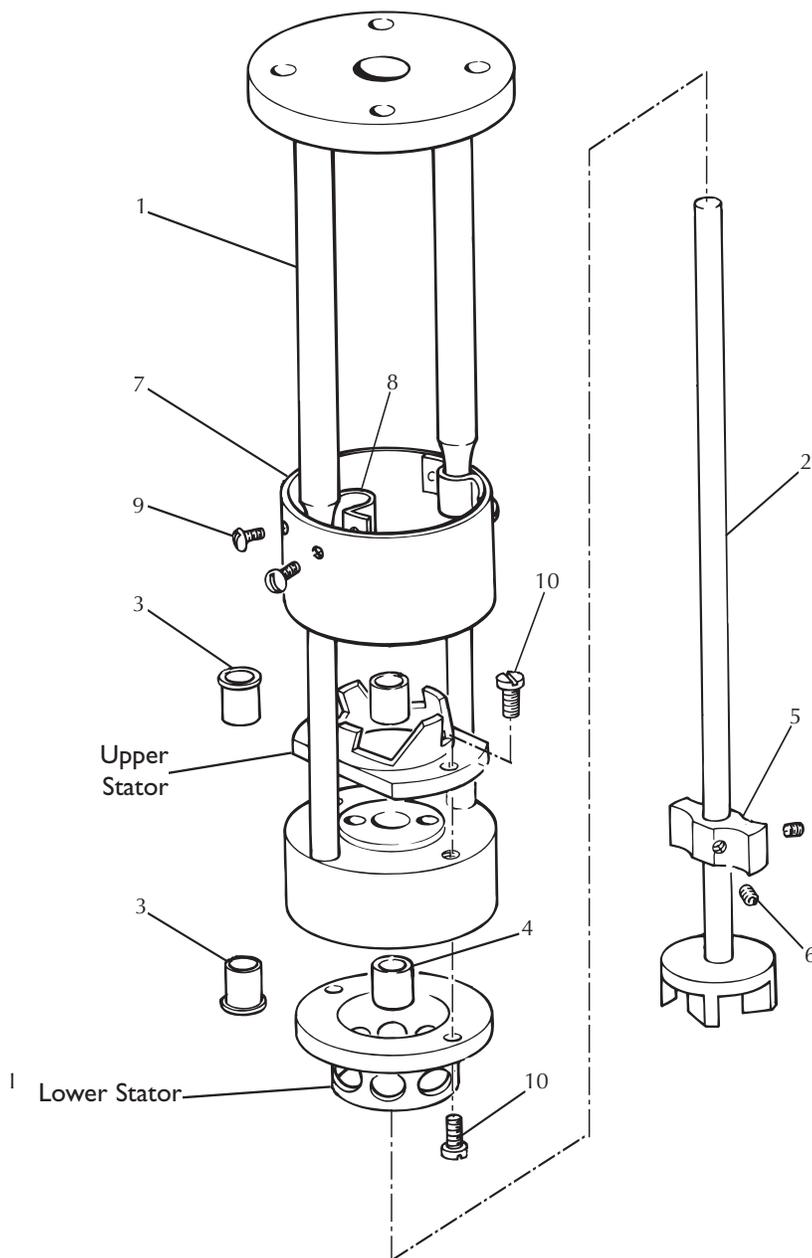


Fig.19 Replacing the Bushing of the Duplex Mixing Assembly



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury. **NOTICES** are given to alert to situations which may result in damage to the Mixer.

6.0 MAINTENANCE



6.6 REPLACING THE BUSHING OF THE LABORATORY IN-LINE MIXING ASSEMBLY. (SEE FIG. 20).

- 6.6.1 Remove the In-Line mixing assembly from the Mixer body, refer to Para. 3.3
- 6.6.2 Turn the In-Line mixing assembly thro' 180° and stand on its mounting flange. Remove the four knurled nuts (8).
- 6.6.3 Carefully raise the mounting plate (6) vertically to avoid the stator (14) striking the rotor blades. Retrieve the 'O' ring (7).
- 6.6.4 Insert the rotor removal rod* through the hole in the top of the drive shaft (2) and locate the rotor removal tool* over the blades of the rotor (5). Using the rod* as a locking bar against the sides of the In-Line body apertures, rotate the tool* to unscrew the rotor from the shaft; this is a standard right hand thread. Once separated, the rotor (5) is withdrawn out of the bottom of the In-Line body (1), the shaft (2) can be withdrawn through the top of the In-Line body complete with the rotating section of the mechanical shaft seal (11).



WARNING: THE ROTOR BLADES MAY BE SHARP.

- 6.6.5 Detach the bearing housing (9) from the lower body cavity by removing the two cap head screws (24). Remove and fit a replacement bushing (3 or 4) with reference to Paragraph 6.1. Refit the bearing housing (9) ensuring that mating surfaces are clean.
- 6.6.6 Inspect the mechanical shaft seal (11) for signs of physical damage or uneven wear and replace if necessary - refer to Para. 5.26
- 6.6.7 Refit the drive shaft (2) and rotor (5) into the mixing assembly by applying the removal procedure described in Para. 6.6.4 above, in reverse.

NOTE: Inspect the condition of the drive shaft and rotor assembly (2 and 5) ; a replacement assembly should be fitted if there are signs of wear or damage.

- 6.6.8 Locate the 'O' ring (7) into the mounting plate recess (6) and ensure that it is seated correctly, refit the mounting plate to the in-line body (1) and secure using the four knurled nuts (8).
- 6.6.9 Refit the In-Line mixing assembly to the Mixer body. (Refer to Para. 3.3)

* The rotor removal rod and tool are supplied with the laboratory In-Line mixer / homogeniser.

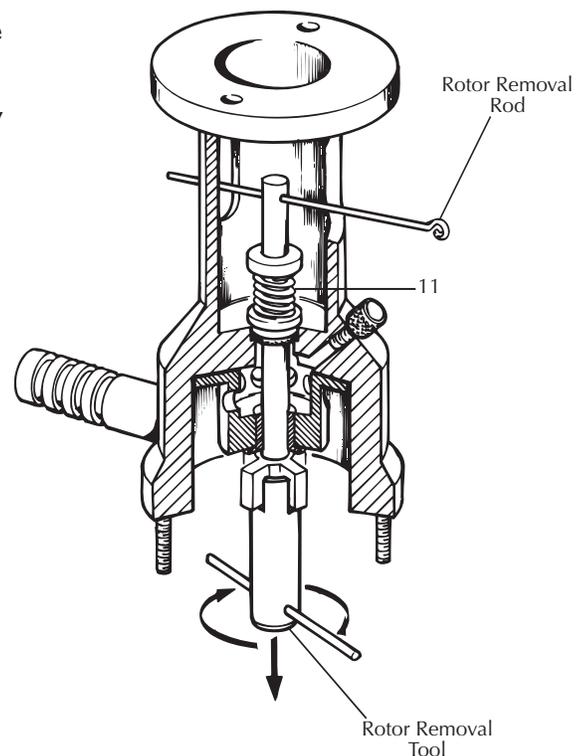
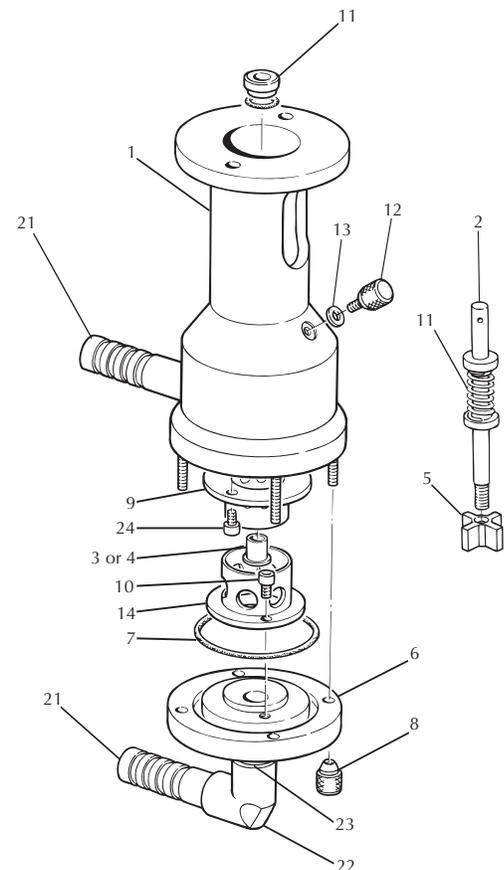


Fig.20 Laboratory In-Line Mixing Assembly

6.7 REPLACING THE MECHANICAL SHAFT SEAL OF THE LABORATORY IN-LINE MIXING ASSEMBLY (SEE FIG. 21).

- 6.7.1 Remove the drive shaft (2) and rotor assembly (5) from the In-Line body as described in Paragraphs 6.6; the upper rotating section of the mechanical shaft seal will remain on the drive shaft when withdrawn from the In-Line body (1).
- 6.7.2 Slide the upper rotating section of the mechanical shaft seal off the drive shaft (2).
- 6.7.3 Push the stationary seal seat section of the mechanical shaft seal and the seal seat 'O' ring out of the recess within the In-Line body using a bar of suitable diameter placed against the seal face. Take care not to strike or scratch the In-Line mixer body.
- 6.7.4 Fit the replacement seal seat 'O' ring into the recess within the In-Line body. Ensure the 'O' ring is seated against the lower face of the recess.
- 6.7.5 Locate the replacement stationary seal seat so that the smaller diameter of the seat locates into the 'O' ring.
- 6.7.6 Push the stationary seal seat squarely into the recess using finger pressure only until fully home.
- 6.7.7 Slide the replacement rotating section of the mechanical shaft seal onto the drive shaft so that the spring sits against the shaft shoulder. The spring seat should move freely upon the shaft (2) .
- 6.7.8 Refit the drive shaft (2) and reassemble the in-line unit with reference to Paragraphs 6.6.

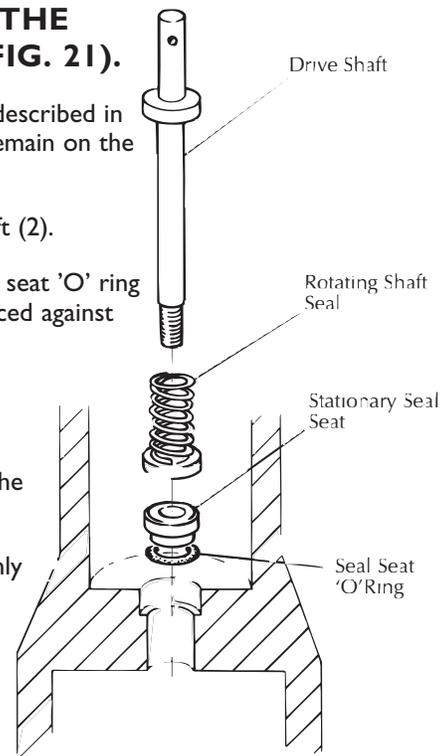


Fig.21 Replacing the Mechanical Shaft Seal of the Laboratory In-Line Mixing Assembly

6.8 GAINING ACCESS TO THE MIXER BODY INTERIOR IN ORDER TO CARRY OUT INSTRUCTIONS 6.9 & 6.10.

- 6.8.1 Remove the plastic cap (1) from the top of the column. The cap is a tight fit but can be removed by the application of hand pressure. Do not use tools which may scratch the column.
- 6.8.2 Remove the four screws (2) located at the corners of the black nylon dust seal (3).
- 6.8.3 Unscrew the four front bezel retaining screws (4) and remove the front bezel (5).
- 6.8.4 Remove the two upper screws (6) retaining the top cover (7) to the rear panel (8).
- 6.8.5 The top cover (7) can now be lifted clear of the column which will provide sufficient access to the motor. Take care not to lose the sealing strips (9).
- 6.8.6 If necessary, where further access is required to adjust the minimum speed control, carefully prise loose the front panel (10) and draw the panel forward taking extreme care not to over-stretch the wiring.
- 6.8.7 Reassemble the mixer body by applying the above removal procedure in reverse. Ensure that all electrical connections are secure.

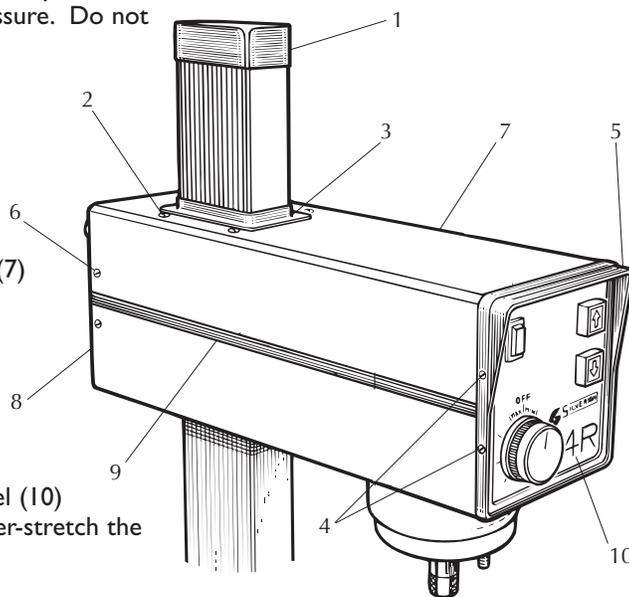


Fig.22 Gaining Access to the Mixer Body



DANGER, WARNING AND CAUTIONS are given to alert to hazardous situations which may result physical injury. **NOTICES** are given to alert to situations which may result in damage to the Mixer.

6.0 MAINTENANCE



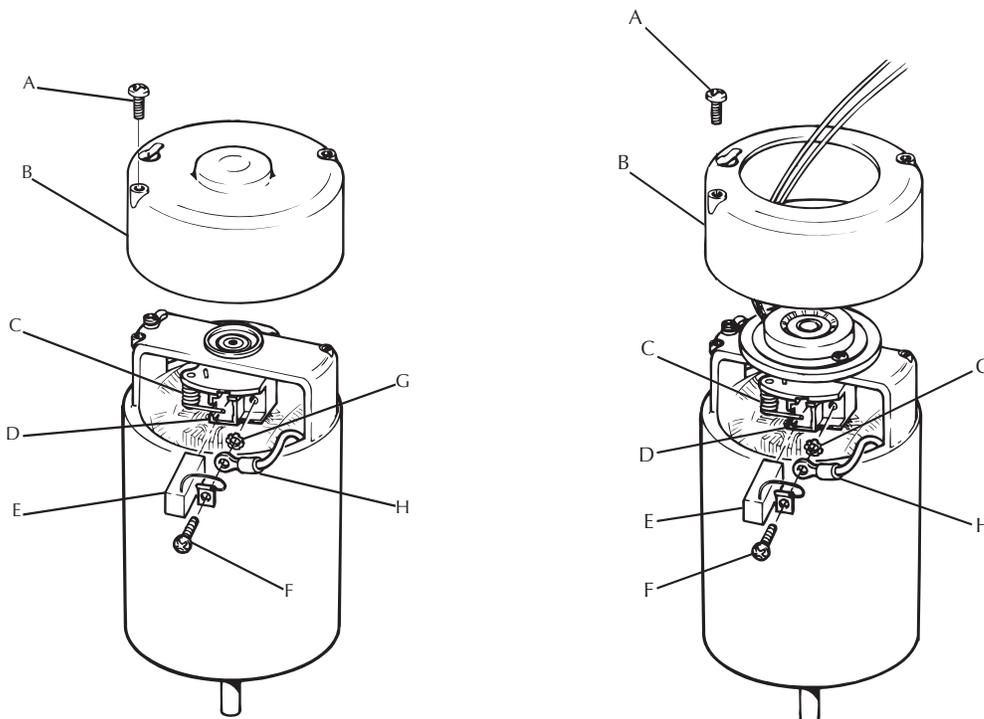
6.9 REPLACING THE MOTOR BRUSHES AND CLEANING THE MOTOR ARMATURE



WARNING: AVOID INHALATION OF CARBON DUST.

- 6.9.1 Gain access to the mixer body - Refer to Para. 6.8
- 6.9.2 Remove the two screws (A) retaining the black plastic brush inspection cover (B) and lift the cover clear of the motor.
- 6.9.3 Clean the armature and commutator area of the motor using a clean, dry air supply.
- 6.9.4 Carefully ease the brush springs (C) away from the brush holders (D) and into the "park" notches.
- 6.9.5 Withdraw the brushes (E) and inspect them for wear or damage. If less than 1/4" (6mm) of carbon remains, the brushes must be replaced as described in the following paragraphs. If brushes are in an acceptable condition reassemble the motor unit by applying the above removal procedure in reverse.
- 6.9.6 *Detach the brush leads by removing the pan head screw (F) taking care not to drop the screw down into the motor windings.
- 6.9.7 Remove the motor brushes (E).
- 6.9.8 Fit replacement motor brushes (E) and reassemble the motor unit by applying the above removal procedure in reverse.

**NOTE FOR REASSEMBLY: The pan head screws (F) also retain shakeproof washers (G) and wires (H). When fitting replacement brushes ensure that these items are refitted.*



The L4R Motor Assembly

The L4RT and L4RT-A Motor Assembly

Fig.23 Replacing the Motor Brushes

6.10 ADJUSTING THE MINIMUM SPEED CONTROL - L4R MODELS ONLY (REFER TO FIG. 23)

NOTE: THE SPEED CONTROL IS ONLY ADJUSTABLE ON THE L4R MODELS. IF A LOSS OF SPEED CONTROL IS EVIDENT ON THE L4RT AND L4RT-A MODELS PLEASE CONTACT SILVERSON MACHINES LTD. OR THEIR ACCREDITED REPRESENTATIVES



WARNING: THIS ADJUSTMENT MUST BE MADE WITH THE MACHINE DISCONNECTED FROM THE ELECTRICAL POWER SUPPLY.

NOTE: The solid-state motor speed control unit is an integral part of the combined on/off switch and master speed control mounted on the front panel. The trimmer potentiometer is located at the top of the unit and is used to vary the minimum speed of the mixer motor.

6.10.1 Gain access to the mixer body - Refer to Para. 6.8

6.10.2 Use a small screwdriver to make the adjustment in small incremental steps:

for both types; 'A' and 'B', turning the trimmer potentiometer **CLOCKWISE** will **DECREASE** the minimum speed, turning it **ANTI-CLOCKWISE** will **INCREASE** the minimum speed.

6.10.3 Reconnect the machine to the power supply after every adjustment and observe the effect obtained before disconnecting and making a further adjustment.

6.10.4 Repeat this procedure until the required minimum speed is obtained.

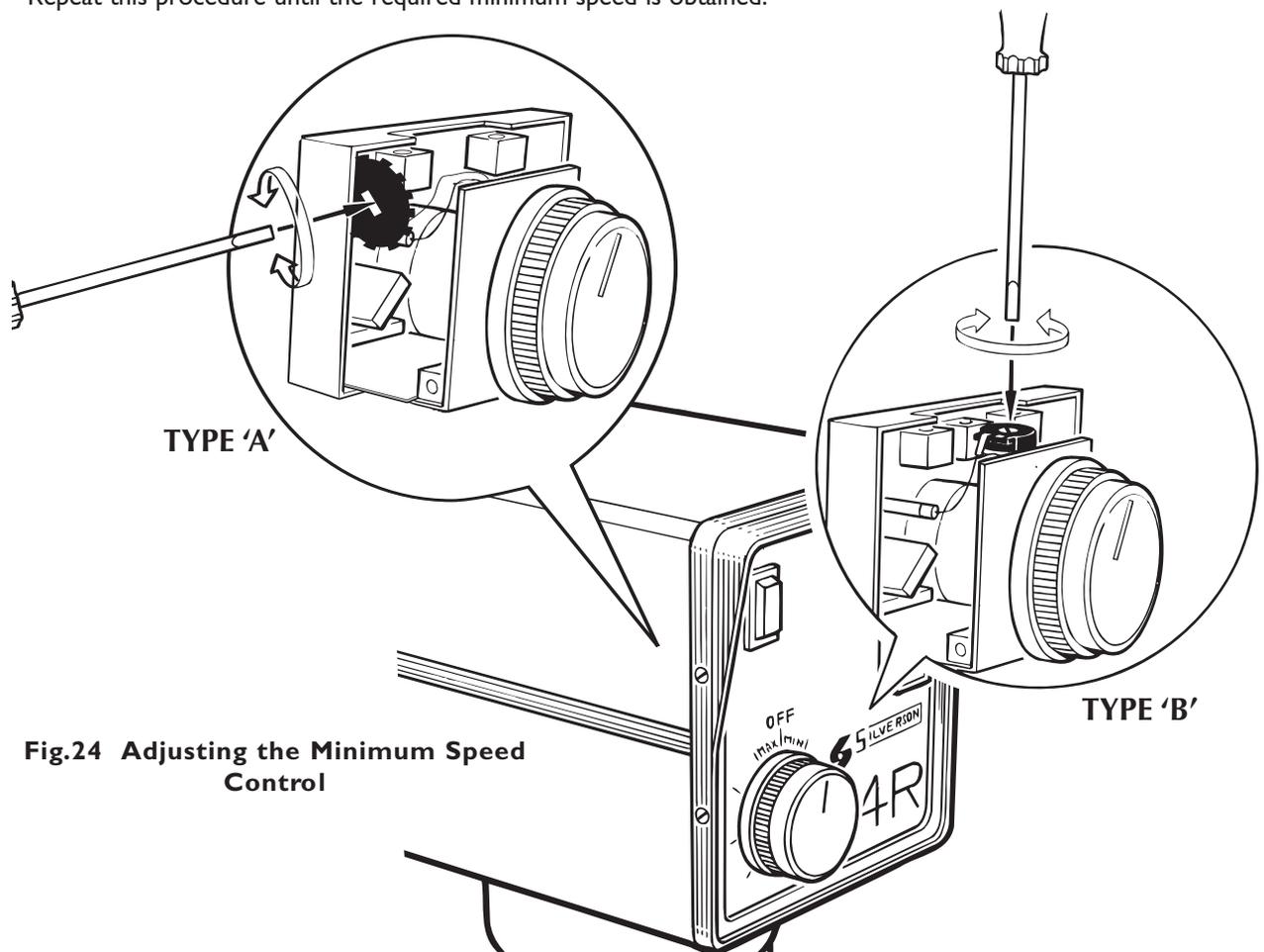


Fig.24 Adjusting the Minimum Speed Control



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6.0 MAINTENANCE



6.11 REPLACING THE FUSE

- 6.11.1 The fuse holder is located on the rear panel of the mixer body and is readily accessible without removing the panel.
- 6.11.2 Use a screwdriver to unscrew the fuse carrier from the holder.
- 6.11.3 Remove and fit a replacement fuse into the carrier. (Refer to Technical Specification for correct Ampere rating).
- 6.11.4 Refit the fuse carrier.



NOTICE: Ensure that the new fuse is of the correct rating (6.3 amp). If the fuse blows repeatedly, consult Silverson Machines Inc. or their accredited agent.

6.12 TROUBLE SHOOTING

The chart below is provided as an aid to tracing and correcting simple faults which may occur from time to time. Your L4R mixer was designed for a hard working life and Silverson Machines Inc. make every effort to ensure that your mixer is in perfect working order when it leaves the factory. The faults listed below are those which can occur as a result of normal wear and tear.

If you have any difficulty in solving a maintenance or servicing problem or prefer to have your mixer professionally maintained, please don't hesitate to consult Silverson Machines Limited or their accredited representatives.



WARNING: ALL ELECTRICAL MAINTENANCE SHOULD BE CARRIED OUT BY A QUALIFIED ELECTRICIAN.

- ✓ The remedy can be carried out by consulting the relevant section of this manual.
- ✗ The remedy should not be carried out prior to consulting Silverson Machines Inc. Specific Maintenance instructions are available upon request.
- ✚ The Mixer must be returned to Silverson Machines Inc. or their accredited agents for repair.

| FAULT | PROBABLE CAUSE | REMEDY |
|---|---|---|
| The power 'on' indicator lamp remains unlit when the mixer is switched on. | (i) The rear on/off switch is switched off. (ii) The indicator lamp is faulty (iii) The fuse has blown (iv) The electrical supply is faulty | ✓ (i) Switch the rear on/off switch to the 'on' position. ✓ ✗ (ii) If the mixer is otherwise fully operational replace the indicator lamp. ✗ 3 (iii) Replace the fuse. 3 (iv) Check the electrical supply |
| The power 'on' indicator lamp is lit but the rise / fall function is inoperative when push buttons are pressed. | (i) Failure of the limit switch (ii) The rise/fall chain is broken or jammed. (iii) Failure of the starter capacitor(s) | ✗ (i) Isolate the limit switch and test the mixer. If the mixer then becomes operational replace the limit switch. ✗ ✗ ✚ (ii) Return to Silverson Machines for repair. ✚ ✗ (iii) Replace the starter capacitor(s) |
| The power 'on' indicator light is lit but the mixer drive is inoperative when the speed control is operated | (i) The motor brushes are worn (ii) The coupling pin has not been fitted. (iii) The rotor is obstructed. (iv) Failure of the combined on/off and speed control unit. (v) Failure of the motor | ✓ (i) Inspect and replace the motor brushes. ✓ ✓ (ii) Fit the coupling pin. ✓ ✓ (iii) Inspect the rotor area and clear obstruction ✓ ✗ (iv) Replace the combined on/off and speed control unit. ✗ ✗ (v) Replace the motor |
| The operating speed of the mixer drive motor is uncontrollable | (i) The motor brushes are worn (ii) Failure of the combined on/off and speed control unit. | ✓ (i) Inspect and replace the motor brushes. ✓ ✗ (ii) Replace the combined on/off and speed control unit. ✗ |
| Fuse blows repeatedly | (i) Short circuit in electrical system (ii) Operating under overload condition. | ✗ (i) Check circuit and repair. ✓ (ii) Check amps during operation. Refer to technical specification for maximum running load. ✓ ✓ |



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7.0 TECHNICAL SPECIFICATION



7.0 TECHNICAL SPECIFICATION

Power Supply: 110V single-phase, 50Hz.

Main Drive Motor: 0.33hp 250W, Nominal maximum speed 8000rpm (6000rpm under full load), electronic speed control.



WARNING: THIS MACHINE IS NOT SUITABLE FOR USE IN A FLAMMABLE / EXPLOSIVE ATMOSPHERE. DO NOT USE THE MACHINE IN A HAZARDOUS AREA WHERE A FLAMMABLE OR EXPLOSIVE ATMOSPHERE MAY BE PRESENT.

Maximum Full Load Amp Draw: 6.1 amps
CAUTION: Continuous running above 6.1amps can result in motor damage.

Fuse: 6.3 amp

Starter Capacitor: 110V or (2x8.4mfd)

Nett Weight: 46 lbs (21 kg)
(inc. std mixing assy)

Construction: Wetted parts are manufactured in 316 stainless steel. Bronze alloy or PTFE bushings are fitted as standard. All sheet metal components are nylon-coated.

Overall Dimns:

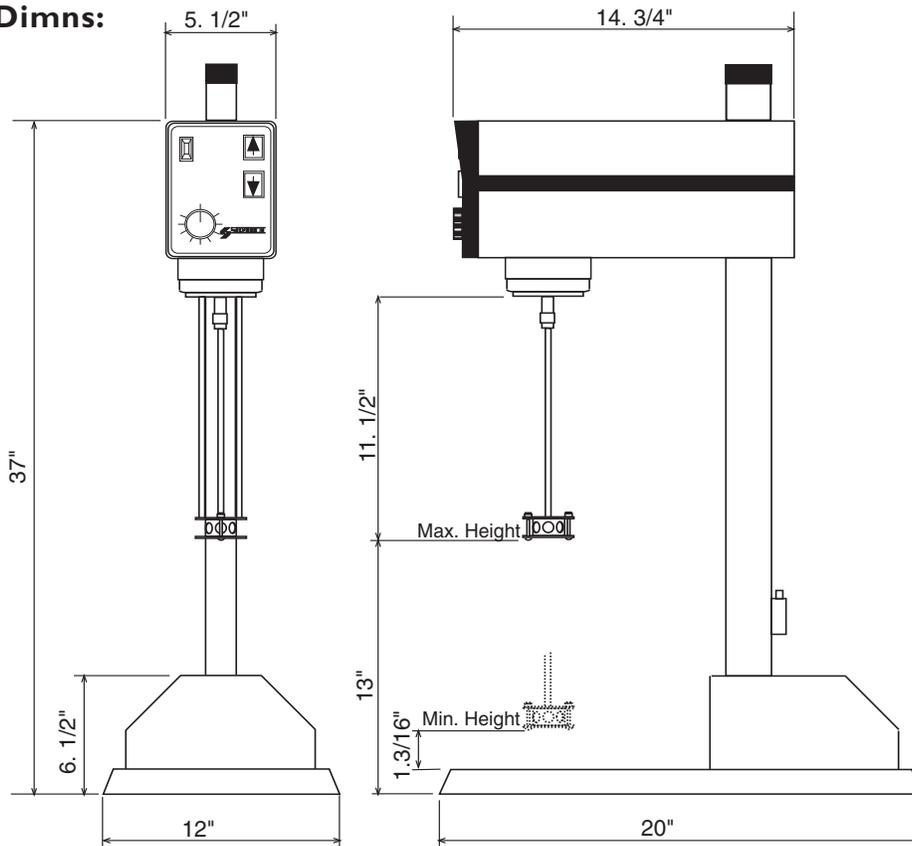
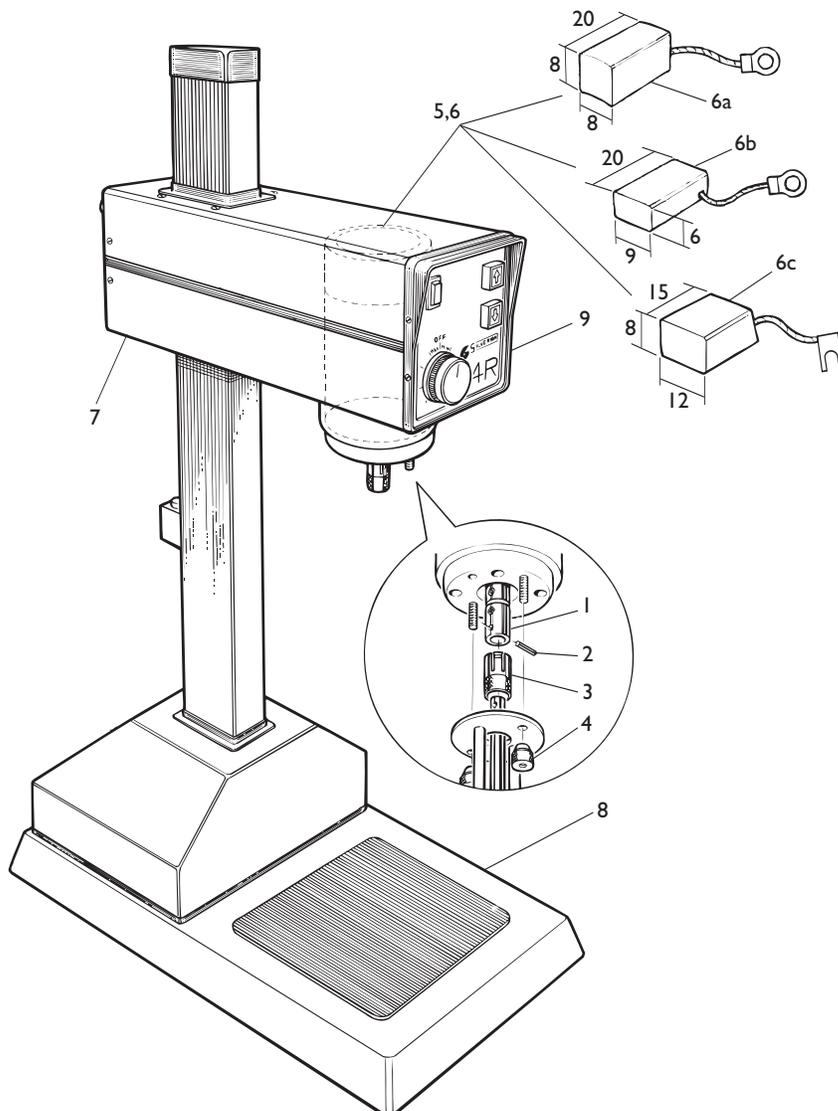


Fig.25 Dimensions

| Item | Part No. | | | Description | Qty |
|------|-------------|-------------|-------------|---|-----|
| | L4R | L4RT | L4RT-A | | |
| 1 | 7250-CL0001 | 7250-CL0001 | 7250-CL0001 | Coupling | 1 |
| 2 | 7250-CP0001 | 7250-CP0001 | 7250-CP0001 | Coupling Pin | 1 |
| 3 | 7250-CS0001 | 7250-CS0001 | 7250-CS0001 | Coupling Sleeve | 1 |
| 4 | 7250-HN0001 | 7250-HN0001 | 7250-HN0001 | Knurled Nuts | 2 |
| 5 | 7250-DE0002 | 7260-DE0002 | 7260-DE0002 | Electric Motor 110V 160Hz | 1 |
| 6a | 7250-DB0002 | 7250-DB0002 | 7250-DB0002 | Brush Set - Electric Motor (Prior To Mixer Serial No. 10318) | 1 |
| 6b | 7250-DB0003 | 7250-DB0003 | 7250-DB0003 | Brush Set - Electric Motor (Mixer Serial No. 10318 onward) | 1 |
| 6c | N/A | N/A | 7250-DB0004 | Brush Set - Electric Motor (After Mixer Serial No. 16991) | 1 |
| 7 | | | | 6.3 amp fuse pack [optional] | 1 |
| 8 | 7250-WM0001 | 7250-WM0001 | 7250-WM0001 | Rubber Mat | 1 |
| 9 | 7250-WB0001 | 7250-WB0001 | 7250-WB0001 | Plastic Bezel | 1 |



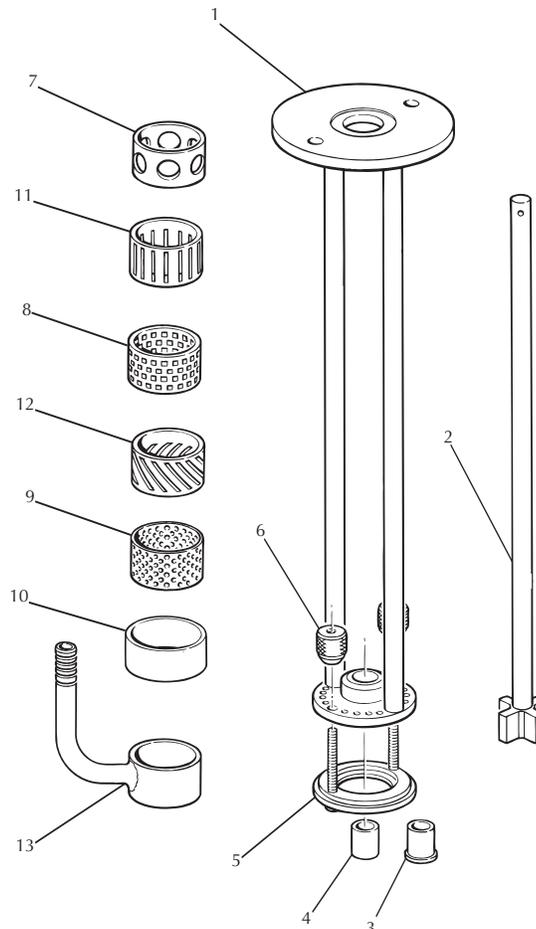
8.0 ILLUSTRATED PARTS LIST



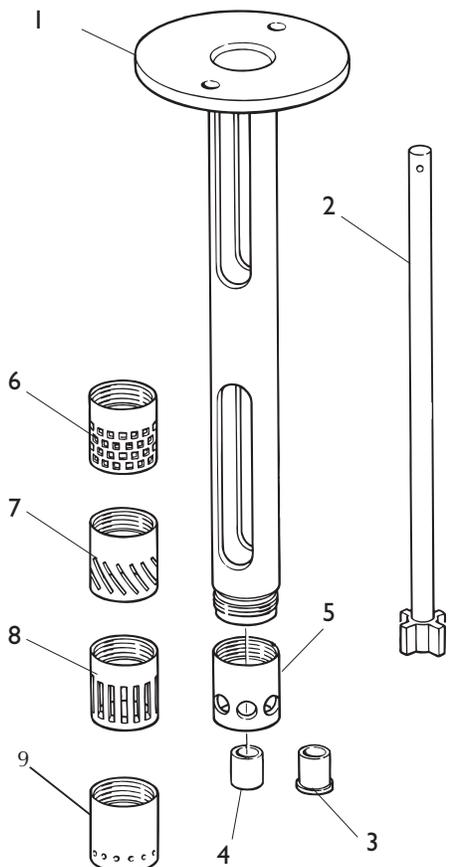
THE STANDARD MIXING ASSEMBLY

| Item | Part No. | Description | Qty |
|----------|-------------|--|-----|
| 1 | 7250-FF0001 | Frame | 1 |
| 2 | 7250-SR0001 | Drive Shaft and Rotor - Standard | 1 |
| optional | 7250-SR0002 | Drive Shaft and Rotor - With shaft hardened in the journal area | |
| optional | 7250-SR0017 | Drive Shaft and Rotor - With shaft hardened in the journal area and Hard Tipped Rotor. | |
| 3 | 7250-BP0001 | PTFE Bushing (Alternative to item 4) | 1 |
| 4 | 7250-BA0001 | Bronze Alloy Bushing (Standard) | 1 |
| 5 | 7250-HR0001 | Base plate | 1 |
| 6 | 7250-HN0001 | Knurled Thumb Nut | 2 |
| 7 | 7250-HG0001 | General Purpose Disintegrating Head | 1 |
| optional | 7250-HG0007 | General Purpose Disintegrating Head - Hard Chromed | |
| 8 | 7250-HQ0001 | Square Hole High Shear Screen | 1 |
| optional | 7250-HQ0010 | Square Hole High Shear Screen - Hard Chromed | |
| 9a | 7250-HE0001 | Standard Emulsor Screen | 1 |
| optional | 7250-HE0006 | Standard Emulsor Screen - Hard Chromed | |
| 9b | 7250-HF0001 | Fine Emulsor Screen | 1 |
| 10 | 7250-HA0001 | Axial Flow Head | 1 |
| *11 | 7250-HS0001 | Vertical Slotted Disintegrating Head | A/R |
| *12 | 7250-HS0007 | Diagonal Slotted Disintegrating Head | A/R |
| *13 | 7250-HP0001 | Pump Head | A/R |

* Optional Accessory



I TUBULAR MIXING ASSEMBLY



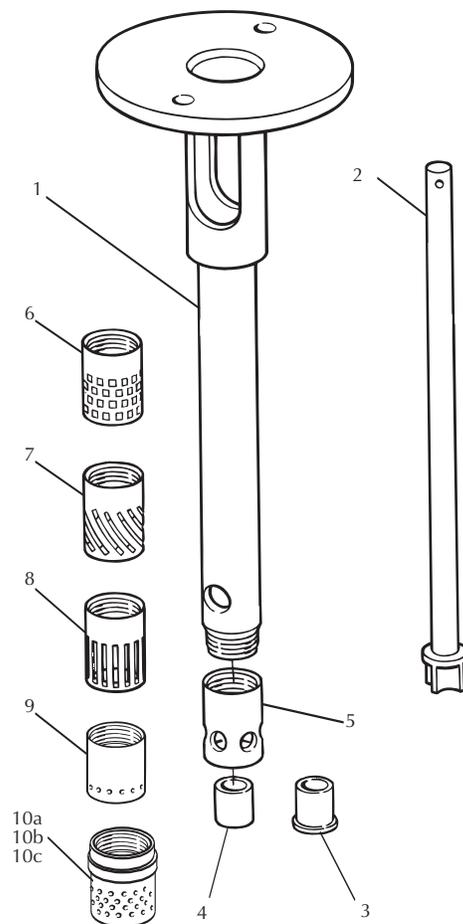
| Item | Part No. | Description | Qty |
|----------|-------------|--|-----|
| Ia | 7250-FF0008 | Frame For Detachable Heads | 1 |
| Ib | 7250-FF0013 | Frame With Integral Open Slotted Disintegrating Head - (Alternative to item Ia) | 1 |
| Ic | 7250-FF0014 | Frame With Integral Diagonal Slotted Disintegrating Head - (Alternative to item Ia) | 1 |
| 2 | 7250-SR0006 | Drive Shaft and Rotor | 1 |
| optional | 7250-SR0010 | Drive Shaft and Rotor - With shaft hardened in the journal area | |
| 3 | 7250-BP0001 | PTFE Bushing (Alternative to item 4) | 1 |
| 4 | 7250-BA0001 | Bronze Alloy Bushing (Standard) | 1 |
| 5 | 7250-HG0003 | General Purpose Disintegrating Head | 1 |
| 6 | 7250-HQ0005 | Square Hole High Shear Screen | 1 |
| *7 | 7250-HS0006 | Diagonal Slotted Disintegrating Head | A/R |
| *8 | 7250-HS0003 | Vertical Slotted Disintegrating Head | A/R |
| *9 | 7250-HH0002 | Standard Emulsor Head | A/R |

* Optional Accessory

3/4 TUBULAR MIXING ASSEMBLY

| Item | Part No. | Description | Qty |
|----------|-------------|--|-----|
| Ia | 7250-FF0007 | Frame For Detachable Heads | 1 |
| Ib | 7250-FF0011 | Frame With Integral Open Slotted Dis. Head - (Alternative to item Ia) | 1 |
| Ic | 7250-FF0016 | Frame With Integral Diagonal Slotted Dis. Head - (Alternative to item Ia) | 1 |
| 2 | 7250-SR0005 | Drive Shaft and Rotor | 1 |
| optional | 7250-SR0006 | Drive Shaft and Rotor - With shaft hardened in the journal area | |
| 3 | 7250-BP0001 | PTFE Bushing (Alternative to item 4) | 1 |
| 4 | 7250-BA0001 | Bronze Alloy Bushing (Standard) | 1 |
| 5 | 7250-HG0002 | General Purpose Disintegrating Head | 1 |
| 6 | 7250-HQ0003 | Square Hole High Shear Screen | 1 |
| *7 | 7250-HS0011 | Diagonal Slotted Disintegrating Head | A/R |
| *8 | 7250-HS0002 | Vertical Slotted Disintegrating Head | A/R |
| *9 | 7250-HH0001 | Standard Emulsor Head | A/R |
| *10a | 7250-HE0002 | Standard Emulsor Screen | A/R |
| *10b | 7250-HF0002 | Fine Emulsor Screen | A/R |
| *10c | 7250-HC0002 | Coarse Emulsor Screen | A/R |

* Optional Accessory

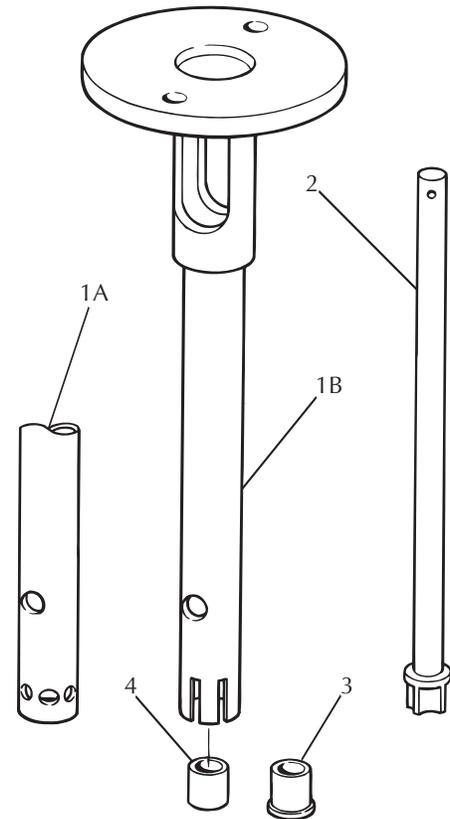


8.0 ILLUSTRATED PARTS LIST



5/8 MICRO TUBULAR MIXING ASSEMBLY

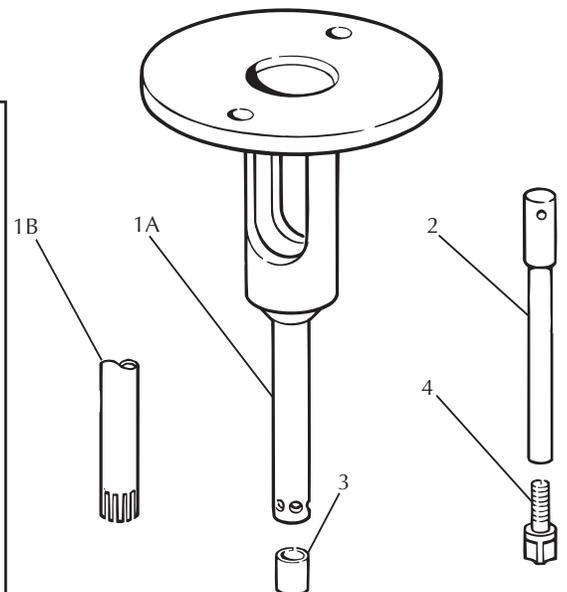
| Item | Part No. | Description | Qty |
|----------|-------------|--|-----|
| 1A | 7250-FF0004 | Frame Assembly - General Purpose Disintegrating Head | 1 |
| 1B | 7250-FF0006 | Frame Assembly - Open Ended Vertical Slotted Disintegrating Head | 1 |
| 2 | 7250-SR0004 | Shaft and Rotor | 1 |
| optional | 7250-SR0008 | Drive Shaft and Rotor - With shaft hardened in the journal area | |
| 3 | 7250-BP0001 | PTFE Bushing (Alternative to item 4) | 1 |
| 4 | 7250-BA0001 | Bronze Alloy Bushing (Standard) | 1 |



3/8 MINI MICRO MIXING ASSEMBLY

| Item | Part No. | Description | Qty |
|------|-------------|--|-----|
| 1A | 7250-FF0002 | Frame Assembly - General Purpose Disintegrating Head | 1 |
| 1B | 7250-FF0003 | Frame Assembly - Open Ended Vertical Slotted Disintegrating Head | 1 |
| 2 | 7250-SS0002 | Shaft | 1 |
| 3 | 7300-BP0001 | PTFE Bushing | 1 |
| 4 | 7300-RR0001 | Rotor | 1 |

Rotor Locking Tool - 7250-TR0005



LABORATORY DUPLEX MIXING ASSEMBLY

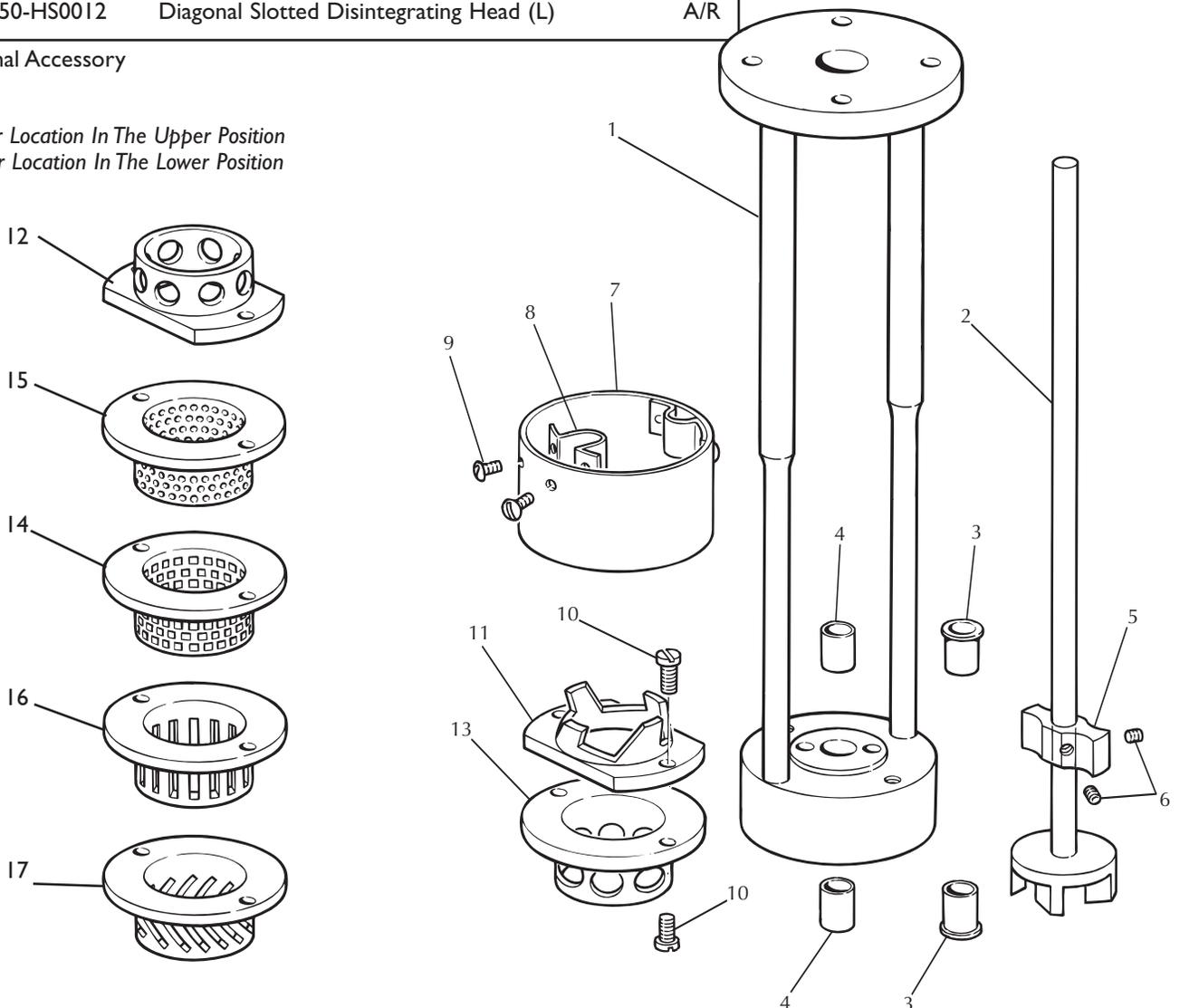
| Item | Part No. | Description | Qty |
|----------|-------------|---|-----|
| 1 | 7250-FF0005 | Frame | 1 |
| 2 | 7250-SR0011 | Drive Shaft and Lower Rotor | 1 |
| optional | 7250-SR0012 | Drive Shaft and Rotor - With shaft hardened in the journal area | |
| 3 | 7250-BP0001 | PTFE Bushing (Alternative to item 4) | 2 |
| 4 | 7250-BA0001 | Bronze Alloy Bushing (Standard) | 2 |
| 5 | 7250-RR0001 | Upper Rotor | 1 |
| 6 | Q/AGS05/006 | Grub Screw - Upper Rotor | 2 |
| 7 | 7250-GP0001 | Shroud | 1 |
| 8 | 7250-GC0001 | Shroud Clamp | 2 |
| 9 | Q/ARHA004 | Screw - Shroud Clamp | 4 |
| 10 | Q/ACH05/012 | Head/Screen Retaining Screw | 4 |
| 11 | 7250-HT0001 | Coarse Tooth Disintegrating Head (U) | 1 |
| *12 | 7250-HG0005 | General Purpose Disintegrating Head (U) | A/R |
| 13 | 7250-HG0004 | General Purpose Disintegrating Head (L) | 1 |
| *14 | 7250-HQ0007 | Square Hole High Shear Screen (L) | A/R |
| *15 | 7250-HE0004 | Standard Emulsor Screen (L) | A/R |
| *16 | 7250-HS0004 | Vertical Slotted Disintegrating Head (L) | A/R |
| *17 | 7250-HS0012 | Diagonal Slotted Disintegrating Head (L) | A/R |

* Optional Accessory

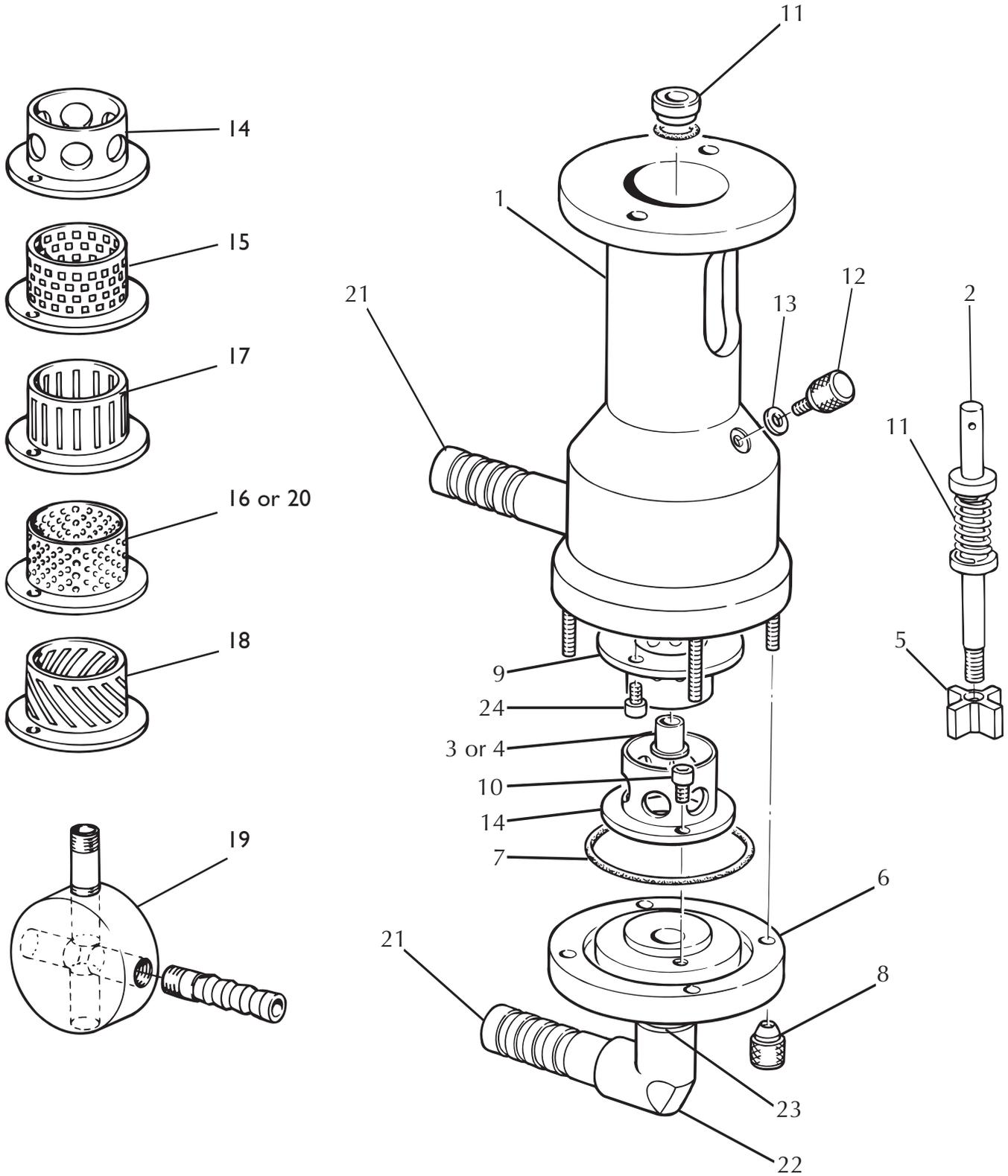
Note:

(U) = For Location In The Upper Position

(L) = For Location In The Lower Position



8.0 ILLUSTRATED PARTS LIST





8.0 ILLUSTRATED PARTS LIST

LABORATORY IN-LINE MIXING ASSEMBLY

| Item | Part No. | Description | Qty |
|-----------------|----------------------------|--|-----|
| 1 | 7250-IS0001 | In-Line Body | 1 |
| 2 | 7250-SR0013 | Drive Shaft and Rotor | 1 |
| <i>optional</i> | 7250-SR0012 | <i>Drive Shaft and Rotor - With shaft hardened in the journal area</i> | |
| 3 | 7250-BP0001 | PTFE Bushing (Standard) | 1 |
| 4 | 7250-BA0001 | Bronze Alloy Bushing (Alternative to item 3) | 1 |
| 5 | <i>Supplied with shaft</i> | Rotor | 1 |
| 6 | 7250-PI0001 | Stator Mounting Plate | 1 |
| 7 | O/V228 | 'O' Ring - Standard Material = Viton | 1 |
| <i>optional</i> | O/VC228 | <i>'O' Ring - Optional Material = PTFE</i> | |
| 8 | 7250-HN0001 | Knurled Thumb Nut | 4 |
| 9 | 7250-BH0001 | Bearing Housing | 1 |
| 10 | Q/ACS04/008 | Cap Head Screw | 2 |
| 11 | | Mechanical Shaft Seal - | |
| <i>optional</i> | S/00SU/008C/A01 | <i>Standard Material: Carbon/Stainless Steel/Viton</i> | 1 |
| | S/00SU/008C/A02 | <i>Optional Material: Carbon/Stainless Steel/PTFE/Kalrez</i> | |
| 12 | 7250-IR0001 | Bleed Screw | 1 |
| 13 | Q/FW05 | Fibre Washer | 1 |
| 14 | 7250-HG0006 | General Purpose Disintegrating Head | 1 |
| 15 | 7250-HQ0002 | Square Hole High Shear Screen | 1 |
| *16 | 7250-HE0005 | Standard Emulsor Screen | A/R |
| *17 | 7250-HS0005 | Vertical Slotted Disintegrating Head | A/R |
| *18 | 7250-HS0010 | Diagonal Slotted Disintegrating Head | A/R |
| *19 | 7250-IA0001 | Multiple Inlet Adaptor Block | A/R |
| *20 | 7250-HF0005 | Fine Emulsor Screen | A/R |
| **21 | 7250-IB0001 | Inlet / Outlet Hose Tail Tube | 2 |
| **22 | Y/ABE006 | Elbow Joint | 1 |
| **23 | Y/ABN006 | Barrel Nipple | 1 |
| 24 | Q/ACS05/010 | Cap Head Screw | 2 |
| | | Rotor Locking Tool: 7250-TR0001 | |
| | | Pin: 7250-TP0001 | |
| | | * Optional Accessory | |
| | | ** Fit using Loctite 577 or equivalent | |