# USER GUIDE
# EFL SIEVE SHAKER

# The EFL User Guide

## Test Sieve Shaker

## Contents

# Description

The Endecotts EFL 2000 is a vibrating shaker that is used to carry out sieve tests in conjunction with sieve stacks for particle sizing of various material samples.

It is based on a rotary motor with an eccentric cam drive with special non-metallic laminated springs that are set at a calculated angle to provide a horizontal twist, as well as a vertical movement to carry out efficient sieve tests.

The EFL 2000 range are fixed amplitude shakers. An incremental timer provides a range of pre-set and repeatable sieve test run times.

The EFL is fully EMC and LVD compliant and complies with all relevant European directives

# Unpacking

The shaker should be set up according to the following procedure and the diagram opposite. The Internal packing and following list of items should be removed from the case and checked before the EFL 2000 is removed.

| | |
|---|---|
| 1 off | Test Sieve Shaker EFL 2000 |
| 2 off | M12 Plated Lock Nuts |
| 2 off | M12 Plated Lock Washers |
| 2 off | Clamping Handwheels |
| 2 off | Large Plain Clamp Washers |
| 1 off | Clamp Plate Assembly complete with Locking Assemblies |
| 1 off | Mains Cable |
| 1 off | Instruction Manual |

EFL 2000

| | | |
|---|---|---|
| 2 off | Short Clamp Rods | SA 564 / 3 |
| 2 off | Long Clamp Rods | SA 564/2 |

Remove lid and collapsible sides of the packing case, the shaker will be left sitting on the pallet. Unscrew the transit bolts from the underside of the pallet (placing blocks under packing will assist this operation). Lift the shaker from the pallet carefully.

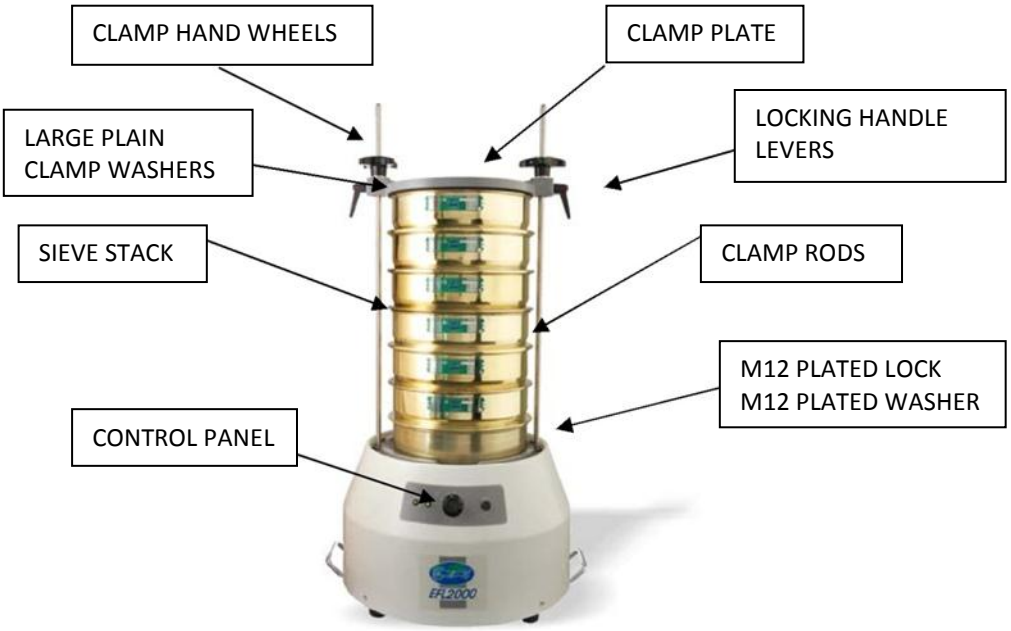
**Take Care as the shaker weighs 83 Kg**

# Setting Up

## Assembly

The machine should be positioned on a level rigid and robust floor suitable for the operation of the sieve shaker, (placing the shaker on a level surface ensures the even distribution of the sample over the sieves and ensures machine stability). The anti-vibration mounts screwed into the underside of the machine can be adjusted to level the machine. Tighten the lock nuts on the anti-vibration mounts once the machine is level.

**Take care as the shaker weighs 83Kg**



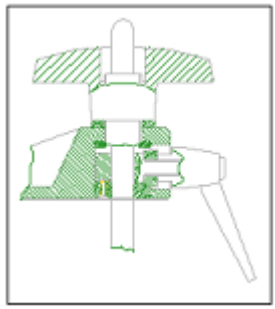
# Setting Up

## Clamping Assembly

Fit one M12 nut and washer onto each clamp rod selected for use, then screw the pair of clamp rods into the location plate and tighten the locknuts.

Place the two large plain washers over the 20mm threads of the clamp sleeves. These can be seen protruding vertically from the two side lugs on the clamp plate. Screw the two handwheels loosely onto the 20mm threads; leave a gap of 5mm between the large washer and the handwheel face. Do not tighten right down at this point.

See Diagram below:



# Setting Up

## Electrical Connections

Ensure that the voltage and frequency on the Rating Label, at the rear of the shaker correspond with the local electrical mains supply. If there is any discrepancy, please consult your supplier or a qualified electrician.

**Do Not Connect to a power supply other than that stated on the Rating Label**

**Important – This equipment must be connected to**

The EFL sieve shaker is provided with a detachable 2 metre long mains cable which an IEC has moulded connector at the shaker end and plug suitable for connecting to the local mains supply. Certain models may be supplied with a fused plug. In the event of failure the fuse must be replaced with a fuse of identical rating.

# Setting Up

## Sieve Stacking

The EFL 2000 shakers accommodate up to the following number of sieves in a stack plus the required lid and receiver:

| **Model:** | **Height:** | **300mm/12 inch** | **200mm/8 inch** | **100mm/3 inch** |
|---|---|---|---|---|
| EFL | Full | 6 | 12 | 16 |
| 2000 | Half | 12 | 24 | 32 |

All sieve stacks require the necessary lid and receiver.

The recesses in the location casting will accept the following sieve diameters:

EFL 2000:
300mm/12 inch, 200mm/8 inch, 150mm/6 inch, 100mm/4 inch or 3 inch

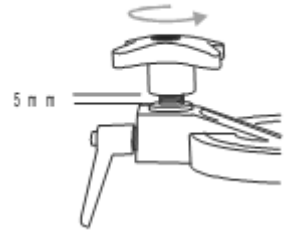
Place the receiver centrally on the location casting in the appropriate recess. Stack the required sieves on top of the receiver. Put the samples in the top sieve and fit the lid.

# Setting Up

## Sieve Stacking

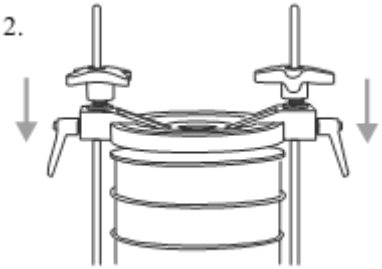
Align the locking assemblies in the two side lugs of the clamp plate with the round clamp rods. Slide the clamp plate down squarely onto the lid at the top of the sieve stack.

1.



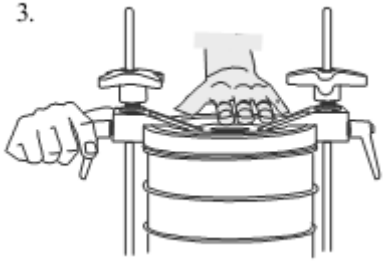

Ensure that the clamping handwheels at the top are loose and the locking assemblies are fully pushed down. There should be a 5mm gap between the large plain washer and the face of the handwheel.

2.



Place one hand on the top of the clamp plate and hold square while locking one side handle lever. Repeat for the opposite side handle lever.

3.



# Setting Up

## Sieve Stacking

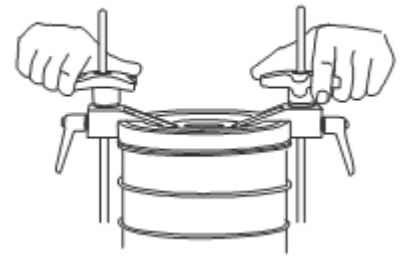
The side handle levers can be set vertically downwards by pressing on the Red button and pulling the handle outwards to release. Turn the handle to a safe, convenient angle downwards and release to engage the teeth.

Screw the two clamping handwheels down simultaneously to ensure the clamping plate is square.

Continue until the handwheels are tight against the internal stop.

Hand tightness must be exerted so that the assembly does not loosen during vibration.

4.

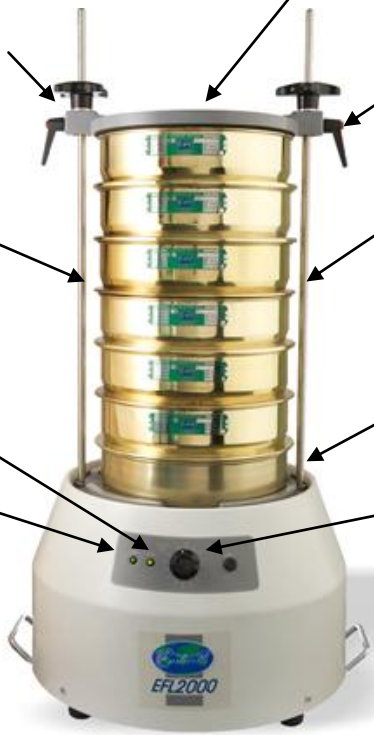


*The locking side handle levers and clamping handwheels must be tightened sufficiently to ensure that the sieves and receiever are clamped securely during operation. Damage may occur if the shaker is allowed to operate with a loose clamping plate.*

# Operating Instructions

## Position on Controls

Operators should be familiar with, and fully understand the controls and indicators before operating the machine. This should be done in conjunction with the diagram below:




CLAMP PLATE

CLAMP HAND WHEELS

SIDE HANDLE LEVERS

SIEVE STACK

ROUND CLAMP RODS

4. Power Indicator

RECEIVER

3. Mains Connected indicator, Green l.e.d

5. Process Timer

6. Fuse

7. Blanking Plug (at rear)

2. Mains Switch (at the rear)

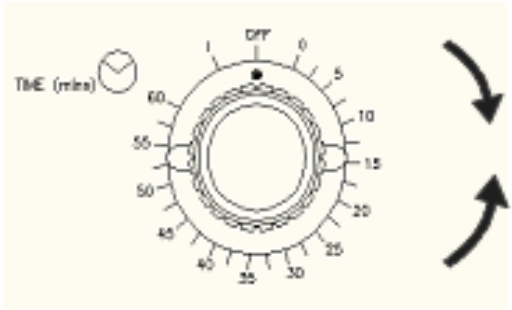
## Functions of Controls

1. **Mains Inlet** - Mains inlet with integral line filter. Ensure the IEC connector on the mains lead is pushed fully into the mains inlet.
2. **Mains Switch** - This controls the electrical power on the equipment. The side marked "I" is On and the side marked "O" is Off.
3. **Mains Connected Indicator** – This indicates electrical power is connected to the equipment, even though the Mains switch (2) is in the OFF position. The l.e.d is illuminated when the IEC connector is pushed fully into the inlet and power is switched on at the local outlet. If the l.e.d fails to light with the local outlet in the ON position then a Fuse (6) has blown or power is not present at the mains.
4. **Mains Power Indicator** – This l.e.d indicates that power has been switched ON at the mains switch (2). The Shaker will operate when the appropriate actions are taken.
5. **Process Timer** - This is a mechanical 0-60 minute timer which also provides continuous running (for settings of less than 15 minutes rotate the knob past the 15 minute mark and then back to the desired setting). Operating periods are increased by rotating clockwise and decreased by rotating anti-clockwise (the timer will commence timing down as soon as the knob is released, regardless of electrical power being connected or not).

# Operating Instructions

## Functions of Controls

When the knob is turned anti-clockwise from the Off position to the continuous running mark " I ", the shaker will continue running until the knob is returned to the Off position.




Turning timer knob clockwise allows the EFL to run for 1 min to 60 mins.

Turning timer knob anti-clockwise allows the EFL to run continuously.

6. This is an anti- surge 1 ¼ inch ceramic fuse which protects the electrical components within the equipment. It is important that the recommended current rating is not exceeded (5 Amperes for 230 Volts, 10 Amperes for 110 Volts) and the fuse is replaced with the same type and size. If the fuse blows after replacement then a fault exists in the equipment.

7. Blanking Plug - This is removed and the threaded hole used as a spillage outlet drain for wet sieving applications. An optional wet sieving kit is available and may be purchased separately. The kit includes a nylon hosetail for connecting a hosepipe.

# Operating Instructions

## Operation

1. Plug the mains lead into Mains Inlet (1) and into a power supply socket.
2. Place sieves onto the shaker as described in Sieve Stacking. (page 6)
3. Switch the power on at the power supply socket. The green l.e.d. (Mains) will be lit.
4. Switch on the Mains Switch (2). The green l.e.d. (Power) will be lit.
5. Set Process Timer (5) to required sieving time. The equipment will immediately start and automatically switch off on completion of the set time.

NOTE: The shaker can be stopped at any time by turning the Process Timer knob anti-clockwise to “O”. Loosen the two clamping handwheels and two side handle levers on the clamp plate. Remove the clamp plate by pulling on the handwheels. The nest of sieves may now be removed and the quantity of the sample on each sieve analysed.

Take Care that there are no loose sieves on the shaker!

Do not attempt to remove the sieves before the shaker has come to a halt

Do not unscrew clamping handwheels or side handle lever while the shaker is in operation

## SAFETY NOTICE WET SIEVING WITH ENDECOTTS SHAKERS

All shakers are electrically operated and it is important to ensure that the liquid used in wet sieving operations **NEVER** comes into contact with the shaker mechanism or input terminals.
Endecotts machines are supplied with a spillage drain for minor spills. The drain is not intended to be used for overflows or external water sprays.

This Wet Sieving accessory is supplied for use with Endecotts Test Sieve shakers and should only be used by qualified personnel.
It is recommended that the mains power supply is via a residual current device on a miniature circuit breaker (Power Breaker).

If there is any doubt with respect to the use of this equipment, contact a qualified electrician **IMMEDIATELY**.

**Extreme care should be taken to avoid contact with the shaker, or any electrical part if supply in operation at any time.**

**DO NOT TOUCH THE SHAKER**

With dry hands switch of the supply at the mains and disconnect the mains supply.

The shaker should be allowed to dry out thoroughly and examined by qualified personnel before further use.

Should wet sieving be a routine procedure then consideration should be given to the possible use of a remote controlled system.

**CAUTION**
**THE SHAKER MUST BE CONNECTED TO THE MAINS EARTH WHEN WET SIEVING**

# Wet Sieving Adaptor Kit

The wet sieving adapter kit is supplied as an optional extra for 8” or 200mm diameter sieves and should be ordered separately.

Kit Part no:
ZMWSA – EFL 2

Other sizes are available on request.

The wet sieving kit consists of the following items:

1 off Special Wet Sieving Clamp Plate
1 set ‘O’ Ring Seals. One required for each sieve in the stack.
1 off Special Wet Sieving Receiver.
1 off Nylon Hosetail.

The Blanking Plug (12) at the rear must be removed and the nylon hosetail fitted. The hosetail must have a suitable length of hose fitted to drain into a convenient drainage point. The ‘O’ ring seals are fitted on the outside of the bottom rim of each sieve so that when the sieves are stacked onto each other they form a seal. The bottom sieve is stacked on the special receiver with a spout. Fit a suitable length of hose to the spout to drain into a convenient drainage point. The clamp plate is usually supplied with the rose reversed to avoid damage. Undo and reverse, so that the rose head is on the inside. Remove the lid from the sieve stack and replace the standard clamp plate with the wet sieving clamp plate. Fit a suitable length of hose to the inlet of the rose on the clamp plate and connect to the fluid supply with flow regulation.

# Maintenance

The Endecott's EFL sieve shaker is maintenance free other than keeping external surfaces clean.

**Cleaning**

Cleaning must always be done with the mains power switched off and the cable disconnected. Cleaning should be done by wiping with a soft cloth, dampened in a solution of water and a mild detergent.

**Do not use any solvent for cleaning**

**Fuse Replacement**

Should a fuse require replacement this must be of an identical type and rating as the original. The rating of the fuse is marked on a label above the fuse. Switch off the mains supply at the switch at the rear of the shaker and remove the mains cable. Unscrew the central cap of the fuseholder with a suitable coin or screwdriver, extract the holder and the fuse together. Remove the blown fuse and place the new fuse in the metal retaining spring within the cap. Fit the cap and fuse back in the holder and screw in fully.

Do not over tighten!

All replacement parts must be ordered by quoting the shaker serial number and the correct part number. Part numbers can be obtained from our sales or technical department.

# Drive Unit

The drive unit is an electrical motor with a special shaft extension for the eccentric cam to be mounted. The motor is mounted on a cast bracket, which has supporting pillars for a self-aligning support bearing. This is fitted at the end of the motor shaft. The eccentric cam has a bearing mounted on it. This bears on the nylon headed bolt on the underside of the location casting.

Removal

1. Remove the shaker cover. (Refer to section entitled Eccentric Cam)

2. Loosen the locknut on the nylon headed bolt.

3. Screw nylon headed bolt fully into location casting.
Unscrew and remove 3 hexagonal headed bolts which secure the drive unit to the base.

4. Remove the complete unit from the machine.

Motor Removal

1. Unscrew and remove 2 hexagonal headed bolts which secure the self-aligning support bearing.

2. Remove support bearing from the motor shaft with care.

3. Unscrew and remove 4 hexagonal headed bolts which secure the motor to the motor mounting bracket.

4. Release the grub screw in the eccentric cam.

5. Remove eccentric cam/bearing assembly from motor shaft with care.

**Assembly of Drive Unit**

1. Slide eccentric cam/bearing assembly onto the motor shaft with bearing outermost.
2. Locate the grub screw in the recess provided in the motor shaft, and tighten to torque of 0.66 Kgfm. (6.5Nm).
3. Place 4 hexagon headed bolts in the motor flange with threads protruding outwards. Ensure that there is a spring washer under each head.
4. Locate the motor on machined face of motor mounting. Screw up and tighten the 4 hexagonal bolts.
5. Slide the self-aligning support bearing onto the motor shaft.

**Note: Do Not Force**

6.Place 2 hexagonal headed bolts into support bearing flange using flat and spring washers and screw in with finger tightness.
7. Ensure that motor shaft will rotate “true”.
8.Tighten the 2 hexagon headed bolts to secure support bearing.
9.Re-check shaft rotation to ensure it is “true”.

Note:Any deflection of motor shaft will result in damage to the motor.

**Replacement**

1. Locate the drive unit on base casting and screw in high the tensile hexagon headed retaining bolts - finger tightness. Ensure that there is both a flat and a spring washer under each head.
2. Unscrew the nylon headed bolt to just above the eccentric cam bearing surface.
3. Ensure that the bearing face is in the center of the nylon pad on 'both axis'. This must be in all directions.
4. Tighten the three hexagon headed bolts which secure the drive unit to the base.
5. Adjust the eccentric cam clearance as described in Eccentric

**Cam Adjustment of Clearance.**

6. Reassemble the shaker in reverse order of 1 to 8 in the section.

# Eccentric Cam

Important: Before attempting to remove the cover, switch off mains and remove power supply cable from rear of sieve shaker.

In order to adjust the gap on the eccentric cam remove the cover as follows:

1. Remove the two clamp rods.

2. Remove the four cover screws and the blanking plug.

3. Remove the mains switch.

4. The switch is a snap fitting and can be gently levered out, do not disconnect leads.

5. Lift up the cover assembly, taking care to ease up the rear to clear the electrical components at the control panel over the location casting.

6. Disconnect the wiring to the motor and the earth lead.

7. The cover assembly may now be completely removed.

8. To reassemble the shaker, reverse the order of 1 to 7 above.

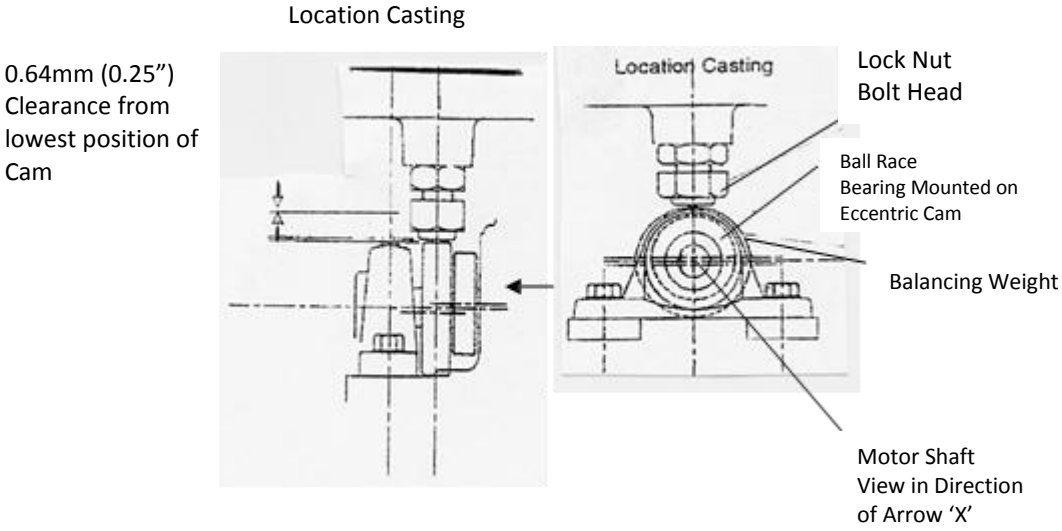
# Eccentric Cam

1. Loosen the lock nut on nylon headed bolt.

2. Rotate the motor shaft until eccentricity of the bearing is in its lowest position. This gives a maximum gap between the bearing and the face of the nylon headed bolt.

3. Adjust the nylon headed bolt to give a gap between the face of the nylon headed bolt and the outside of the bearing, of 0.64 mm (0.025 in). using a feeler gauge. (See diagrams below)

4. Tighten the lock nut on nylon headed bolt.



# Specification

Model: EFL 2000

| | | |
|---|---|---|
| Voltage: | 230 V | 110 V |
| Frequency: | 50 Hz / 60 Hz | 50 Hz / 60 Hz |
| Phase: | 1 | 1 |
| Power Consumption: | 485 VA | 390 VA |
| Class: | 1 (earthed) | 1 (earthed) |

Vibrations Speed: 1,425 per minute at 50 Hz
1,130 per minute at 60 Hz

Dimensions: EFL 2000/2
1,025 mm High (including rods)

510 mm Diameter

(Handles 2 x 35 mm)

Weight: 83 kg

Endecotts policy is one of continuous development and we reserve the right to modify future models

# General Advice

Endecotts shakers are fully tested and factory checked before shipping to customers. No parts require lubrication or resetting unless disturbed.

The synthetic springs are long lasting under normal operating conditions and should never need changing.

The sieve shaker has been constructed and factory tested to ensure correct operation when connected to the specified electricity supply indicated on the machines rating plate.

Use of unapproved spares or any alteration to the machine would invalidate all warranties and compliance with European directives for 'CE' Marking.

**Endecotts Ltd does not accept any responsibility if the operating instructions contained in this manual are not strictly followed.**

**ZMEFL-MAN1 ISSUE 09/12**

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