SHREDDER

MANUAL

SH1

MODEL	**SH1 7.5kW**	**MELTOG LIMITED,**
MACHINE SERIAL No.:	**SHR3077**	**GELDERD ROAD, BIRSTALL WEST YORKSHIRE,**
M/C ORDER No.:	**SH1216**	**WF17 9LW**
DATE OF ISSUE:	**26/2/02**	**TEL.: 01924 422822**

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DRAWINGS and DIAGRAMS SUPPLIED

Cutter Box drawing

Installation drawing per System Supplied

Electrical circuit diagram

INSTALLATION INSTRUCTIONS

Check that no damage has occurred in transit and that all guards, covers and structural members are secure.

Ensure that the floor space provisioned for siting the Shredder is capable of supporting its weight. The floor should be of stone or concrete on a firm substrate. It is recommended that the machine be bolted down.

The connecting of the mains supply to the machine should be carried out by a **COMPETENT ELECTRICIAN.**

Check that the line fuses are at the correct amp rating.

The control panel is intended to be remotely mounted, but the electric motors are already connected to the control unit. A supply cable from a fused mains isolator to the shredder control panel will be required. The cable entry gland used must comply with IP65 rating of the enclosure.

This supply may then be connected to terminals L1 L2 L3 on the connecting block as shown on the wiring diagram.

A schematic wiring diagram of the electrical control system is supplied within the control panel and should be consulted before attempting connection.

At this point a start-up sequence should be attempted, in accordance with **the OPERATING INSTRUCTIONS.** If the cutters on start-up do not rotate towards each other, then reverse any two of the incoming lead

CAUTION!

WE RECOMMEND THAT ALL INSTALLATION WORK BE CARRIED OUT BY QUALIFIED ENGINEERS

WARRANTY STATEMENT

Your shredder and system carries a full warranty as set out under Meltog terms and conditions.

Controls on Shredder

The Shredder is designed to be operated as part of a waste disposal system either from a central control position or as a locally operated machine. It interfaces to the central control system so that its mode of operation is signalled to the central controls.

The operation of the Shredder is by means of the controls on the front of the main electrical panel. The status of the Shredder is also indicated on this panel. The purpose of these controls and the meaning of the indicators is explained in the following paragraphs.

Power Indicator

This is a WHITE indicator, which is illuminated when the Shredder is connected to the supply and the machine isolator is ON.

Emergency Stop

This is a RED mushroom head push button which, latches on operation. This causes the E-Stop circuit to become open when operated. The push button is unlatched by twisting the head.

This control is intended to stop the Shredder and its associated items immediately if an emergency arises. It must NOT be used as a service stop.

E-Stop Reset

This is a RED push button/indicator which, is illuminated when the E-Stop circuit has been tripped or after the power has been switched on. To run the Shredder this indicator must be OFF. This is achieved by pressing the indicator after which the light will go OFF provided there are no E-Stop push buttons operated and no malfunctions of the principle contactors within the control circuit are detected.

Note that when this indicator is ON no other controls are illuminated except the Power Indicator.

Shredder Start

This is a GREEN illuminated push button which, is ON when no power is connected to the Shredder. Pressing this button when the light is on will cause the Shredder to enter the start sequence an turn OFF the illumination. If the GREEN light flashes this indicates that one or more of the motor overloads has been tripped. Any trips must be reset before the Shredder can be started.

Shredder Service Stop

This is a RED illuminated push button/indicator which, is ON at all times when power is applied to any of the Shredder items. When this indicator is ON the Shredder will enter its stop sequence when the push button is pressed. The indication will turn OFF when all the motors have stopped. When ON this indicator shows that some part of the Shredder system is running.

Shredder Fault/Reset

This is a YELLOW push button indicator which, has a two principle functions. The first is to indicate malfunctions within the Shredder and its controls. The second is to reset these faults provided their cause has been rectified. As an additional function when the button is operated the Shredder Start, Service Stop and the Fault indicators will go ON, thus providing a test for those indicators.

Shredder Forward

This is a GREEN indicator which, is ON when the shredder is running in the forward (normal) direction.

Shredder Reverse

This is a YELLOW indicator which, is ON when the Shredder is running in reverse direction. This occurs during the start sequence or when the Shredder has detected an overload.

Operation of the Shredder

Operators must be familiar with the contents of the section concerning the controls before operating the shredder.

Starting the Shredder

Ensure that the electrical supply is connected to the Shredder control cabinet and that the isolator on the supply connection on the wall has been turned on.

Turn on the isolator on the control panel. This should turn on the Power indicator and the E-Stop reset indicator. Press the E-Stop reset indicator to reset the E-Stop circuit. Provided that none of the E-Stop push buttons are operated and that no contactor faults are detected the E-Stop indicator will go off and the Green Shredder Start indicator will turn on.

Press the Shredder Start push button to cause the Shredder to enter the start sequence. If there are conveyors on the system then the output conveyor will start followed a few seconds later by the Shredder and then a few seconds later by the input conveyor. As soon as the start sequence is entered the GREEN indication is turned off and the RED Stop Button is turned on.

Note that when the Shredder starts it runs in reverse for three seconds to clear the cutter. It then stops for two seconds before commencing forward (normal) running. During these periods the appropriate Shredder direction indicator will be illuminated.

Stopping the Shredder

Except during an emergency the Shredder must be stopped, only by pressing the illuminated Stop push button. When this is pressed the machine will enter the stop sequence at the end of which the Red stop indicator will turn off and the Green start indicator will turn on.

Shredder Overload

Should an object be placed in the Shredder which causes the cutters to be overloaded the control circuit will enter the overload sequence. When such a condition is detected the Shredder will stop for two seconds, run in reverse for three seconds, stop for a further two seconds and then recommence forward running. In most cases this will clear the Shredder.

In noisy environments the state of the direction indicators will signal this condition.

If more than four such overloads occur within one minute period the Shredder will stop and the condition will be indicated by the fault light flashing. The obstruction must be cleared manually before the Shredder can be run again.

SAFETY REGULATIONS

Essential Health and Safety at Work requirements have been complied with according to the act of 1974, where applicable. Which requires that the machinery must as far as possible be designed, constructed and operated for a safe system of work. The following guidelines have been provided to enable a "judgement to be made on safe use" of Shredding units as required by H.A.S.A.W. It is the responsibility of the user to utilise this judgement to apply both routine and emergency procedures, which constitute a safe working system.

1. Persons operating this machine must first receive instruction in accordance with the operating instructions.

2. System layout should allow safe access from the working area and adequate space should be provided to operate the infeed and discharge systems safely.

3. The authority for starting and stopping the machine should be clearly allocated and obvious.

4. Adequate arrangements should be made for the removal of shredded materials from the machine and immediate floor area. DEPENDING ON APPLICATION, MANY SHREDDED MATERIALS MAY BE SHARP AND OR HAZARDOUS. Adequate clothing and protection should be provided to users handling such materials.

5. When an obstruction is not cleared by the machine's auto-reverse sequence, the machine should be switched off and the power isolated before any attempt is made to clear the cutting chamber.

6. **THE REVOLVING SHAFTS AND CUTTERS ARE DANGEROUS. AT NO TIME SHOULD HANDS BE PLACED WITHIN THE HOPPER OR NEAR THE UNDERSIDE OF THE CUTTING CHAMBER DURING OPERATION.**

7. The machine LOADING HOPPER has been fitted with an electrically interlocked emergency stop bar, in accordance with BS.5304:1988 'Safety of Machinery'.

   IT IS STRICTLY ADVISED THAT THE HOPPER IS NOT REMOVED WITHOUT FIRST ISOLATING THE MACHINE FROM ITS ELECTRICAL SUPPLY.

8. The machine and its electrical controls should be inspected and properly serviced by qualified competent engineers on a regular basis.

9. It is the responsibility of the user to ensure that any other equipment, used in conjunction with the shredder and not supplied by Meltog Limited, is safely guarded and complies with H.A.S.A.W. Regulations in force at the time.

ALWAYS ISOLATE THE MACHINE BEFORE ATTEMPTING TO CARRY OUT MAINTENANCE PROGRAM.

MECHANICAL MAINTENANCE

A clean machine will work more efficiently and give a more trouble free service life.

WEEKLY

Check **PRIMARY GEARBOX** lubrication level and maintain a level visible in the sight-glass.

Check **SECONDARY GEARBOX** grease level on dip stick (integral with the filler cap) and maintain to green marker level.

Use gearbox oil of typically ISO 100 Viscosity for ambient temperatures in the range 7 deg C to 27 deg C.

Or, for other appropriate ambient working temperatures as according to ISO 3448 (BS 4231 1:1992)

The Primary Gearbox oil should initially be changed after 500 working hours and subsequently at 2,500 working hours or every 6 months thereafter.

6 MONTHLY In addition to above.

NON-DRIVE END BEARINGS - Bearings are oil lubricated and should be maintained as above.

In order to verify the integrity of the bearing seals and locking screws it is advised to inspect at this time. This can be achieved by simply removing the housing end caps.

The locking screws were torque tightened at the factory and should not require attention. If, however, it becomes necessary to remove, their refitting will require a torque setting of 160Nm.

GENERAL

Ensure cutters and ploughs are clear of debris. Inspect cutter hooks for tip damage or excessive wear.

Check correct operation of the control panel and safety switches.

A sharp cutter edge is not essential for shredding most materials.

For continued reliable operation of the shredder we recommend Periodic Inspection and Service by Meltog Specialist Service Engineers.

ELECTRICAL SPECIFICATION

The electrical controls are contained in an IP65 enclosure and mounted remotely to the machine.

ISOLATOR

A mains supply isolator is provided with facility to lock if required.

TRANSFORMER

Provides a step-down of voltage supply for the control section of the panel at 24v.

EMERGENCY STOP SAFETY RELAY

An emergency stop safety relay is supplied to break the control supply in the event of an emergency.

FUSES

Anti-surge type fuses protect the control wiring and components.

TIMER NETWORK (INTERNAL TO PLC)

A control network for automatic operation of the Forward and Reverse contactors during a recovery cycle.

CURRENT TRANSFORMER (CT)

For use with current sensing relay. The transformer output is proportional to the current flowing in the motor conductor, fed through the core.

CURRENT SENSING RELAY

Monitors the current passed through the current transformer (CT). Thus, the relay senses current levels. The relay will energise when input reaches the set value and releases when current drops below the hysteresis threshold, which is at a percentage below the set value. The current sensing relay also incorporates a built in delay timer to allow for the motor start up current.

RELAYS

Relays are used to provide Start Latching and recovery enable functions.

RECOMMENDED ELECTRICAL SPARES LIST

QTY	DESCRIPTION	PART NO.
1	Contactor 24v coil	E19 000 162
1	Current relay	E04 000 092
2	Anti-surge fuse 2A	E10 000 121
2	Bulbs 24v	E18 000 090
1	Circuit Breaker 5a	E10 000 050
1	Circuit Breaker 2a	E10 000 049

RECOMMENDED MECHANICAL SPARES LIST

QTY	DESCRIPTION	PART NO.
(Combination set of 4 cutters)		
1	Cutter	SH1-216
1	Spacer	SH1-158
2	Bearings	AAA 110 050
2	Bearings	AAA 100 045
3	Seal (Nitrile)	HOS 100 070
1	Seal (Nitrile)	HOS 110 080
2	'O' Ring	HOR 000 003
2	'O' Ring	HOR 000 004

REPAIR INSTRUCTIONS

Within the contents of this section are the instructions dealing with the dissembling and assembling of the Shredder, when the need to replace worn or broken parts, or when strip down for close inspection is required.

The Shredder has been designed to achieve the minimum of strip down, particularly around the Cutter Chamber area. See Fig.2 Typical Cutter Box Layout.

When it is necessary to replace Cutters or to change a Cutter set-up, the Hopper Access plate at the non drive end will require removing, (if necessary the Hopper can be removed) and in turn the End Plate. On removal of these items, the Cutter Shafts will be easily accessible to enable the Cutters and Spacers to be removed and replaced with the Shafts in situ.

To replace or inspect items contained within the Gearbox, it will be necessary to drain the oil by removing the drain plug on the underside of the Gearbox.

When carrying out the following instructions, careful removal and fitting of items are essential, to ensure the efficiency of the Shredder. All worn parts should be checked and replaced as necessary, particularly Bearings and Oil Seals.

The Shredder is built to metric dimensions throughout including fastenings. Screws fitted are of ISO Metric Screw Threads to British Standard BS 3643.

1 TO REMOVE HOPPER ACCESS PLATE (OR HOPPER)

1.1 Switch off and remove fuses from the mains isolator.

1.2 Remove the screws securing the Access Plate to the Hopper.

1.3 Remove the screws from the Safety Switch on the side of the Hopper. Lay the Switch to one side leaving the wiring and casing intact.

1.4 Remove the screws from the Hopper flange and lift off the Hopper.

2 REMOVING AND REPLACING CUTTERS AND SPACERS

2.1 Remove the screws securing the End Cover to the End Plate and remove the cover to gain access to the Bearing Retainer, Bearings, Seal Housings, Seals and '0' Rings.

2.2 Remove the screws securing the Bearing Retainer to the Shafts and remove the Bearing Retainer from the Shaft to release the Bearings, Seal Housing, Seal and '0' Rings.

2.3 Remove the Spacers to gain access to the Cutters. The end of the Cutter Shafts are completely stripped.

2.4 Remove the screws securing the End Plate and jack evenly to disengage the End Plate from the Dowels. Remove the End Plate clear of the chamber.

2.5 On completing the strip down the Cutters and Spacers can now be removed alternately from each Cutter Shaft. To replace or change the Cutter set-up, refer to paragraph 7.4 of this manual.

3 TO REMOVE MAIN DRIVE MOTOR

3.1 Switch off and remove the fuses from the mains isolator.

3.2 Disconnect all connections from the Terminal Box on the Motor, including the adapter securing the Anaconda Tubing to the Terminal Box. Withdraw all of the wiring and the Anaconda Tubing clear of the Motor.

3.3 Remove the screws around the flange securing the Motor to the Gearbox Front Plate.

3.4 Carefully lift the Motor free of the Spigot location in the Gearbox Front Plate of the Machine this will bring with it the Gearbox Drive Gear.

NOTE: When maintenance is confined to the replacement or servicing of the Motor, paragraph 3.1, must be carried out before detaching the Motor from it's mounting.

4 T0 REMOVE SHAFTS

4.1 Carry out fully the instructions contained in paragraphs 2 and 3 to remove the Cutters and the Motors.

4.2 Drain the oil from the Gearbox by first removing the dipstick complete with the breather plug. Place a tray under the Gearbox area and remove the drain plug from the underside of the Gear Box and drain off oil and refit the drain plug.

5 TO REPLACE BEARINGS & SEALS (CUTTER CHAMBER END)

5.1 Carry out instructions contained in paragraphs 2.1 to 2.5 to remove Bearing and Seal Housings. With the Housings removed replace Bearings or Seals as required.

NOTE: When fitting Seals ensure that these are fitted the right way round. The Seal has a sealing lip and spring which should be fitted facing away from the Cutter chamber.

6 TO REPLACE GEARS, BEARINGS & SEALS (GEARBOX)

6.1 Carry out the instructions contained in paragraph 4, with the Front Plate removed, replace items where required.

NOTE: When fitting Seals ensure that these are fitted the right way round. The Seal has a sealing lip and spring which should be fitted facing away from the Cutter chamber.

7 RE-ASSEMBLY OF CUTTERS AND SPACERS

7.1 With the Hopper removed and the Cutter Shafts dissembled to the instructions contained in paragraphs 1 and 2, replace the Cutters and Spacers as required, referring to the Cutter Layout drawing (fig.1)

NOTE: When replacing worn Cutters on double Cutter set-ups, Cutters in this set-up can sometimes be reclaimed if wear has taken place around the Shearing edge, providing the hooks are in good condition. If so, the Cutters can be turned around with the worn edges assembled in the Centre of each pair, the unused edges then become the Shearing edges.

7.2 Before fitting the Cutters and Spacers, ensure all butting faces are clean and free from grit, dirty Cutters and Spacers may cause ineffective clamping when finally tightened up, and may cause clamping between the two opposing Shafts if clearances between the overlapping Cutters are affected.

7.3 Refer to the Cutter Layout (Fig. 1) drawing for the Cutter set-up, and assemble Cutters and Spacers as illustrated. Slide the Cutters alternately onto each of the two Cutter Shafts, fitting Cutters and Spacers accordingly.

IMPORTANT!

Before assembling, refer to the Cutter Layout (Fig. 1) drawing. The sequence relating to the position of the Cutter hooks on assembly should be strictly adhered to, to achieve the best conditions in grabbing the waste material and Shredding.

For example, in the case of the 15mm single Cutter set-up, the hooks shown in the end view of these two illustrations are numbered 1 to 4 on each Shaft. The numbering of the hooks correspond to the position of the Cutters numbered 1 to 4 along each of the two Shafts shown in the plan view, and are positioned radially by virtue of the hexagon sections of the Shafts.

7.4 On completing the assembling of Cutters and Spacers to the Set-up required. Refit the Wear Plate to Cutter Chamber End Plate. Locate the End Plate on the four Dowel Pins and secure with the screws and spring washers.

7.5 Refit the Seal Housings into the End Plate.

7.6 Refit the Seals into the Seal Housing.

NOTE: When fitting Seals ensure that these are fitted the right way round. The Seal has a sealing lip and spring which should be fitted facing away from the Cutter chamber.

7.7 Refit the Spacers and ensure `O' Rings are in good condition and positioned correctly in the annular grooves of the Spacers.

7.8 Refit the Bearings and the Bearing Retainer and tighten to the recommended torque to secure the Cutter Shaft Assemblies.

7.9 Refit the End Cover to the End Plate and apply sealing compound to joint faces. Secure with screws and spring washers.

7.10 Refit the End Cover ensuring that it is filled with oil to a level just below the Bearing Retainer.

7.11 Refit the Motor spigot into the Front Plate of the Gear Box. Secure the Motor with the screws removed when dissembled.

7.12 Reconnect the wiring and the Anaconda tubing to the Motor Terminal Box and refit the Terminal Box Cover. On testing the machine on completion of the re-wiring, refer to the `Installation' section to check rotation of the Cutter Shafts.

For Technical Information of Servicing, please contact the Sales and Service Department at the following address:-

MELTOG SERVICE DEPARTMENT
MELTOG LIMITED
GELDERD ROAD
BIRSTALL
WEST YORKSHIRE
WF17 9LW
ENGLAND

TELEPHONE :- 01924 422822
FAX :- 01924 422155

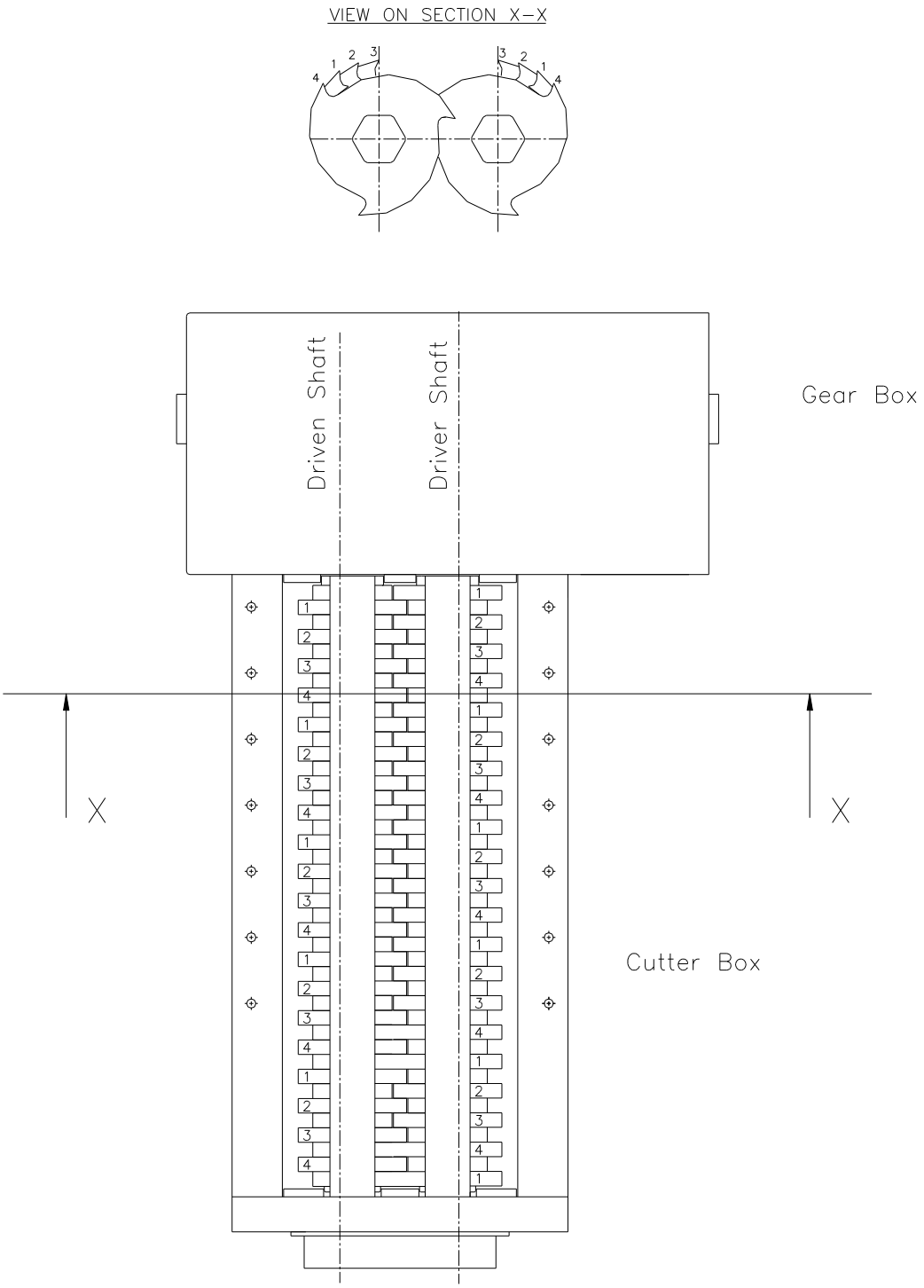

Fig.1 TYPICAL CUTTER LAYOUT – SINGLE SPIRAL SHOWN Iss.A

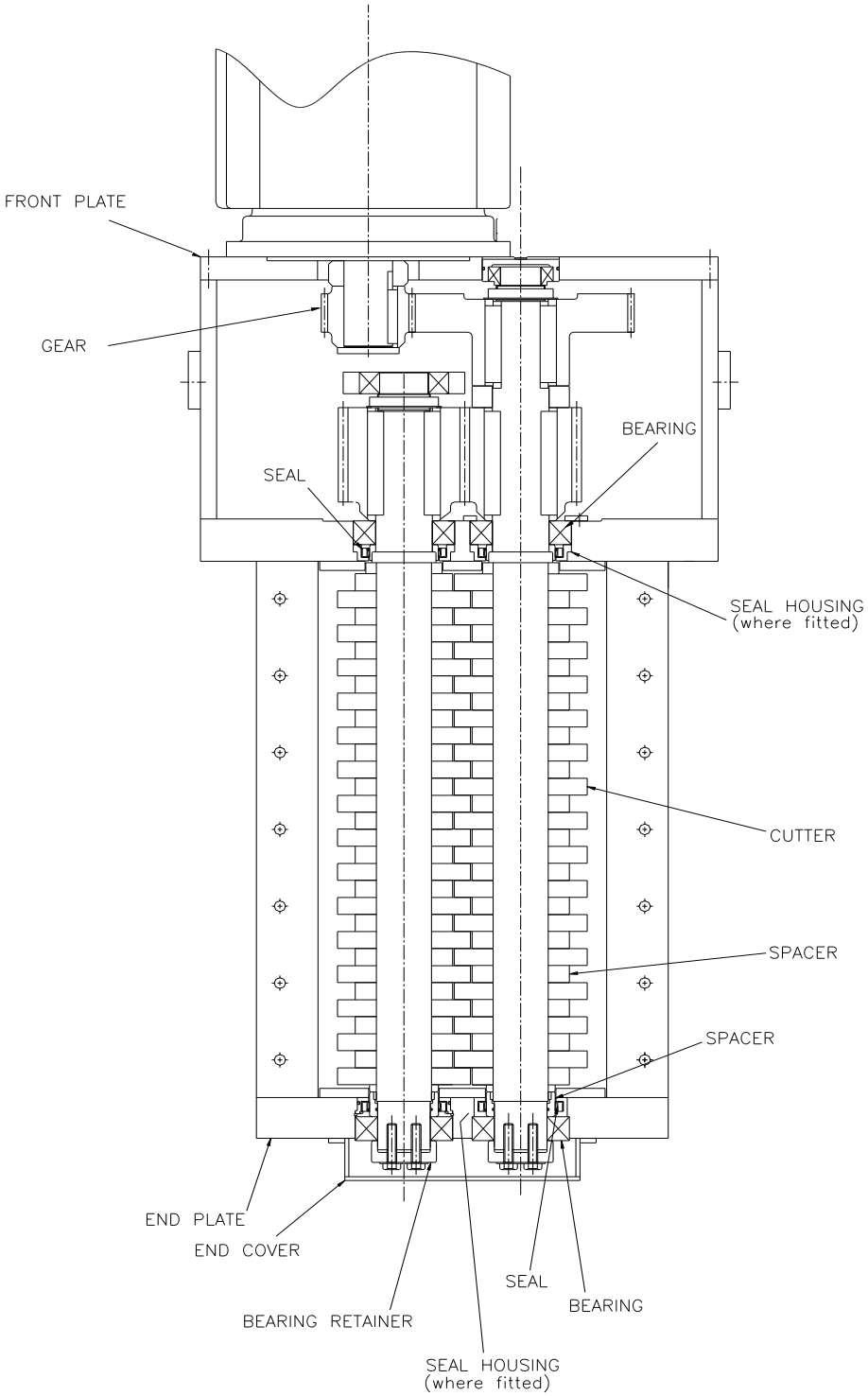

Fig.2 TYPICAL CUTTER BOX LAYOUT Iss.A