



SCHAEFF & CO UK

WS120
HYDRAULIC
CUTTING UNIT

MANUAL

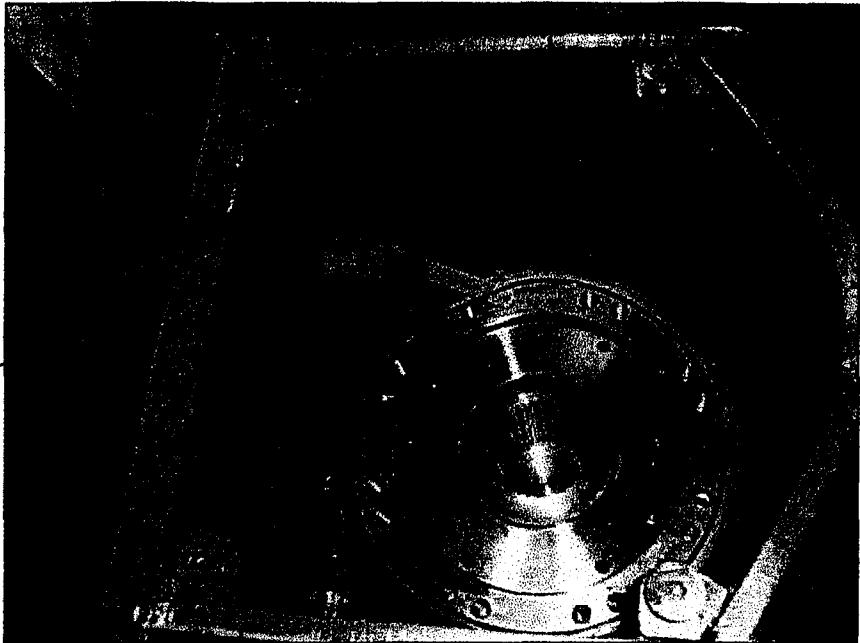
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Changing the Hydraulic Motor to Gearbox Housing O'Ring

Remove the hydraulic motor (see Removing the Hydraulic Motor).

With the motor removed the Gearbox Housing O'Ring Seal (A) can be accessed.

A



Changing the Hydraulic Motor to Gearbox Seal and the Seal Carrier to Gearbox O'Ring

Remove the hydraulic motor (see Removing the Hydraulic Motor).

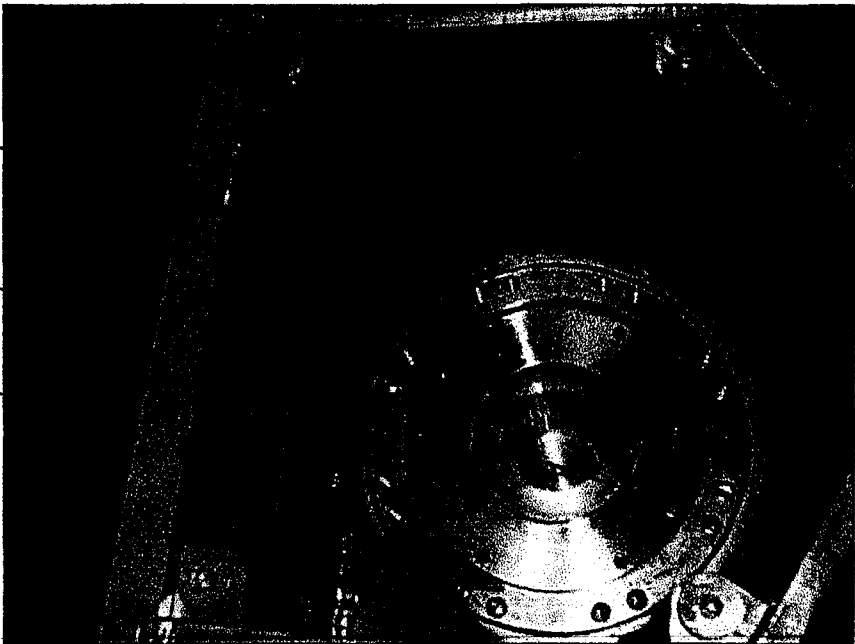
Remove the 6 M6 caphead bolts (A).

Using the two M6 tapped holes (B) remove the seal carrier (C).

A

B

C



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Changing the Hydraulic Motor Displacement

The displacement of the hydraulic motor can be adjusted so the hydraulic cutting unit can work with different flow outputs from hydraulic excavators. This should not be done without first consulting the Webster Schaeff Technical Department (see Technical Description).

Remove the hydraulic motor (see Removing the Hydraulic Motor).

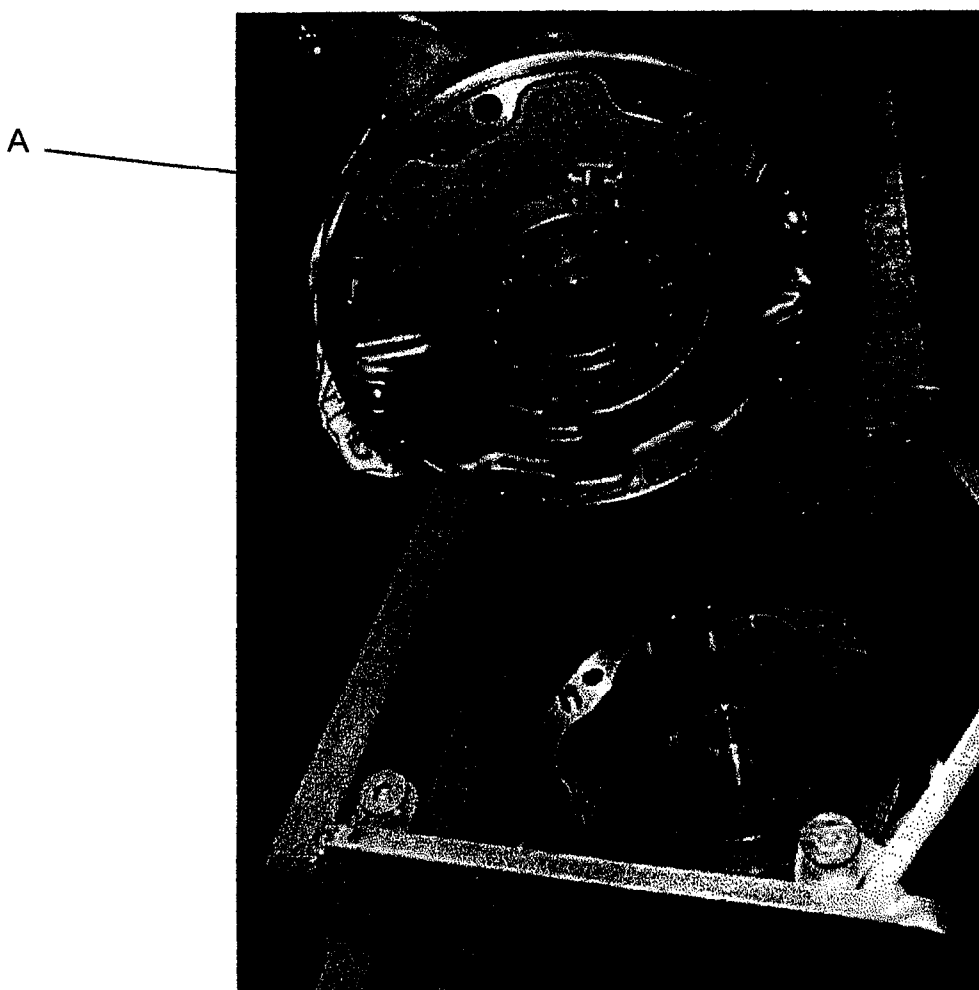
The displacement can now be altered by substituting the cam ring for one with a different displacement.

IMPORTANT – the motor must be purged before starting (see Priming the Hydraulic Motor Casing).

Changing the Hydraulic Motor Distributor to Cam Ring O'Ring Seal

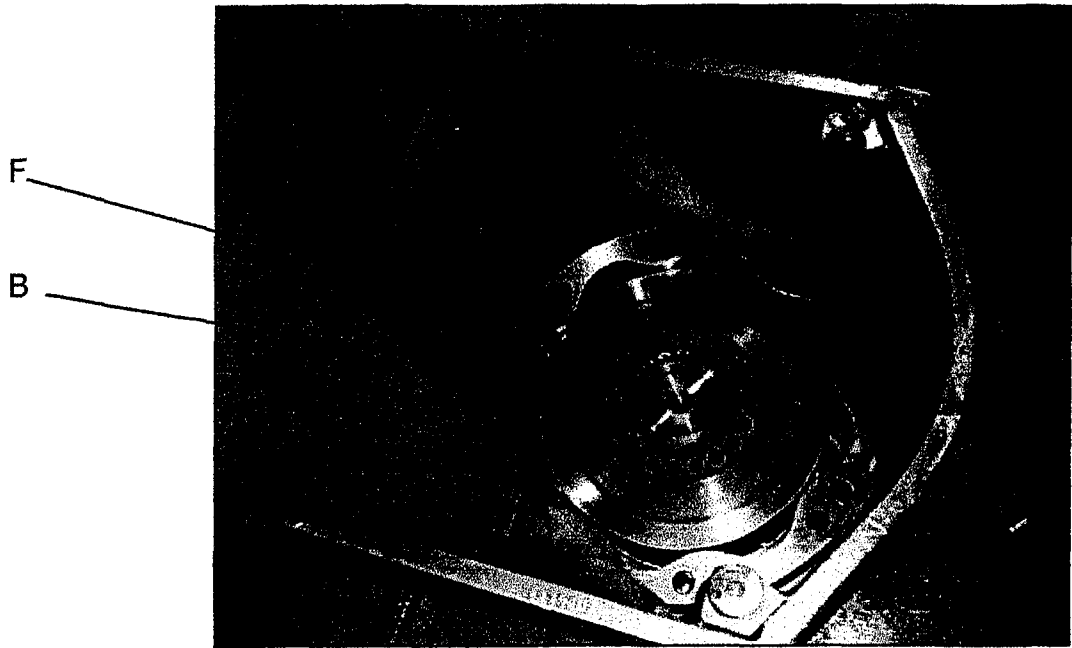
Remove the hydraulic motor (see Removing the Hydraulic Motor).

With the distributor removed from the cam ring the O'Ring (A) can be replaced.



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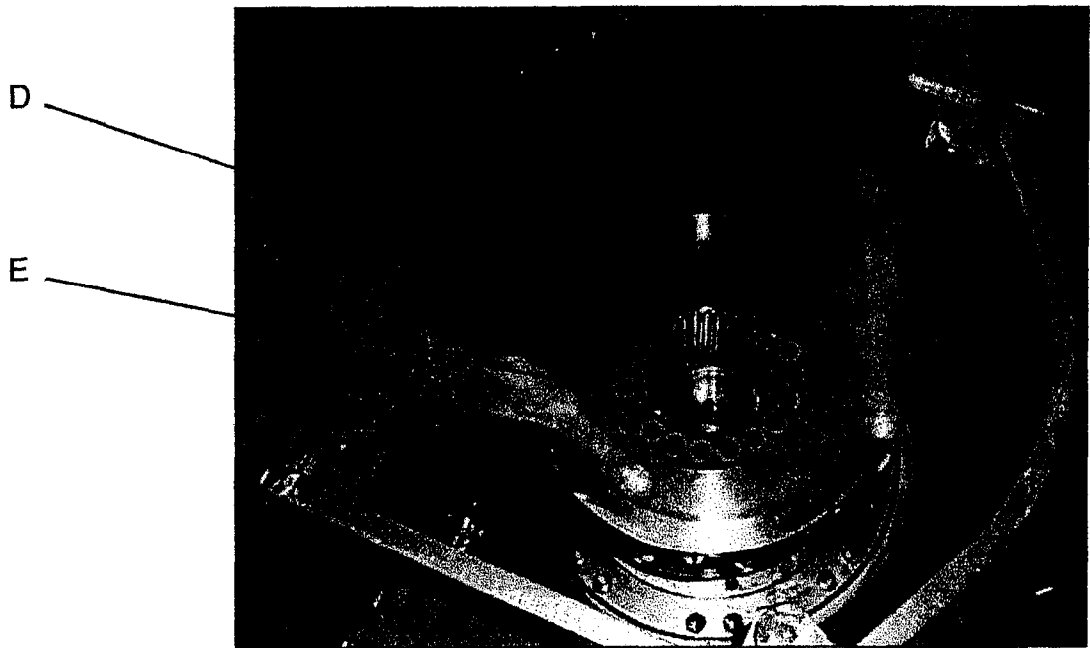
The top half of the motor (distributor) can now be removed followed by the cam ring (B).



The piston carrier (D) can now be lifted from the drive shaft spline. When refitting piston carrier, ensure the distribution holes (E) are pointing upwards and the countersunk holes (F) on the cam ring are pointing down.

Reassembling the motor is the reverse procedure. It is **IMPERATIVE** that all parts are **scrupulously clean** and the motor is **primed** (see **Priming the Hydraulic Motor Casing**).

Ensure all bolts are correctly torqued (see Bolted Joints for torque settings).



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Checking the Condition of the Hydraulic Motor

The following procedure must only be carried out by a responsible person familiar with the workings of hydraulic systems.

Switch off the engine of the host vehicle.

Ensure the hydraulic oil is not too hot.

Disconnect the drain line hose of the hydraulic motor and place the section of the hose from the motor into a bucket of known capacity or similar measuring device.

Start the engine and run the motor at low speed.

Note the flow rate of the oil from the line, it should be no more than 2 lpm.

If the flow is within 2 lpm, increase the motor speed up to full speed noting any increase in flow. At full speed the flow should be no more than 4 lpm.

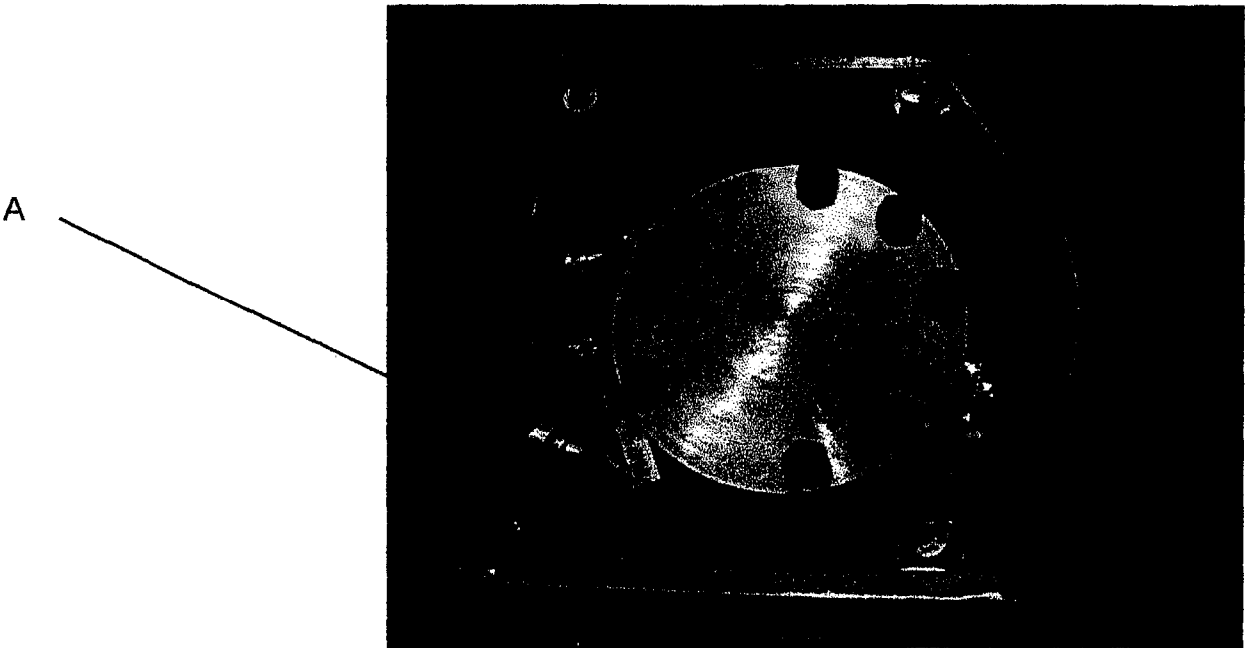
Removing the Hydraulic Motor

It is recommended you contact Webster Schaeff Technical Department before carrying out the following procedure as your warranty may be affected.

Switch off the engine of the host vehicle and ensure the hydraulic oil is not too hot.

Remove the hydraulic motor cover plate.

Disconnect the hoses to the hydraulic motor and remove the M16 bolts (A).



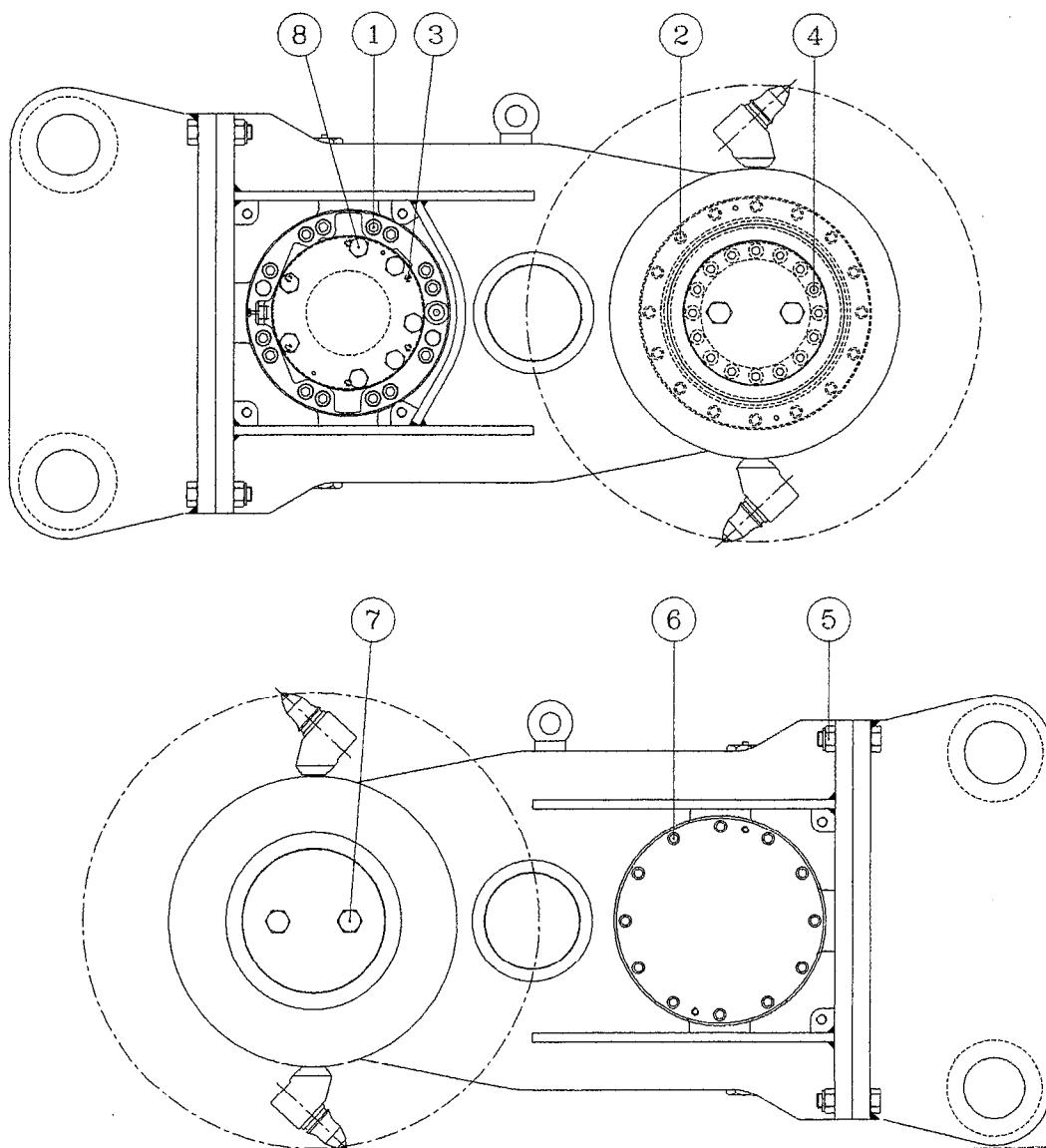
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Bolted Joints

- **IMPORTANT :-** Replace nuts and bolts after disassembly.

It is recommended Loctite 242 threadlocker is used were shown for extra security.

REF	DESCRIPTION	DIMENSION	TIGHTENING TORQUE (Nm)	LOCTITE	QUANTITY
1	Hydraulic Motor to Gearbox Housing	M16	300	-	14
2	Seal Carrier to Gearbox Housing	M12	135	✓	16 (each side)
3	Seal Carrier to Gearbox Housing	M6	16	✓	6
4	Cutting Head Clamping Element	M16	355	-	16 (each side)
5	Adapter Plate to Gearbox Housing	M24	660	✓	10
6	Pinion Shaft Cover Plate	M12	135	✓	12
7	Dust Cover	M24	660	✓	2 (each side)
8	Hydraulic Motor Crank Case Cover	M20	385	✓	7



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MAINTENANCE

Maintenance Schedule

The following checks are recommendations for a maintenance schedule and should be altered according to usage and familiarity with the unit.

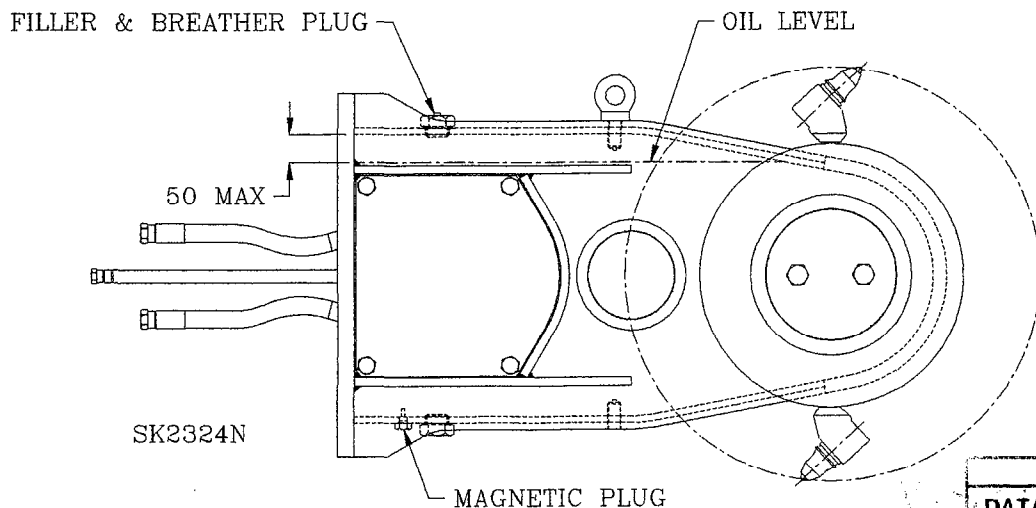
The operator must be instructed to wear the appropriate level of personal protective equipment when changing the gearbox oil or when exposed to the oils used in the hydraulic system. The used oil must be collected and stored in a suitable container, prior to disposal in an approved manner.

- Pre – Shift
 - Check cutting heads are securely fastened.
 - Check all bolted joints.
 - Check for leaks and damage on hoses.
 - Check gearbox oil level (see maintenance, Oil Level).
 - Check for leaks on gearbox.
 - Check all picks and boxes for wear and replace with new where necessary.
 - Ensure gearbox breather is clear (see maintenance, Oil Level).
 - Check for leaks on Hydraulic Motor.
- Every 100 Hours/
2 weeks
 - Check hydraulic motor (see maintenance, checking the Condition of Hydraulic Motor).
 - Remove and clean magnetic plug.
 - Check torque settings (see maintenance, Bolted Joints).
- Every 1400 Hours/
6 months
 - Webster Schaeff or Appointed Distributor Service Review

Oil Level

Fill gearbox using filler plug (see figure). Set level with gearbox in horizontal position. Gearbox capacity approximately 37 litres.

BP	ESSO	CASTROL	MOBIL	SHELL	TEXACO	TOTAL	FUCHS
GRXP 320	SPARTAN EP320	ALPHASP 320	MOBIL GEAR SCH 320	SHELL GEAR	MEROPA 320	TRANSSTATE	POWER GEAR



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OPERATOR'S INSTRUCTIONS

Safety

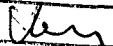
Ensure all the following safety messages are read, prior to using or servicing the unit, to avoid personal injury.

- Ensure the area is clear of personnel before and during operation of the cutting unit. The cutting unit will produce small fragments that can be hurled a certain distance from the head. Ensure no personnel or equipment is within the area. If anyone enters this area, stop cutting and turn off the engine of the excavator.
- When leaving the excavator, place the head on the ground and turn off the engine.
- Never touch the cutting head when it is rotating.
- Always stop the engine and remove the keys when inspecting or servicing the unit.
- Do not adjust hydraulic valves or any part of the hydraulic system whilst the machine is running.
- Always change frayed or damaged hoses as soon as possible.
- Always use specified equipment and change immediately if damaged.

Operation

Ensure that the maintenance schedule has been adhered to before operating the machine.

- Operate the handles smoothly without jerking. If the cutting head stalls, back off the hydraulic excavator ram. Do not overload the picks as this may cause damage to the unit (see installation details for ram settings).
- Do not operate the unit at the end of the stroke of an hydraulic excavator ram.
- Do not use the cutting drum with damaged or missing picks as this causes vibration and may damage the unit or excavator.
- The unit should never be run in reverse rotation.
- Never try to cut with the unit whilst tracking the excavator as this may cause damage to the unit.
- Never place the cutting head against the working surface before starting the unit as this may damage the unit. The unit should be running and fed into the working surface at a rate that does not allow stalling.
- Periodically check that the cutting head is clear of debris as this can affect the overall cutting rate. Always ensure that the cutter unit or any part of the unit is correctly supported during any maintenance work.
- Only personnel with suitable training/knowledge should maintain and operate the machinery.

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Starting-Up

Before starting up, the pre-shift maintenance schedule must be performed and torque settings checked.

Ensure the hydraulic circuit complies with the relevant technical description for the unit.

The gearbox must be operated for a running in period before any cutting can be performed.

During the running in period the oil temperature should be checked – between 50° and 60° is acceptable. Under no circumstances must it exceed 80°. If this occurs, the cooling circuit must be redesigned.

After the running in period the flows and pressures should be checked out and reset if necessary.

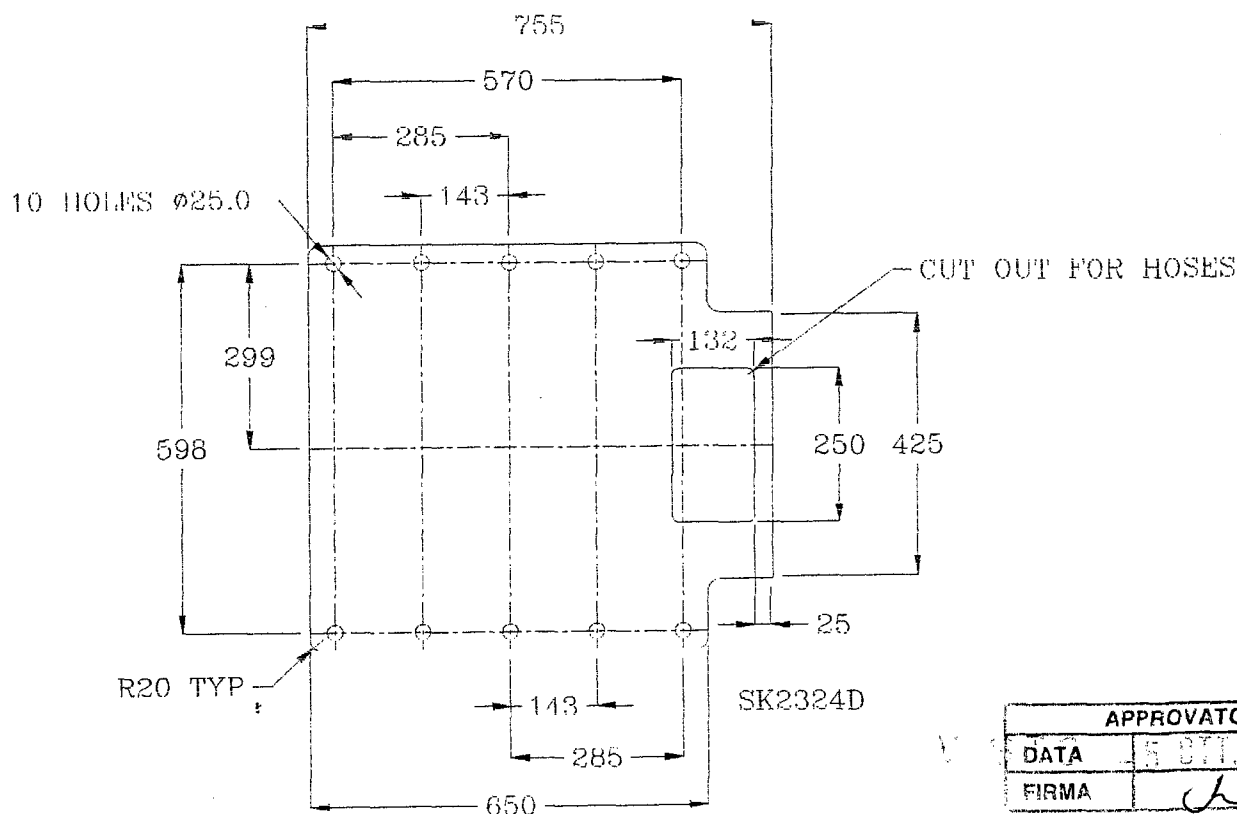
Hydraulic motor casing must not exceed 75 bar.

Lifting

A lifting lug is supplied for lifting the Hydraulic Cutting Unit. The lifting lug has a safe working load of 2500 kg (BS 4273). Ensure the lug is not damaged and is securely fastened before use. It is recommended that the lug be removed before operating the unit to prevent damage.

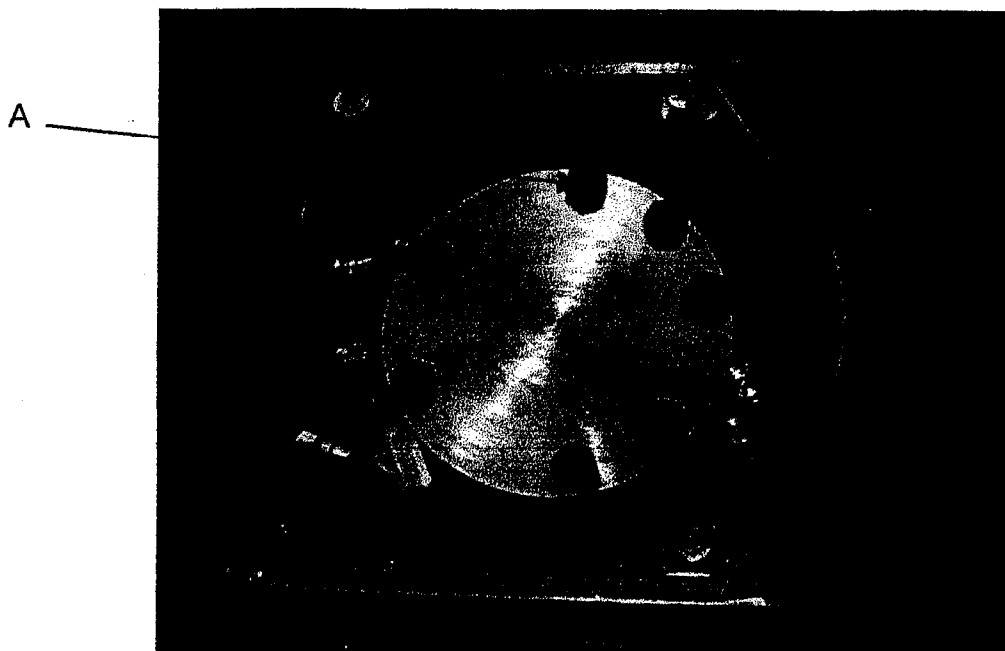
Gearbox Rear Plate Details

The following dimensions give the details of the gearbox rear plate to assist in the manufacture of an adapter bracket.



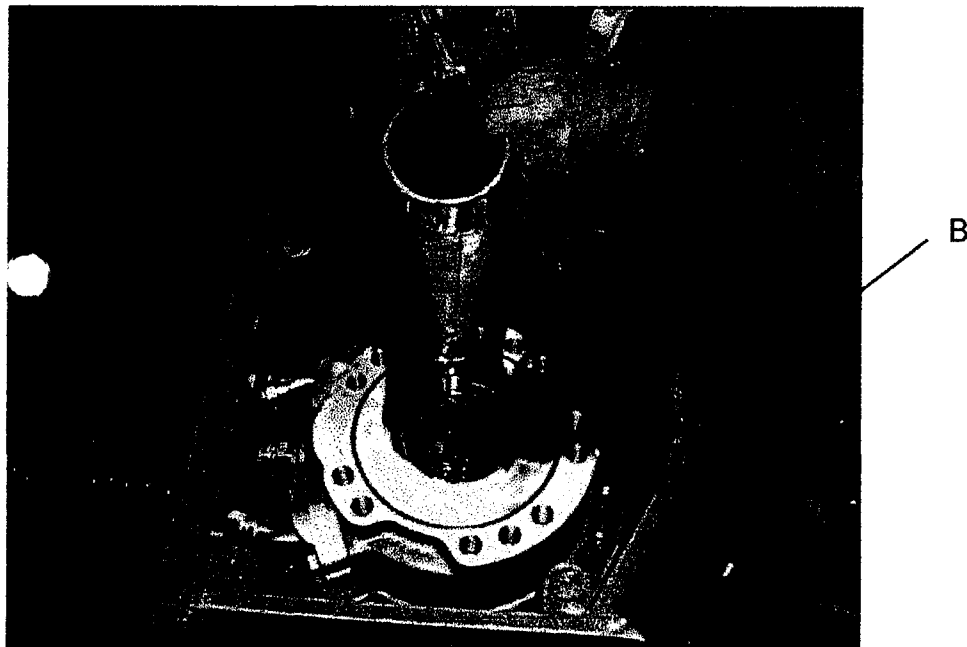
Alternatively the motor can be primed with the gearbox on its side and the crank case cover removed:-

Remove the 7 M20 hexagon bolts (A) securing the crankcase cover.



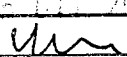
Remove the purge screw (B).

Pour oil into motor, **ensure clean oil is used and no dirt is allowed to enter motor**, until it flows from purge screw hole (B).



Replace the purge screw (B) and fill to top.

Replace crankcase cover, ensure correct torque setting is used for bolts (see Bolted Joints).

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Pollution and Filtration

A low level of pollution will ensure that the moving parts of the hydraulic motor (piston, distribution) have a longer lifetime.

A pollution level lower than class 9 of NAS 1638 is recommended (18/13 of ISO.4406).

Note: Failure to maintain the required filtration can affect the manufacturer's warranty on the hydraulic motor.

Hydraulic Oil

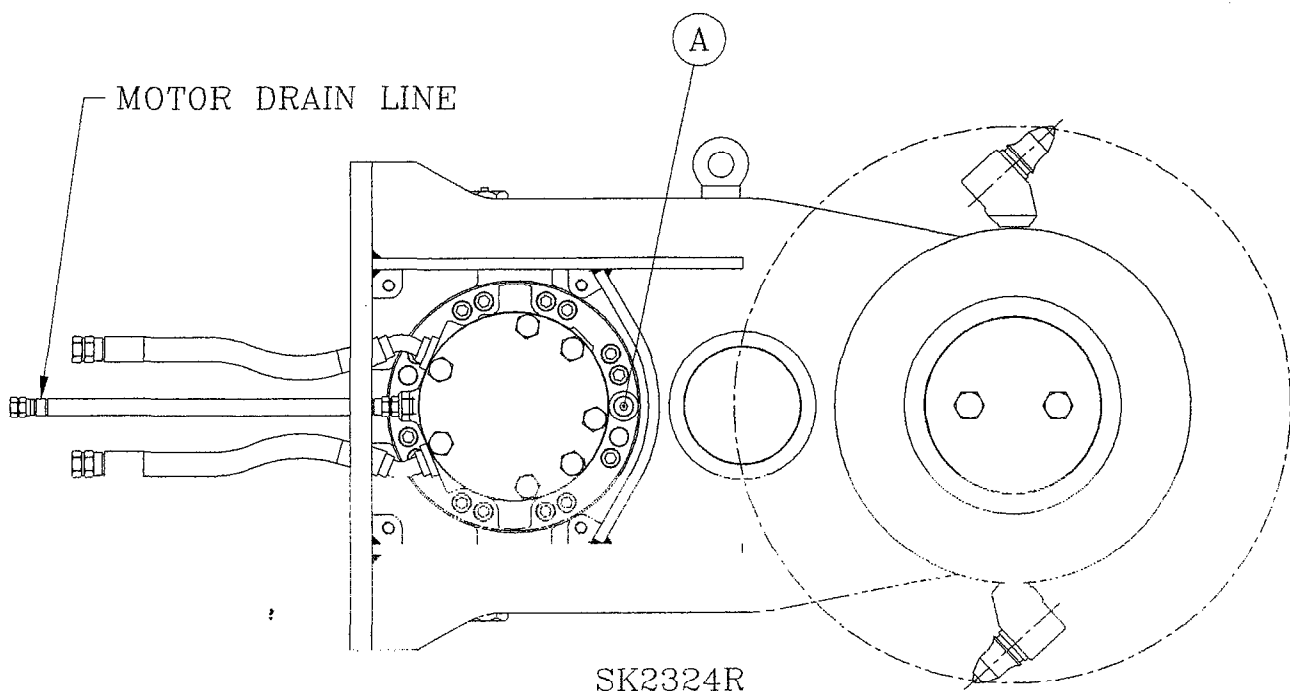
- Oil type HV 46 or 68
- HV mineral oils possessing improved viscosity / temperature properties (DIN 50524, part 3).
- Class 46: Viscosity is at 40°C
- Class 68: Viscosity is at 40°C

If the oil type is below 46 centistokes at 40°C (ISO HV46) the performance must be down-rated. Please consult Webster Schaeff technical department for further information.

Priming (Filling) the Hydraulic Motor Casing

It is **IMPERATIVE** that this operation is performed before start-up.

- Ensure operator is equipped with the appropriate level of personal protective equipment exposed to the oils used in the hydraulic system before performing this task.
- Disconnect the motor drain line at the reservoir end (before the filter). Fill the casing via this line.
- Unscrew the purge screw (A).
- Re-tighten the screw (A) when oil flows from this screw (Motor casing capacity 4 litres).
- Reconnect the leakage line.



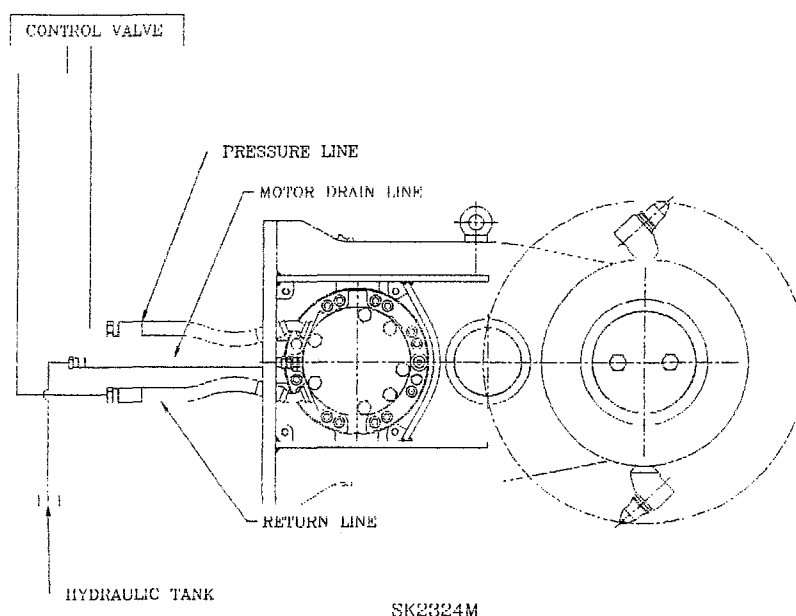
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Hydraulic Connection

It is recommended that simultaneous pressure and flow tests be carried out prior to working the unit to establish the available hydraulic power. Alternatively a power curve should be obtained from the excavator manufacturer that relates to the hydraulic circuit that the cutting unit will run from. The maximum flow rate should also be established. Values should be compared against the units working parameters (see Technical Description). Failure to comply can effect the warranty on the unit. The Webster Schaeff Hydraulic Cutting Unit can be fitted to the excavator's circuit in the following way:

This is the most efficient way of connecting in to the circuit and will ensure the hydraulic cutting unit is using the maximum available power. The drain line of the hydraulic motor returns directly to the excavator's hydraulic tank. This method is dependent on there being a pressure difference of approximately 15 bar between the return line of the hydraulic motor and the drain line of the hydraulic motor. If the hydraulic motor is noisy during operation (rattles) then there is insufficient pressure difference and a check valve (5 - 10 bar) will be required in the return line. If the return line is to be connected directly to tank it is recommended that this line return through a filter.

The pressure in the drain line must not exceed 25 bar.



The hosing is to be supplied and fitted by the customer. It is recommended that a service engineer from the excavator's manufacturer is used for the changes made to the excavator.

Three hoses are supplied with the WS-120 Hydraulic Cutting Unit :-

2 off – 1" bore hose with a 1.1/4" S.A.E. flange 45° swept elbow code 62 (6000 series) end and 1" BSP Female end x 2m long – maximum working pressure 320 bar.

1 off – 1/2" bore hose with 1/2" BSP Female ends x 2m long – maximum working pressure 362 bar.

It is recommended that at least 1" bore hoses to SAE 100 R13 or equivalent (maximum working pressure 320 bar) are used for the motor pressure and return lines and a low pressure 1/2" bore hose for the motor drain line.

The hoses must be attached to the excavator dipper arm in a position that will allow hoses to move freely through the entire stroke of the dipper ram.

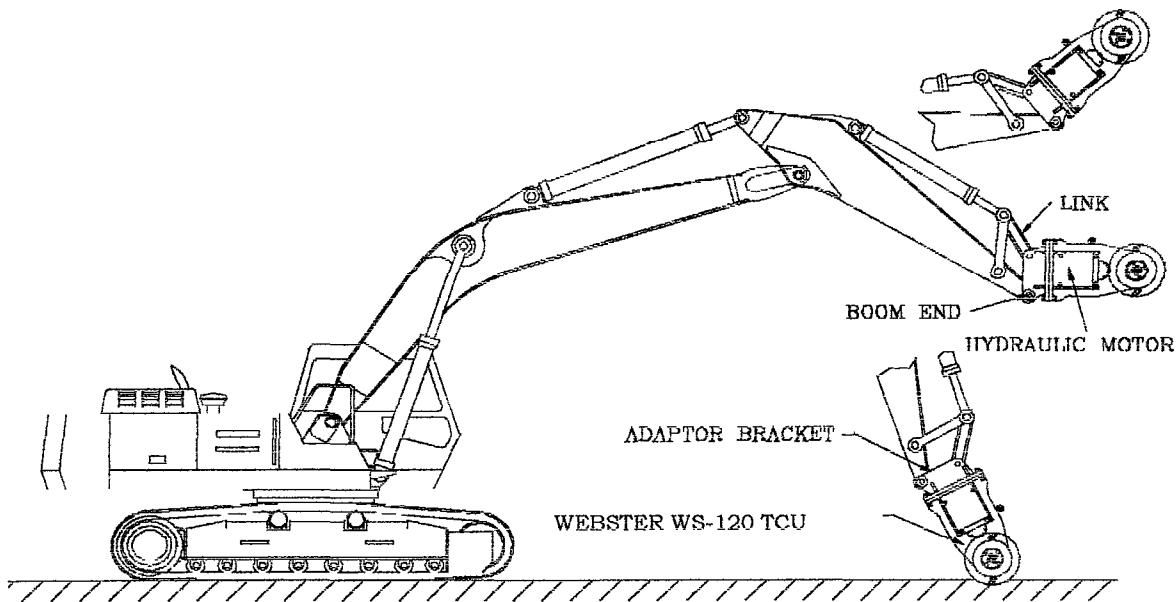
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INSTALLATION

Adapter Bracket

The WEBSTER SCHAEFF HYDRAULIC CUTTING UNIT requires an adapter plate in order to fit onto the excavator. The adapter bracket of the cutting unit uses the existing pins of the excavator. The cutting drums are designed to cut downwards i.e. the hydraulic motor will be on the right hand side looking from the drivers cab.

The following information will be required to allow an adapter bracket to be manufactured to suit the excavator base vehicle.



Boom Pin Diameter, Y2

Link Pin Diameter, Y1

Clearance Over Link, X1

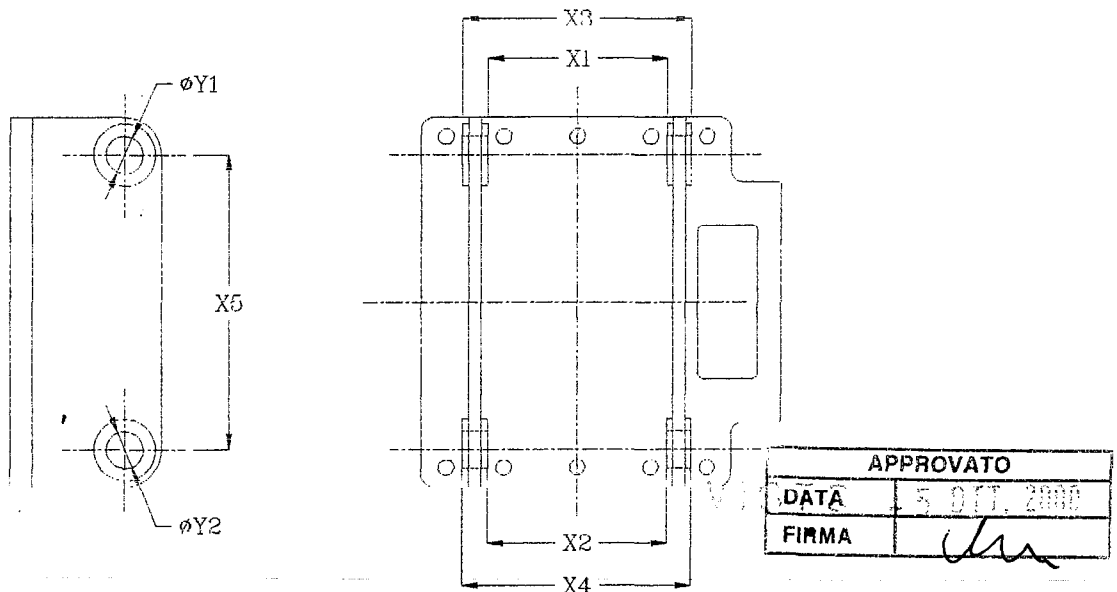
Clearance Over Boom, X2

Link Pin Length In Bosses (not including additional length for retention), X3

Boom Pin Length In Bosses (not including additional length for retention), X4

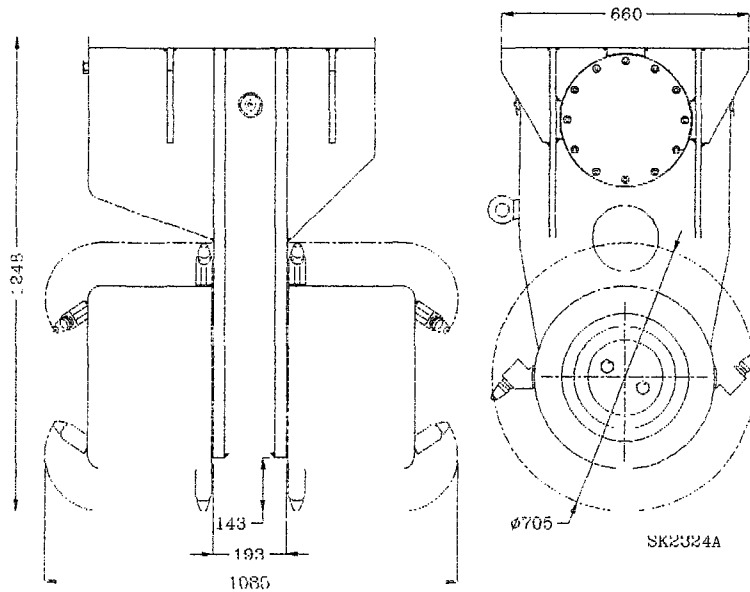
Pin Centre Distance, X5

The maximum force that can be applied on to the cutting head (excavator break out force)



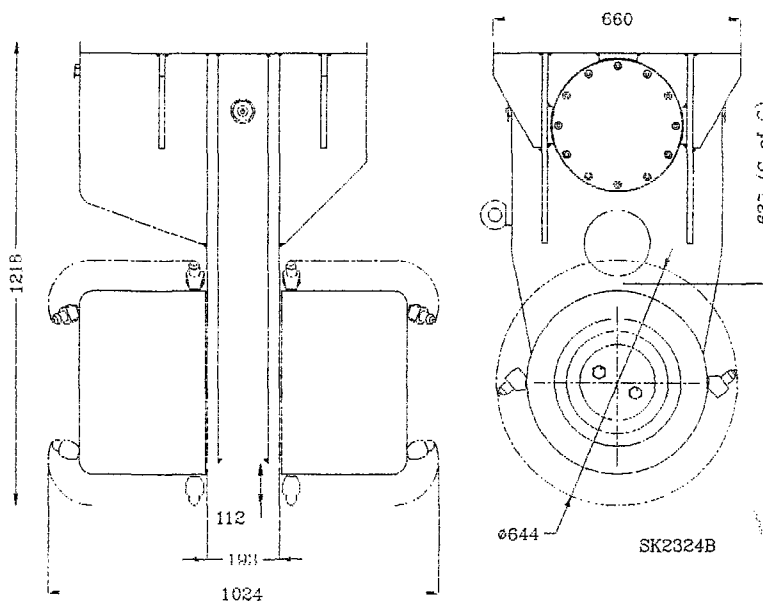
WS-120 Rock Drums

- Pick speed - 2.5 m/s @ 67.5 rpm 8.2 ft/sec.
- Pick Force - 76 kN @ 26855 Nm 17100 lb @ 19808 lb ft



IS-120 Scaling / Grinding Drums

- Pick Speed - 2.3 m/s @ 67.5 rpm 7.5 ft / sec.
- Pick Force - 83 kN @ 26855 Nm 18675 lb @ 19808 lb ft



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TECHNICAL DESCRIPTION WS-120

The Webster Schaeff WS-120 Hydraulic Cutting Unit can be supplied with either scaling / grinding cutting drums or rock cutting drums (if different diameters, widths and / or picks are required contact Webster Schaeff & Co Technical Department).

A range of motor displacements are available to suit different pump outputs.

WS-120HD Specification (High Displacement)

Maximum Input Power	- 120 kW	- 161 hp
Recommended Flow	- 460 lpm (max 500 lpm)	- 121 US gpm (max 132 US gpm)
Maximum Pressure	- 375 bar	- 5440 psi
Gearbox Ratio	- 1.61 : 1	
Output Shaft Torque	- 32264 Nm @ 300 bar	- 23797 lbft @ 4350 psi
Output Shaft Speed	- 68.1 rpm @ 460 lpm	- 68.1 rpm @ 121 US gpm
Unit Weight	- 1845 kg	- 4067 lb

WS-120MD Specification (Medium Displacement)

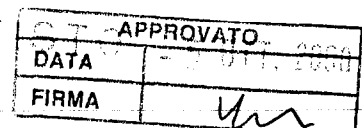
Maximum Input Power	- 120 kW	- 161 hp
Recommended Flow	- 380 lpm (max 500 lpm)	- 100 US gpm (max 132 US gpm)
Maximum Pressure	- 450 bar	- 6526 psi
Gearbox Ratio	- 1.61 : 1	
Output Shaft Torque	- 26855 Nm @ 300 bar	- 19808 lbft @ 4350 psi
Output Shaft Speed	- 67.5 rpm @ 380 lpm	- 67.5 rpm @ 69.6 US gpm
Unit Weight	- 1845 kg	- 4067 lb

WS-120LD Specification (Low Displacement)

Maximum Input Power	- 120 kW	- 161 hp
Recommended Flow	- 340 lpm (max 460 lpm)	- 89.5 US gpm (max 121 US gpm)
Maximum Pressure	- 450 bar	- 6526 psi
Gearbox Ratio	- 1.61 : 1	
Output Shaft Torque	- 24150 Nm @ 300 bar	- 17813 lbft @ 4350 psi
Output Shaft Speed	- 67.2 rpm @ 145 lpm	- 67.2 rpm @ 38.2 US gpm
Unit Weight	- 1845 kg	- 4067 lb

If oil specification is below 46 centistokes at 40°C (ISO HV46) the performance must be downrated.

Please consult Webster Schaeff Technical Department for further information.



Adaptor Bracket

Details of the boom end, bucket link and pin sizes will be required to supply an adapter bracket for the hydraulic cutting unit. The adapter bracket bolts to the back of the hydraulic cutting unit allowing for a range of different bracket types (see Installation, Adapter Bracket & Gearbox Rear Plate Details).

Cutting Drum Selection

Details of the standard cutting drums available with the hydraulic cutting unit are given in the Technical Description. The Rock Drums are used for excavating soft to medium rock with the picks laced to give the most efficient cutting rates possible.

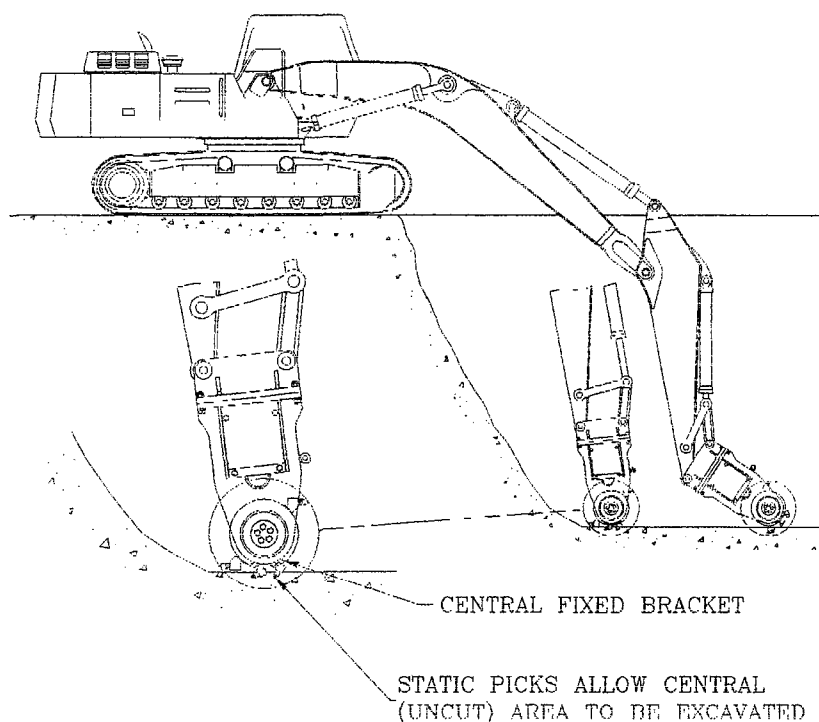
The Scaling/Grinding Drums are used for profiling and grinding where an accurate or relatively smooth finish is required. These drums will produce small rock chippings and hence are not an efficient means of excavation.

Different drum widths, diameter and pick types can be supplied by consulting the Webster Schaeff Technical Department.

Trenching

The Webster Schaeff Hydraulic Cutting Unit is used extensively in trenching applications as a result of its ability to leave an accurate and profiled wall. For trenching applications the distance across the drums can be set to give the exact trench width. However, this will result in a central piece being left unexcavated where there cannot be any picks due to the nature of the twin drum arrangement. In this case, a central bracket is available with static picks to break the remaining rock using the action of the excavator bucket ram.

Consult this Webster Schaeff Technical Department if this is a requirement.



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SELECTION

Before selecting a Webster Schaeff Hydraulic Cutting Unit the hydraulic circuit of the base vehicle should be fully investigated. Follow the check list below to help with this selection;

Auxiliary Circuit

Is there an auxiliary circuit installed on the machine? Most modern excavators are now supplied with an auxiliary circuit, usually for running a hydraulic hammer.

If there is a circuit available, can the flow and pressure be adjusted?

If a circuit is not available it is recommend one be installed by your local excavator dealer, or alternatively, one of the existing functions can be used to supply the hydraulic cutting unit (e.g. the bucket ram). However, this will limit the available movement.

Available Power

Most hydraulic excavators have two pumps driven from the engine and either one or both of these pumps will be supplying the auxiliary circuit. It is important that the number of pumps supplying this circuit is determine dot evaluate the available power to the hydraulic cutting unit, and hence the correct selection of hydraulic cutting unit. A rule of thumb is to take 45% of the engine power for each pump e.g.

Engine power = 100kW

Number of pumps on machine = 2

Number of pumps supplying auxiliary valve = 1

Available power to head = 45kW (max.)

Pressure Setting

One of the features of the Webster Schaeff Hydraulic Cutting Unit is the ability to run at high pressures. Apart from the increase in efficiency this means the hydraulic cutting unit can run at the maximum excavator pressure thus preventing any unnecessary heat generation.

Flow Setting

The recommended flow for the hydraulic cutting unit must not be exceeded (see Technical Description). This may mean that the auxiliary valve must have a means of adjusting the flow. It is also important that the flow to the hydraulic cutting unit is not too low.

Hydraulic Connection

The hydraulic cutting unit can be connected into the excavator circuit by one of two ways (see Installation, Hydraulic Circuit);

1. Drain line to tank – This is the most efficient way of connecting into the circuit and will ensure the hydraulic cutting unit is using the maximum available power. The drain line of the hydraulic motor returns directly to the excavator's hydraulic tank.

This can be a problem on excavators as a means of returning directly to the tank is not always available. If this is the case then the following circuit can be used.

2. Drain line coupled to return – This is an inefficient means of connecting into the circuit. However, it will allow the hydraulic cutting unit to be fitted to any excavator circuit. The drain line can be coupled into the motor return line as long as a flow restrictor is placed before the connection to ensure the return line pressure is always higher than that of the motor drain.

INTRODUCTION

The WEBSTER SCHAEFF HYDRAULIC CUTTING UNIT is to be used in conjunction with an excavator and has the power and flexibility for a range of applications. The cutting drums will

ERROR: IOError
OFFENDING COMMAND: %image_file_continue

STACK:

-mark-
-savelevel-