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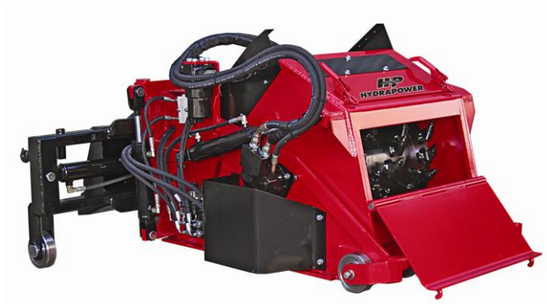
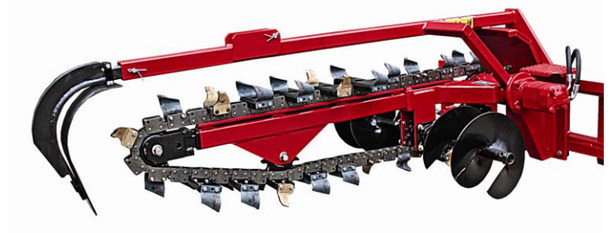




HYDRAPOWER

Operational Manual

Maintenance Manual

&

Spare Parts Manual

for

Model "AC" Profiler

Doc:OMA4-AC Rev:01 Date: 29/1/18

EARTHMOVING ATTACHMENTS

To the Purchaser

Congratulations on your choice of another Australian made quality attachment from Hydrapower. We have been manufacturing attachments for earthmoving machinery since 1981. Our attachments have proven themselves to be reliable and essential equipment, making your machine more versatile. Attachments are the intelligent option to keep your operating expenses down whilst providing better services and performance to your customers.

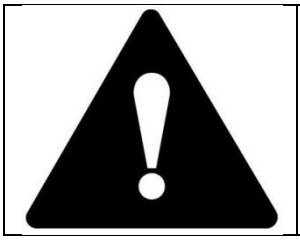
This manual is intended as a guide to facilitate the safe and correct use and maintenance of your attachment. It is important that it be kept handy at all times, either within the host machine or within the container fitted to the attachment for this purpose. ⚠It is necessary that this manual be read carefully prior to operating the attachment for the first time. If this manual is ever becomes lost or unreadable please contact Hydrapower for a replacement.

Contents

⚠ SAFETY FIRST

DO NOT OPERATE THE ATTACHMENT UNTIL

YOU HAVE READ THIS PAGE



This safety alert system identifies important safety messages in this manual.

When you see this symbol be alert, your safety is involved, carefully read the message that follows and inform other operators

⚠ Contact with moving parts can result in injury or death. Ensure that personnel are kept a minimum of 2 metres from the attachment. Always put the attachment and host machine in a safe "servicing position" (q.v.), turn off the host machine and ensure the operator's station is empty before allowing personnel to approach the attachment, for maintenance or any other reason.

⚠ Do not place any part of body or limb under raised attachment at any time. Never alight from machine with attachment in an elevated position.

⚠ Always ensure that you are wearing suitable protective clothing and equipment.

⚠ Ensure the attachment is suitable for the host machine to which it is fitted, being both for the correct class of machine & having compatible mounting dimensions. Ensure that the mass of the attachment does not exceed the machine's lifting capacity as specified on the manufacturer's lifting chart.

⚠ Do not use attachment for any purpose other than that for which it is intended.

⚠ When installing cutting picks, use a soft hammer and wear protective eyewear to prevent metal fragments damaging your eye.

⚠ Investigate hydraulic oil leaks promptly. Do not use your hands to check for hydraulic leaks. Hydraulic oil flows are under high pressure and can cause injury.

⚠ When travelling around the site, carry attachment clear of ground by the minimum amount necessary to clear obstacles and prevent damage. Do not lift above 1.5 metres from the ground.

⚠ Ensure the breakaway couplings are properly connected to the host machine. Incorrectly fitted and/or faulty breakaway couplings are the most common cause of failures in hydraulic motors.

⚠ Do not remove any safety device or decal from the attachment.

⚠ Research the path to be excavated for hazards such as water mains, power cables, telephone cables etc.

⚠ Perform/review risk assessment prior to operation.

⚠ Read the operation manual carefully before you use your attachment.

Company Profile

Hydrapower Pty Ltd was established in April 1981 after a change in the Directorship of the pre-existing company, J & T Products (John & Tina). Hydrapower was chosen as the name of the company after one of the Directors designed and built a powerful Skid Steer Loader of the same name (***Hydrapower*** meant the machine was powered by a hydrostatic drive).

The majority of work at that time was related to the manufacture of drilling rigs, water trucks and service trucks, trenching attachments for Skid Steer Loaders, as well as service work for bitumen and earthmoving companies.

With the substantial knowledge and understanding gained in the construction industry, Hydrapower concentrated its resources on the earthmoving attachment market.

It was realised that the Australian market was not large enough to support a local Skid Steer Loader manufacturer. Hydrapower recognised that the Skid Steer had far more capabilities than just that of a loader and as the consumer's expectations of the Skid Steer increased, so the range of Hydrapower attachments increased.

Hydrapower now manufactures several different classes of attachments and within these classes are seemingly endless models and variations, all to cater for variations in skid steer loader size and customer requirements.

Today's range of attachments include Cement Mixers, Pallet Forks, Road Bucket Brooms, Angle Sweepers, Slashers, Flail Mowers, Scarifiers, Trenchers, Under-belt Cleaners (Scrapers), Road Profilers and Grader Blade Attachments.

Hydrapower attachments are not always initially the cheapest attachment, but we have proven that the quality and extras we include in the design of our products as standard provide longer service life and easier maintenance.

Quality Policy

Hydrapower Pty Ltd specialises in the manufacture of attachments to suit Skid Steer Loaders, Backhoes and Excavators. Attachments include Trenchers, Post-Hole Borers, Road Profilers, Road Bucket/Brooms and Slashers plus special "to customer specifications" attachments. It is Hydrapower's policy to provide a quality product and to have continuous improvement to Goods and Services, which ensure customer satisfaction and generate repeat business. It is the objective of the management of Hydrapower to:

(a) Establish and maintain an effective and properly managed quality system.
(b) Enhance the reputation of the Company by achieving delivery dates that comply with order requirements and Company standards at optimum cost.
(c) Provide objective evidence that the quality system is implemented and maintained in accordance with management policies.

The Quality Manual, and the referenced system documentation, describes how the Hydrapower quality system is designed to ensure that the Company policy and objectives are satisfied at all times. It also outlines how effective control is established and maintained in order to achieve the required assurance of quality and a high degree of consistency in completed work.

Warranty Statement

Hydrapower offers twelve (12) months warranty on all attachments except Road Profilers and Rock Wheels, which are warranted for six (6) months. This is our only warranty and covers faulty workmanship and defective parts manufactured by Hydrapower Pty Ltd. The warranty does not cover transportation costs of parts or travelling costs nor does it cover consequential damage

Degradation of parts through wear associated with equipment operation is not warranted (i.e. trencher teeth, profiler picks, bearings etc.). Warranty is granted on the following strict conditions:

(a) Equipment must be operated in accordance with the instructions provided by Hydrapower Pty Ltd as stated in the operation manual.
(b) Prior to work being performed on the product, Hydrapower is contacted and a Purchase Order number obtained.

Failure to meet any of these conditions will void the warranty. Invoices received by Hydrapower for warranty work performed on its equipment must have a Hydrapower Purchase Order Number. Invoices without this Purchaser Order number will not be accepted.

While every care is taken by Hydrapower to ensure that the goods arrive in good condition, Hydrapower accepts no responsibility for any damage caused to any Hydrapower product while under the care of freight companies. Freight insurance is available on request.
(In keeping with our policy of continued improvement, Hydrapower reserves the right to alter the price, design, specification, or to discontinue any items listed in our price lists without prior notice).

MODEL AC PROFILER/STABILIZER ATTACHMENT - OPERATION

The model AC Profiler Attachment is designed to be coupled to a Skid Steer or Compact Tracked Loader for the purpose of cutting away a portion of asphalt pavement and/or performing in situ stabilization of the road base. With the correct drum configuration and a reduced production rate, the profiler can also cut unreinforced concrete with compressive strength up to 35 MPa. ⚠Using this attachment to cut materials other than road base, asphalt or ≤ 35 MPa unreinforced concrete is considered outside its intended use.

This attachment has been designed to be compatible with a particular class of loader, both in terms of its hydraulic requirements and its total mass. It will have been fitted with an adapter assembly to facilitate attachment to the particular loader's quick coupler. This manual contains specific information on periodic maintenance considered necessary for the continuing safe and efficient operation of this attachment. ⚠Operating this attachment on non-compatible host machines, operating without adequate maintenance (q.v.) or in a manner contrary to that outlined in this manual is considered outside the range of its intended use.

General Description

Refer to the images included under the headings Product ID Plate, Safety Decals etc., Spare Parts Drawing, Hydraulic Schematic and Electrical Schematic on the next few pages of this manual (q.v.) to aid in understanding the description here.

The functional core of the AC Profiler is a Profiler Drum (item 14 in the spare parts drawing) driven by a bent axis piston hydraulic motor (item 10) through a "wheel drive" reduction gearbox (item 13). This cutting assembly is mounted into the Inner Box (item 16) which is in turn mounted into the Outer Box (item 15) on pivot pins (item 6) at the front. The Inner Box is actuated up and down around this pivot point by the two Depth Rams (item 66), thereby controlling the cutting depth as indicated on the Depth Gauges (item 17). A large pivot pin welded into the back of the Outer Box then engages into a pivot boss in the Slide Plate (item 19). The Tilt Ram (item 29) actuates the Outer Box to allow the entire assembly to be tilted for "keying in". The Slide Plate is mounted onto the Side Shift Frame (item 46) using Slide Blocks (item 23). The Side Shift Ram (item 28) moves the Slide Plate along the Side Shift Frame allowing the entire assembly to be moved from the centre out to the extreme left hand side of this frame.

During normal operation the Outer Box is level with the ground supported on the four Wheels (item 4) across the front on the pivot point. Two identical Wheels support the Side Shift Frame at the rear to maintain the attachments level. The Inner Box and Drum are then pivoted into the pavement hydraulically to the required depth. When "keying in" the outer box is not level with the ground as it is tilted in a transverse plane to allow a cut that is deeper at one end then the other. In this situation the front Wheels are not supporting the attachment.

As standard a Profiling Drum is fitted, with a pick pattern and density best suited to milling Hot Mix Asphalt. Upon request a Stabilizer/Reclaimer drum, best suited to in situ stabilization, can be fitted with slightly fewer picks mounted onto stands welded to a smaller outside diameter drum. It is also possible to fit drums with a greater number of teeth than usual to yield the best results when cutting concrete.

Technical Specifications and Host Machine Compatibility

The table below lists the specifications of the model AC Profilers covered by this manual:

ATTRIBUTE	450mm Wide x 200mm Deep	600mm Wide x 200mm Deep	750mm Wide x 200mm Deep	750mm Wide x 250mm Deep	1000mm Wide x 200mm Deep	1000mm Wide x 250mm Deep
Part No.	92AC450/20	92AC600/20	92AC750/20	92AC750/25	92AC10000/20	92AC10000/25
Hydraulic Flow Rate	100 - 170 litres per minute	100 - 170 litres per minute	100 - 170 litres per minute	100 - 170 litres per minute	110 - 170 litres per minute	110 - 170 litres per minute
Hydraulic Pressure	207 - 345 bar (3000-5000 psi)	207 - 345 bar (3000-5000 psi)	207 - 345 bar (3000-5000 psi)	207 - 345 bar (3000-5000 psi)	207 - 345 bar (3000-5000 psi)	207 - 345 bar (3000-5000 psi)
Minimum Theoretical Hyd.Power (Hotmix)	34 kW (45 hp)	48 kW (65 hp)	55 kW (74 hp)	55 kW (74 hp)	63 kW (85 hp)	63 kW (85 hp)
Side Shift	711 or 762mm (28 or 30")	711 or 762mm (28 or 30")	711 or 762mm (28 or 30")	711or 762mm (28 or 30")	711 or 762mm (28 or 30")	711 or 762mm (28 or 30")
Tilt	±15°	±10°	±10°	±10°	±10°	±10°
No. of Picks	48	60	72	84	96	110
Approx. Mass	1050 kg	1130kg	1250 kg	1440 kg	1500 kg	1630 kg

A host machine compatible with a given AC Profiler will be able to lift it safely 1.5 metres above the ground given the approximate mass of the attachment shown in the table above. It will also be able to supply sufficient hydraulic power to the Profiler for adequate performance. The table contains values for the minimum theoretical hydraulic power required for each AC Profiler. Theoretical hydraulic power can be calculated with either of the following equations:

Theoretical Hyd. Power (kW) = Max. Flow (litre/min) x Max. Pressure (bar) ÷ 600
Theoretical Hyd. Power (HP) = Max. Flow (gal/min) x Max. Pressure (psi) ÷ 1714

Note that the calculated power is called “theoretical” because in hydraulic systems the maximum flow rate is never available when the system reaches its maximum possible pressure. The true power available to the attachment is likely to be about 80-85% of this value. Hydrapower uses theoretical hydraulic power to test machine compatibility because the values for maximum flow and maximum pressure are usually easily found in the host machines specifications. Note that in addition to meeting the hydraulic power requirement a compatible host machine will produce a hydraulic flow and have a relief pressure within the ranges stated in the table above. Note that the values for flow and pressure vary over a large range. Hydrapower sometimes needs to vary the specifications of hydraulic and drive line components to cover that range. Contact Hydrapower directly if there is any doubt about host machine compatibility.

Host Machine Hydraulic Configuration

In order to meet the hydraulic power requirements detailed in the previous section, the host loader will generally need to have “high flow” hydraulics. Skid Steer and Compact Tracked Loaders with High Flow hydraulics generally fit into one of two broad categories of systems. Some hosts can be categorized as “Dual Circuit High Flows” whilst others can be called “Single Circuit High Flows”.

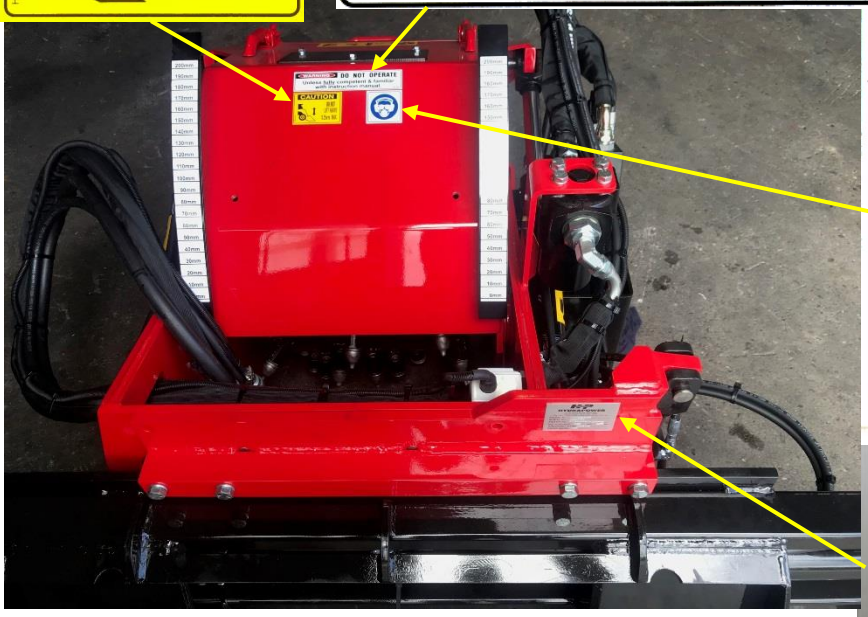
A Dual Circuit High Flow loader has an additional, generally lower flow, hydraulic circuit that can be operated simultaneously with and controlled independently from the High Flow circuit. It is not enough to have an additional set of breakaway couplings as these are often teed into the same lines as the High Flow couplings and therefore the oil going through the additional couplings cannot be independently controlled. An AC Profiler Attachment manufactured to suit a Dual Circuit High Flow host machine will have five hoses that attach to the host. There is the large diameter pressure and return hoses supplying the motor which rotates the drum. The motor also has a smaller hose called the case drain that connects the motor’s case direct to the host’s tank to ensure the oil in the motor case remains at a very low pressure. Finally, there are two further hoses that supply the valve that controls the auxiliary functions (depth, side shift and tilt). A hydraulic schematic for Profilers to suit Dual Circuit High Flows has been provided on the top half of page 10 of this manual.

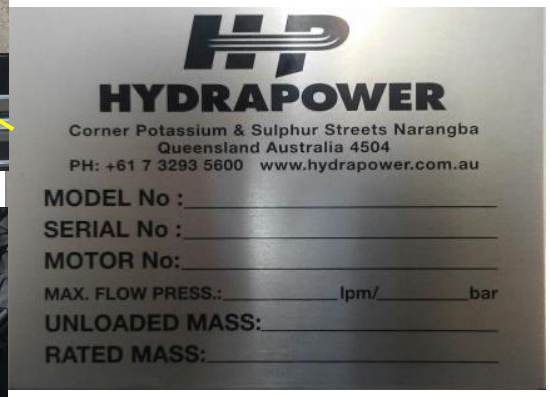
When a “5 hose” Profiler is attached to a Dual Circuit High Flow it is possible to run the auxiliary functions without engaging drum rotation. It is generally better to side shift and tilt the profiler into its required position and orientation without the drum spinning. In some cases, especially when keying in with the attachment tilted, it may also be better to adjust the depth prior to engaging drum rotation and pushing the drum into the material to be cut. Note that when operating auxiliary functions of “5 hose” profilers the auxiliary oil goes directly to the depth control rams unless it is electrically diverted to either side shift or tilt. Direction control is achieved by changing the direction of the auxiliary oil with the host’s 4in1 toggle.

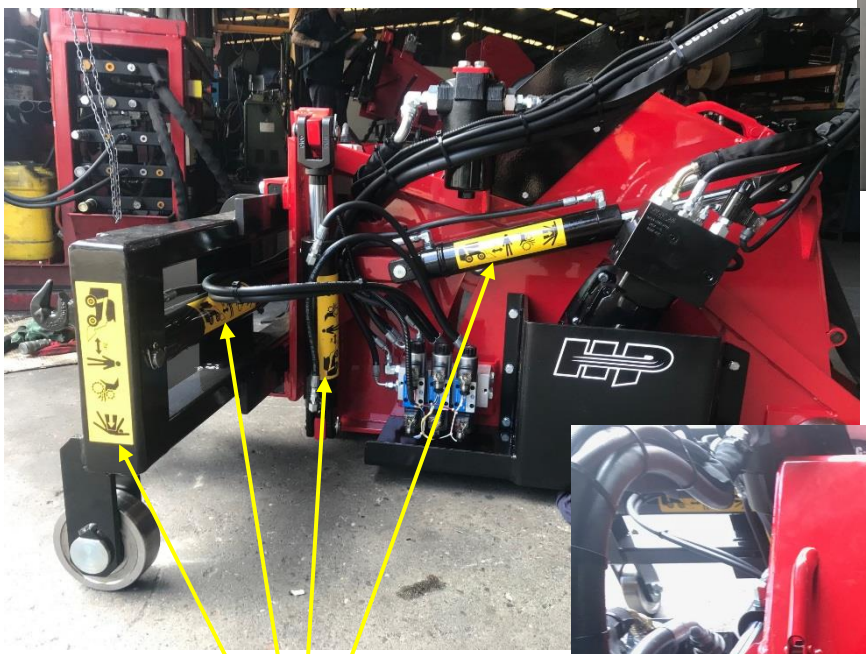
A host with a Single Circuit High Flow has only one hydraulic circuit. The output from this circuit can generally be switched from standard flow to high flow and there are often two sets of differently sized breakaway couplings connected to it, however there is still only one circuit. An AC Profiler manufactured to suit a Single Circuit High Flow has only three hoses connected to the host. They are the pressure hose, the return hose and the case drain. As shown on the hydraulic schematic for Profilers to suit Single Circuit High Flows on the lower half of page 10, in these systems supply oil goes through the high pressure filter and then into the solenoid operated priority flow divider (“Hammer Valve”) before progressing to the drum rotation motor. If an electrical signal is sent to operate any of the auxiliary functions a small amount of oil (5-10 litres/min) is diverted away from drum rotation to the auxiliary directional control valve and then onto the selected auxiliary function.

What this means is that on Profilers attached to Single Circuit High Flows drum rotation must be engaged whenever any profiler function is required. ⚠This means extra care must be taken to ensure the drum is clear of all potential obstacles or entanglements prior to side shifting or tilting. Note that as oil from the host machine can only travel through the profiler’s hydraulics in one direction, all directional control of auxiliary functions of “3 hose” profilers must be achieved with electrical signals. Basic, generic electrical schematics for both “5 hose” and “3 hose” profilers are included on page 11 of this manual. Note that the actual electrical wiring can vary greatly depending upon which particular model and brand of host machine for which the profiler is designed. Host specific electrical schematics are generally available when required.

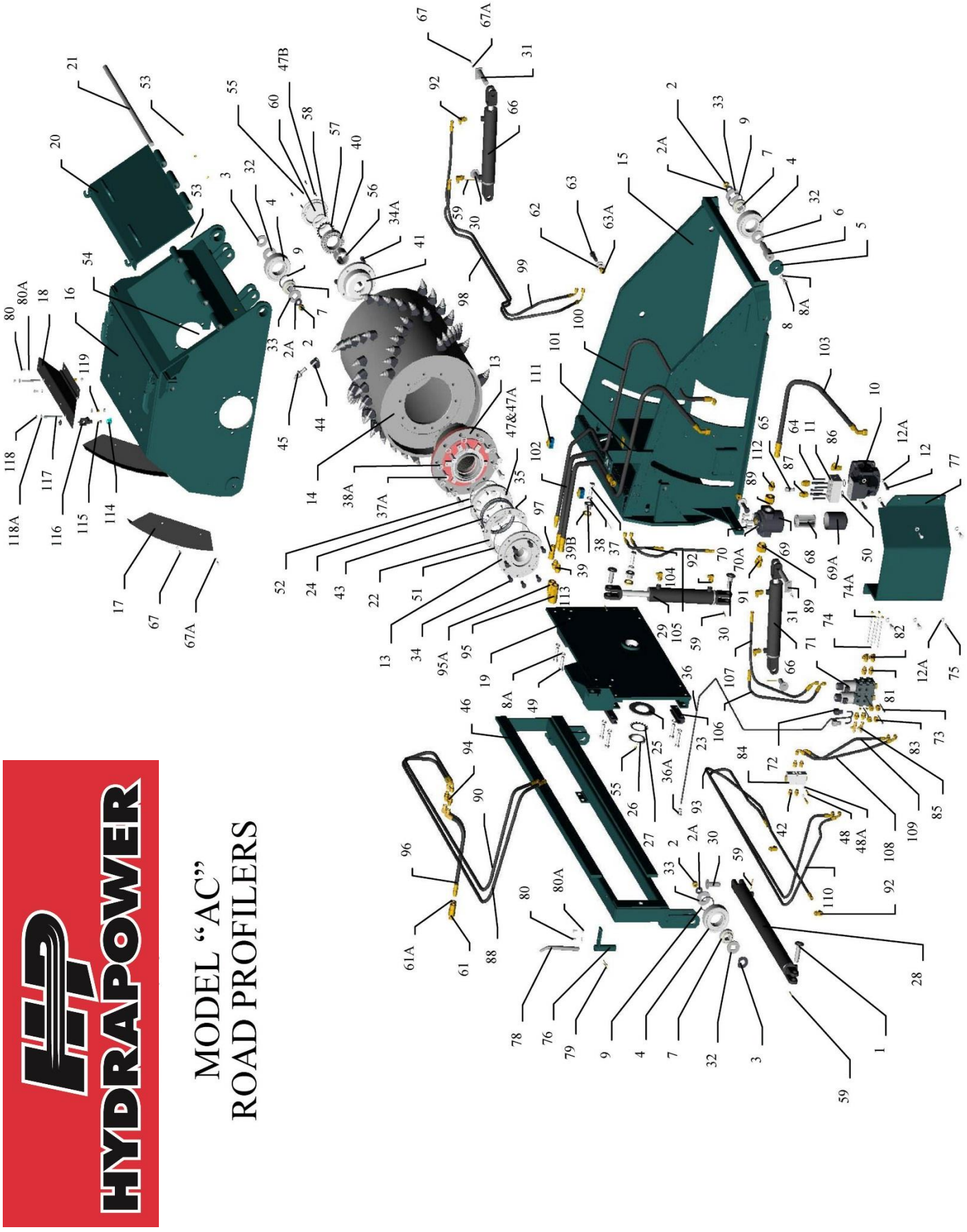
Product ID Plate, Safety Decals etc.



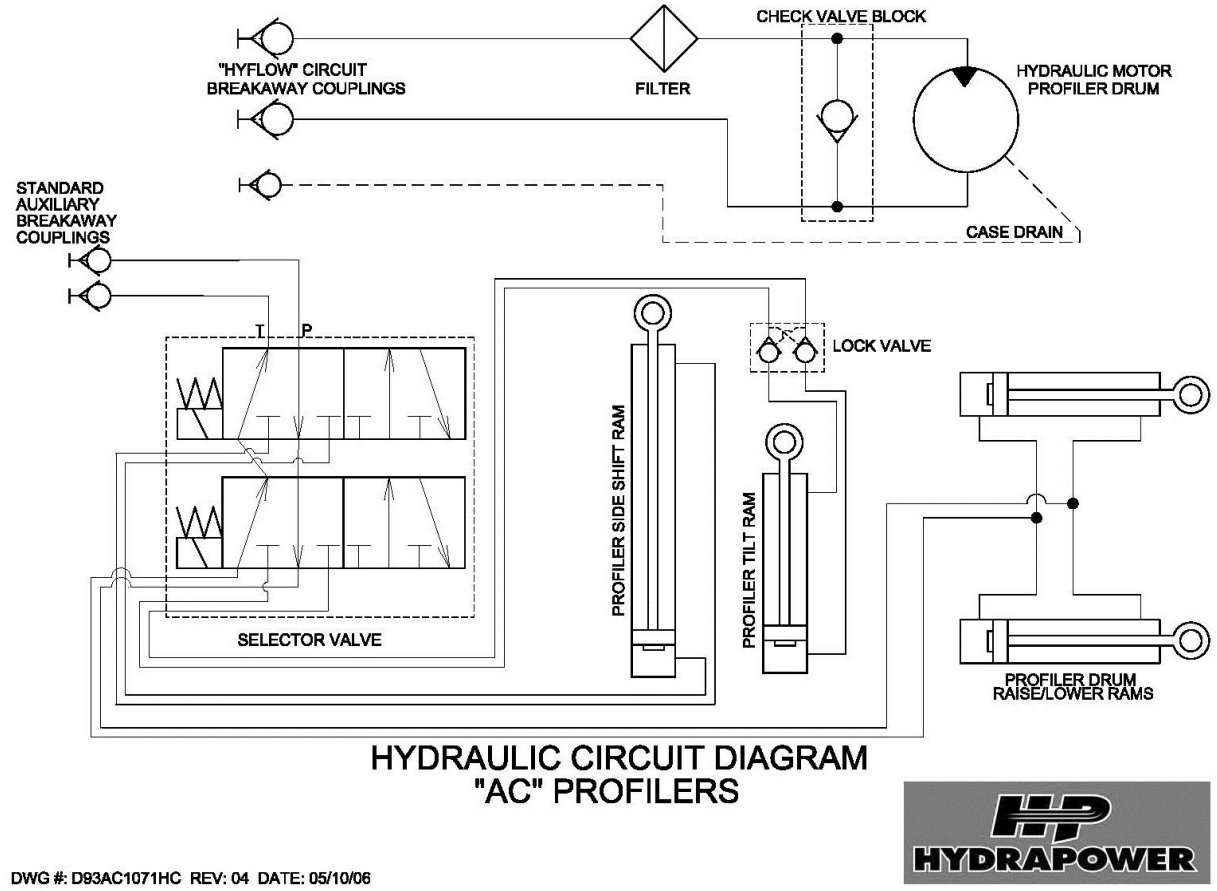




Spare Parts Drawing – AC Profilers



Hydraulic Schematic – Dual Circuit High Flows (“5 hose”)



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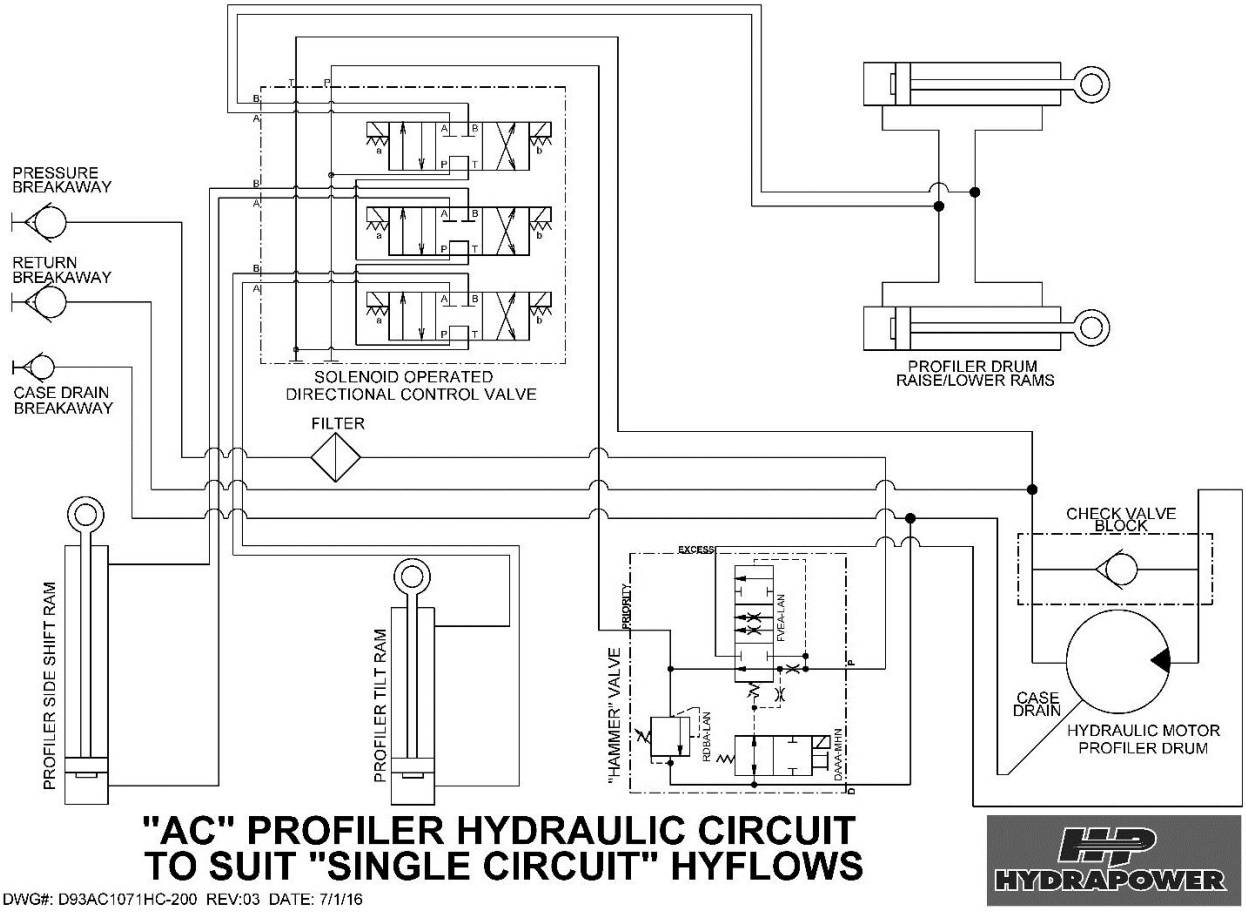
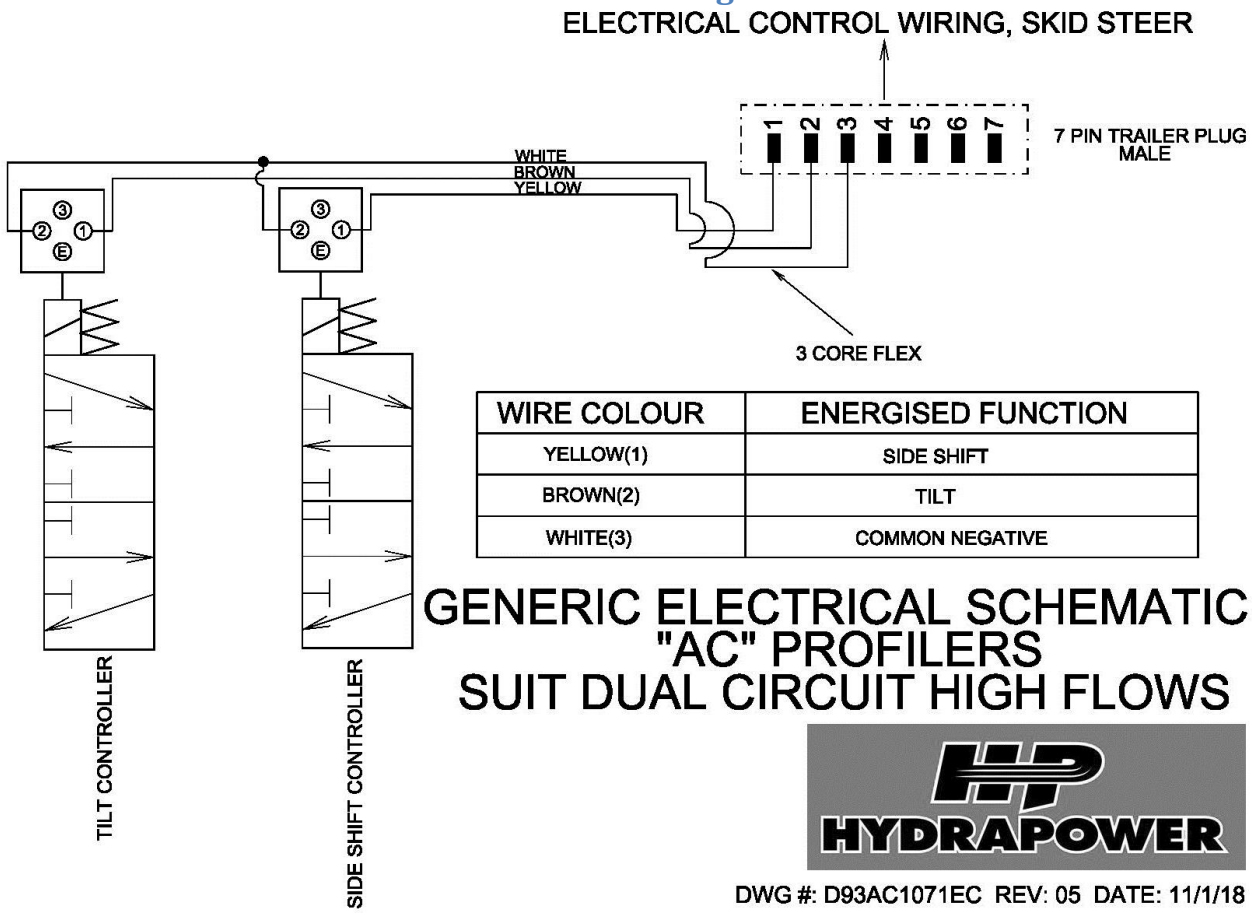
Hydraulic Schematic – Single Circuit High Flows (“3 hose”)



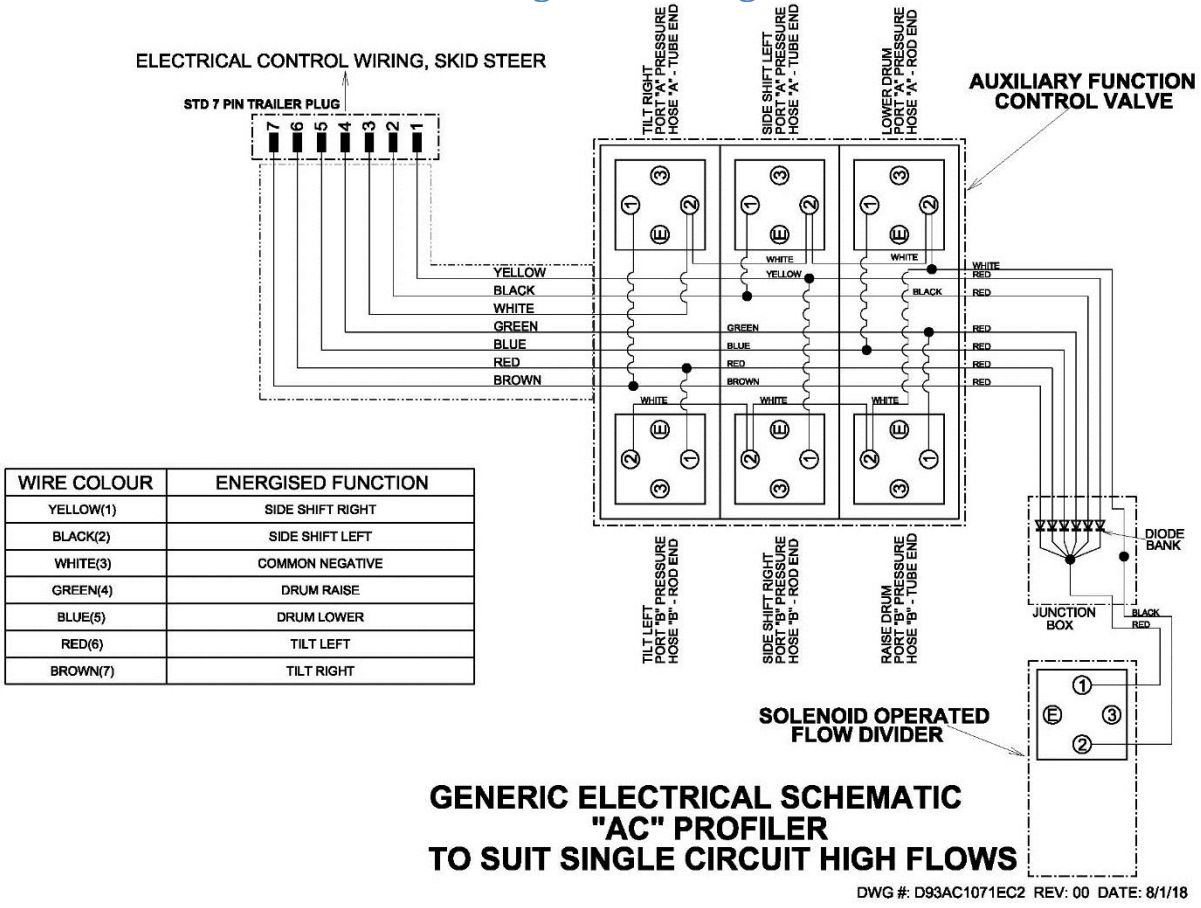
DWG#: D93AC1071HC-200 REV:03 DATE: 7/1/16

Generic Electrical Schematic – Dual Circuit High Flows



WIRE COLOUR	ENERGISED FUNCTION
YELLOW(1)	SIDE SHIFT
BROWN(2)	TILT
WHITE(3)	COMMON NEGATIVE

Generic Electrical Schematic – Single Circuit High Flows



WIRE COLOUR	ENERGISED FUNCTION
YELLOW(1)	SIDE SHIFT RIGHT
BLACK(2)	SIDE SHIFT LEFT
WHITE(3)	COMMON NEGATIVE
GREEN(4)	DRUM RAISE
BLUE(5)	DRUM LOWER
RED(6)	TILT LEFT
BROWN(7)	TILT RIGHT

Connecting the Attachment

⚠ An operator must have carefully read this manual prior to using the attachment.

If the attachment is to be used for the first time on a given day then the daily inspections/operations listed in the maintenance schedule (q.v.) should be performed.

Now the AC Profiler can be attached to the loader as per a standard bucket. A set of detailed instructions as to how to achieve this safely will be included in the host machine's operation manual. Confirm that the attachment is securely coupled and that all locking pins/devices are in place.

Once the Profiler is attached to the loader it is necessary for a person to connect the hydraulic hoses. To allow this the host machine and attachment must be in a safe "servicing position" (q.v.). The operator must turn the loader's engine off, operate the controls to release stored pressure and vacate the operator's station to avoid inadvertent operation of the controls. The hydraulic hoses can now be connected using the breakaway couplings. Take care; incorrectly connected breakaway couplings are the most common cause of seal failures in hydraulic motors.

⚠ Ensure the breakaway couplings are properly connected to the host machine.

Once the breakaway couplings are connected and personnel are clear the operator can re occupy the operator's station, turn on the loader and confirm attachment function by lifting it clear of any obstacles and running the drum for a few seconds.

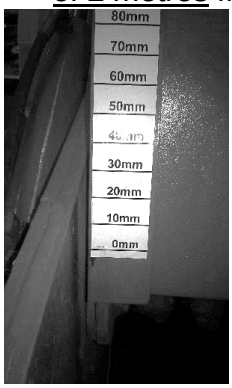
Operating the Attachment

⚠ Please take note of all the safety instructions under "Safety First" on page 2 of this manual before and during attachment operation.

The operator should ensure that they are familiar with the switches/buttons in the host machine's cabin that control the Profiler's various functions. Hydrapower has generated documents showing how Profiler functions are controlled in several different host machines and if such a document is available it will be supplied with the attachment.

Firstly, move to the location of the required cut.

⚠ When travelling around the site, carry attachment clear of ground by the minimum amount necessary to clear obstacles and prevent damage. Do not lift above 1.5 metres from the ground.
⚠ Research the path to be excavated for hazards such as water mains, power cables, telephone cables etc.
⚠ Perform/review risk assessment prior to operation.
⚠ Contact with moving parts can result in injury or death. Ensure that personnel are kept a minimum of 2 metres from the attachment.



Before lowering the attachment to the ground, ensure that that the drum is fully raised. If this is so then the depth gauges should be indicating that the cutting depth is less than 0mm. Note that the depth gauges are read by noting the point on the scale that lines up with the top of the inner box. As an example, in the photo on the left the depth gauge is reading "20mm".

For a standard horizontal cut the attachment can lowered onto its wheels (four across the front and two on the side shift frame at the back). Push the host machines loader arms down to their stops (usually another 30-50mm after the

profiler wheels are on the ground), taking some weight off the front tyres. This ensures that the maximum practicable downforce is applied to the profiler.

Now bring the host machines engine up to its maximum sustainable speed and commence drum rotation. If the profiler is fitted with water sprayers turn them on to reduce dust and improve pick life. Using the drum raise/lower function lower the drum slowly and smoothly into the material until the required depth is achieved. Ensure the profiler wheels remain on the ground whilst the drum is beginning to cut. If the cutting action of the drum is lifting the wheels off the ground then the drum is being lowered too quickly for the material being cut and the downforce being provided by the host machine.

Once the required depth is achieved, begin to push the profiler steadily forward in the required cutting path with the host machine. Allow the attachment to cut at its own pace. Moving too quickly will cause the attachment to bounce and, at the extreme, stall. The cut surface will be rough and possibly uneven as a result. When the required cut is complete keep the drum rotating whilst the drum is raised out of the material using the raiser/lower rams. Stop the drum rotation once the drum is fully raised. ⚠Do not seek to turn the host machine or side shift the profiler whilst the drum in engaged in the ground.

The AC Profiler has a tilting function, which allows the operator to perform an angled cut as required for “keying in”. “AC” profilers can be fitted with two bolts (circled in the photo on the left) which pass through the slide plate and thread into the outer box to keep the outer box level and prevent tilting. If these bolts are installed they need to be removed prior to tilting the profiler. Attempts to tilt the profiler without removing these bolts will be unsuccessful and may cause damage to the tilt ram and/or its mounting points.

Prior to “keying in” it is advisable to perform the flat cut immediately adjacent first. Now lift the AC Profiler clear of the ground.

⚠ Contact with moving parts can result in injury or death. Ensure that personnel are kept a <u>minimum of 2 metres</u> from the attachment.

⚠ Do not place any part of body or limb under raised attachment at any time. Never alight from machine with attachment in an elevated position.
⚠ Do not lift above 1.5 metres from the ground.

Tilt the profiler to the required angle and lower the profiler drum to a suitable digging depth. ⚠ Note that for profilers fitted to “Single Circuit High Flow” host machines the drum must be rotating to actuate the auxiliary functions, so in this case and risk assessment of keying in operations needs to take this into account. The depth gauges will show how far the cutting tips protrude beneath the outer box in the plane of the box; this will only give a general indication of the cutting depth possible on the lowest side when tilted. Once the profiler and drum are correctly oriented commence drum rotation and lower the attachment slowly and smoothly to engage the drum with the asphalt to the required depth. Now begin to move slowly and steadily forward through the required cutting path. ⚠Note that when tilted the cutting area will not be as thoroughly shrouded as during normal operation, so take extra care.

In some circumstances, it is possible that the material being cut can break into large chunks and that one of these pieces can become jammed between the drum picks and portions of the inner

box. The profiler drum can only be hydraulically driven in one direction; it is not possible to run the drum in reverse to clear jams. It is possible to turn the hydraulics off and roll the drum backwards by putting it in contact with the ground and moving slowly forward. If a jam cannot be cleared using this technique then it will be necessary to put the profiler and host machine in a safe servicing position, turn the loader off and exit the operator's station. Service personnel can then approach to clear the jam manually. The inner box has a lid held shut by both bolts and over centre latches, opening this lid gives service personnel better access to the drum.

Safe Servicing Position

⚠ Contact with moving parts can result in injury or death. Ensure that personnel are kept a minimum of 2 metres from the attachment. Always put the attachment and host machine in a safe "servicing position" (q.v.), turn off the host machine and ensure the operator's station is empty before allowing personnel to approach the attachment, for maintenance or any other reason.

Refer to the host machine's operation manual for the recommended "servicing position" of your loader. The details following on "servicing position" are specific to the attachment and must not be interpreted as negating or lessoning in any way any safety conditions specified by the host machine's manufacturer.

It is never sufficient to rely on stored energy, such as hydraulics, to support an object against gravity if it is necessary for a person to place any part of their body where it may be crushed beneath it or between it and other objects. So at minimum when servicing the attachment it needs to be supported against gravity by structurally sound mechanical means and positioned or clamped to prevent any uncontrolled movement. The attachment hydraulic system must not be pressurized or connected to hydraulic systems that may cause it to be pressurized. If the attachment is still physically attached to the loader, it must not rely on the host machine for support against gravity. The host machine must be switched off with the operator's station empty. If it becomes necessary to move the attachment or energise the hydraulics to facilitate service or testing, all personnel must withdraw a safe distance while this occurs.

Periodic Maintenance

The attachment should be subjected to a visual inspection every day before starting work. Check that the profiler picks (item 45) are in serviceable condition, especially those in the outside cutting positions. Check that the picks are all free to spin in their holders and if not clean them down with diesel or the like to free them up. Apply grease to the grease nipples lubricating the main outer box tilt shaft, the inner box front pivot shafts and the inner box lid hinges. Also insert a single "pump" of grease into the main drum bearing housing through the grease nipple accessible through a hole in the outer box when the drum is raised. Check for oil leaks & damaged hoses or breakaway couplings.

⚠ Investigate hydraulic oil leaks promptly. Do not use your hands to check for hydraulic leaks. Hydraulic oil flows are under high pressure and can cause injury.

Check for any evidence of a gear oil leak between the flanges of the gearbox (item 13). If gearbox runs without oil it will quickly fail. If the Profiler is fitted with water sprayers, hinge back the spray bracket and ensure that water holes in the inner box are clear of obstruction.

Once a week clean the attachment thoroughly to ensure visual inspections remain effective. Afterwards check that the hard facing on the edge of the drum is still in place and that all the pick

holders are in serviceable condition. Also, use a spanner to physically ensure that all the nuts and bolts on the attachment are tight.

The gearbox oil should be changed after the first 50 hours of operation and then every 500 hours thereafter. The gearbox should be half filled with 80W/140 synthetic oil. Oil fill and level plugs are accessible between the flanges of the gearbox. Similarly, after the first 50 hours and then every 500 hours thereafter the filter element (item 68) in the high-pressure filter (item 69) should be changed.

Once a month the inspection should be extended to include the bearings (item 7) inside the guide wheels (item 4) and the nylon slide blocks (item 23) which support the slide plate (item 19) on the side shift frame (item 46). It is necessary that the guide wheels continue to be supported properly and able to spin. Replace the bearings if necessary. The guide wheels themselves should be 150mm in diameter, any wheels with a significantly reduced diameter should be replaced. Significantly worn or damaged nylon slide blocks might mean the attachment is no longer properly supported, so in this case they must be replaced. Check the condition of the tee bushes and washers (items 38, 38B & 62) which help to guide and support the tilting of the outer box and the pivoting of the inner box.

At least every six months the quick coupler adapter and the side shift frame (item 46) should be carefully inspected for wear, permanent deflection and/or cracking which may compromise its structural integrity. Hydrapower recommends that non-destructive testing techniques such as Magnetic Particle Inspection be used to aid this process. Also during the six monthly (or 500 hour) gearbox oil change the hydraulic motor shaft and seal should be inspected. Once the gear oil has been drained from the gearbox, the hydraulic motor can be removed and the condition of its output shaft and seal inspected. The motor needs to be reinstalled before refilling the gearbox with gear oil.

After 750 hours or at least annually, the Profiler should be fully disassembled to allow for thorough, individual inspection of all components for wear and/or structural damage. In particular, inspect critical areas in the vicinity of the quick coupler, the side shift interface, the wheel mounts and inner box pivots, the ram mounts, the pick holders, the gearbox mount to the main frame and drum and the drum bearing housing. Disassemble the drive gearbox (item 13) and check the condition of the gears, the bearings and the duo cone seal (item 43). Inspect the drum bearing (item 40). Check the condition of all the hydraulic rams.

The key element of a full disassembly is removing the drum. To achieve this you will need a lifting device rated to lift at minimum 2 tonne and a means of safely and independently supporting each of the major components as they are separated. First, remove the motor guard (item 77). Now drain the gearbox oil by removing the two gearbox oil plugs, accessible from underneath between the side of the outer box and the drum. Now the motor (item 10) can be removed. It may be necessary to remove and plug the hydraulic hoses from the motor. Remove the drum raise lower rams (item 66) and the pivot guide tee bushes (item 62). A lifting device can now be used to pivot the inner box and outer box apart from each other. Now remove the end cover (item 60) from the bearing housing (item 41) to allow access to the taper lock (item 56) clamping the bearing (item 40) to the drum stub axle. Undo the taper lock and the bearing housing bolts, allowing the bearing and housing to be moved at least 12mm towards the drum. Now the bolts (item 34) clamping the gearbox input flange to the inside of the inner box can be removed. The lifting device can be used to support the drum while it is moved axially until the spigot on the gearbox input flange clears the mating surface in the inner box. The drum can now be lifted free.

The periodic maintenance information for this attachment is summarized in the table below:

PERIOD INSPECTION	DAILY (4 - 6 HOURS)	WEEKLY (30 HOURS)	MONTHLY (100 HOURS)	HALF YEARLY (500 HOURS)	4000 + HOURS
OIL LEAKS	X				
PICKS	X				
GREASE POINTS	X				
DAMAGED HOSES OR BREAK-AWAYS	X				
WATER JETS & HOLES	X				
THOROUGH CLEAN-DOWN		X			
DRUM & PICK HARD-FACING		X			
BOLTS		X			
WHEEL BEARINGS			X		
TILT BUSHES			X		
NYLON SLIDE BLOCKS			X		
GEARBOX OIL*				X	
OIL FILTER*				X	
CHECK INTEGRITY OF QUICK HITCH				X	
MOTOR SHAFT SEAL				X	
FULL DISASSEMBLY					X

***Note:** The Gear Oil and the hydraulic oil filter should be changed after the first fifty (50) hours of use, and then every 500 hours thereafter.

Preservation and Storage

If the attachment is to be stored for a period greater than four (4) weeks without being operated the following steps should be taken:

- Wash the attachment down & touch up damaged paint to avoid rust.
- Ensure the hydraulic motor and hoses are full of oil. If possible, connect the breakaway couplings to each other to protect them from contamination & corrosion.
- Apply grease to all the grease nipples.
- Manually apply grease to exposed, unpainted surfaces such as the ram rods and pivot pins.
- Where possible store out of the elements and away from standing water.

When returning the attachment to service after being stored for two (2) months or more, it is recommended that a detailed inspection, equivalent to the 500-hour inspection above, be performed prior operation.

Technical Data

Model:	
Serial Number:	
Motor:	
Gearbox:	
Max. Hyd. Flow (litres/min):	
Max. Hyd. Pressure (bar):	
Unloaded Mass:	
Cutting Width x Depth:	

NOTES:

Appendix A – Sample Risk Assessment

PLANT RISK ASSESSMENT

Plant Assessed: Profiler Model "AC" Cutting Width x Cutting Depth……
Serial No.:……
Scope: Cold Planing Roads and/or Road Stabilization Date: 30 August 2005

Plant Checklist
A more detailed analysis is required if the shaded area is not ticked.

	Yes	No
Is the plant designed to preform the work outlined in the scope?	✓	
Has the plant been modified from the original condition?		✓
Is the plant in good working condition?		
Is the plant serviced and maintained according to the manufacturers specifications?		
Are service records kept for this particular item of plant?		
Does the plant create a risk of contact with:		
Overhead Power Lines?		✓
Underground Cables?		✓
Does The Plant:		
Have Lifting attachments appropriate for the load?	✓	
Have specified safe working limits?	✓	
Have safe access and egress conditions?	✓	
Have sufficient work instructions?		

RISK LEVEL FOR HAZARDS IDENTIFIED

LIKELIHOOD How likely could it happen?	CONSEQUENCES : How severely could it affect health and safety?			
	EXTREME - death or permanent disablement	MAJOR - serious bodily injury or serious work caused illness	MODERATE - injury or illness requiring casualty treatment	MINOR - injury or illness requiring first aid only, no lost time
VERY LIKELY - could happen frequently	1	2	3	4
LIKELY - could happen occasionally	2	3	4	5
UNLIKELY - could happen, but rare	3	4	5	6
VERY UNLIKELY - could happen, probably never will	4	5	6	7

The numbers (1-7) in this chart indicate the priority as follows:

- 1,2 or 3 - High Risk, do something about these risks urgently
- 4 or 5 - Moderate Risk, do something about these risks as soon as possible
- 6 or 7 Low Risk, these risks may not need your immediate attention

This Risk Assessment has been compiled by Hydrapower to assist the owner and operator of plant to identify risks. The operation and maintenance manual as well as the operator's own risk assessment should be used in conjunction with this supplied risk assessment to identify risk associated with your specific environment and safe work practices.

MODIFICATIONS VOID THIS RISK ASSESSMENT

*Compiled with the assistance of the Australian Industry Group

Type Of Hazard	Yes/No	If the answer to the question is yes, Specify the part, plant or situation that could cause the hazard	Risk Level	Control Option	Control Type
A. MECHANICAL HAZARD					
1.Entanglement Hazard Is it possible to become entangled or drawn into moving components of the plant? Eg. Persons clothing, hair, body parts, jewellery, hand held cleaning equipment, etc.	NO				
2.Crushing Hazard Is it possible to be crushed due to:- Falling or moving objects or plant, between plant and immovable objects, plant tipping or rolling, etc.	YES	When connecting the attachment's hydraulic lines to the host machine, if the controls are inadvertently moved part of the body may be crushed by the quick coupler or tyres.	3	Turn off the host machine when connect the hydraulic lines.	T
		When performing maintenance on the attachment, the hydraulics could fail on the host machine, or the attachment may fall from an unstable stand, resulting in maintenance persons beneath the attachment being crushed	3	Use only trellises, bench or similar capable of supporting the full weight of the attachment.	T
3. Cutting Stabbing & Puncture Hazards Is it possible to be struck by or strike sharp objects in or ejected from plant	YES	If picks are installed by striking with a hard object (eg.hammer) the tungsten carbide on the pick could shatter and splinters of tungsten could puncture the eye or skin.	3	Operator or maintenance fitter should wear safety glasses when removing or installing milling picks	A/T PPE
4. Shearing Hazard Is it possible to be injured between machine parts and work pieces or machine parts and structures.	YES	If a bystander is in contact with the profiler when either the side-shift, tilt or depth control functions are activated, there is a risk that part of the bystanders body may get caught in a pinch point resulting in an injury.	3	Safety decal fitted to attachment advising the distance bystanders should be from the operating attachment.	A/T
5. Friction Hazard Is it possible to receive abrasions or burns from contact with rotating parts of plant or surfaces or materials handled by the plant.	YES	If bystanders are in close proximity to the raised attachment while the drum is rotating, there is a risk that part of the bystanders body may come in contact with the drum.	3	Safety decal fitted to attachment advising the distance bystanders should be from the operating attachment.	A/T
		Profiler picks may be hot after use, maintenance personnel are at risk of burning their hands if care is not taken.	5	Utilise water jet spray system to keep profiler picks cool	E
				Maintenance personnel should allow sufficient time for the picks to cool prior to inspection/removal	A/T
6. High Pressure Fluid Hazard Is it possible that injury or illness may occur due to contact with fluids under pressure, through possible piping failure. misuse, etc.	YES	Failure of hydraulic hose as a result of fatigue, constant rubbing, misuse or pulling could release high pressure fluid.	5	Burst protection sleeve fitted to supply and return lines of attachment as these are the hoses at greatest risk of failure.	E
				Wear safety glasses when operating attachment	PPE
				Regular inspection of hoses as per maintenance manual	T

Control Legend
E - Engineering A - Administrative
S - Substitution PPE - Personal Protective Equipment
T - Training

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7. Mobile Plant Hazards Is it possible for injury or illness through the operation of any mobile plant from rollovers, falling loads, crushing, striking, collisions, unsuitable or unstable plant etc.	YES	Travelling with loader arms raised too high will change the centre of gravity of the host machine making the plant unstable	3	Safety decal fitted to attachment advising the operator not to travel with the loader arms raised too high.	A/T
8. Vibration Hazard Is injury or illness possible from prolonged use of vibrating equipment or plant.	NO				
9. Striking Hazard Is it possible for someone to be struck by flying or moving objects due to:- Uncontrolled movement of plant, plant or parts of the plant or workplaces disintegrating, etc.	NO				
B. ELECTRICAL HAZARD					
1. Is there a possibility of plant contacting or coming with-in close proximity to powerlines.	NO				
2. Is there a possibility of burns or electrocution from fault power leads, overloaded circuits, etc.	NO				
3. Is there a possibility of a fire starting from faulty electrical equipment	NO				

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C. CHEMICAL HAZARD					
1. Fire or Explosion Hazard Is it possible that chemicals could explode of burn.	YES	Hydraulic oil escaping from a burst hose under pressure could form a fine mist which may ignite if the mist came in contact with a hot surface or flame.	5	Burst protection sleeve fitted to supply and return lines of attachment as these are the hoses at greatest risk of failure. Regular inspection of hoses as per maintenance manual	E A/T
2. Exposure Hazard Is it possible that persons can be exposed to chemicals creating burns, respiratory problems or toxic affects through ingestion, inhalation, absorption or injection	YES	Hydraulic oil escaping from a burst hose under pressure could spray the operator or bystander with hot oil.	5	Burst protection sleeve fitted to supply and return lines of attachment as these are the hoses at greatest risk of failure. Wear safety glasses when operating attachment Regular inspection of hoses as per maintenance manual. Safety decal fitted to attachment advising the distance bystanders should be from the operating attachment.	E PPE A/T
3. Environmental Hazards Is it possible to create an environmental problem through chemical spillage, seepage, disposal, dumping, etc. of chemicals	YES	Hydraulic oil escaping from a burst hose could come in contact with the ground	5	Regular inspection of hydraulic hoses as per maintenance manual.	A/T

D. ERGONOMIC HAZARDS					
1. Workstation Design Is it possible for injury or illness to occur due to:- Posture, poor visibility, mis-match or workers and machines over reaching, lifting, bending, twisting, etc.	YES	It may be possible that the operator who needs to access the host machine by standing on the attachment slips and falls when entering or leaving the host machine.	5	Operator should review the procedure of entering and leaving the cab and ensure there are adequate handles on the host machine for support.	A/T
2. Overuse Syndrome Is it possible that injury or illness may result from repetitive movement involving, lifting, twisting, etc.	NO				

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E. BIOLOGICAL HAZARDS					
1. Is it possible or injury or illness to occur through handling of clothing, PPE, housekeeping etc.	NO				
2. Is it possible for injury or illness to occur through the handling of waste product, unsterilised equipment etc.	NO				

F. SYSTEMS OF WORK					
1. Are there SWI for this plant.	YES	Operation manual was supplied with attachment from the manufacturer	N/A		
2. Is it possible for someone to be injured or have ill health due to the process of the task due to the exposure to dust. Fumes, toxic gases, vapour, etc.	YES	Milling hard surfaces can create potentially hazardous dust/mist that can irritate skin, eyes, nose and throat and cause temporary or permanent respiratory disease.	3	Utilise a dust suppression system when milling hard surfaces (eg. Water jets) Wash hands after handling picks or milling, before eating & smoking Use Personal Protection equipment such as dust mask and safety glasses when milling	E A/T PPE
3. Is there a possibility of suffocation due to lack of oxygen or poisoning due to contaminated atmosphere.	NO				
4. Is there a possibility of burns or fire hazard due to extreme temperatures.	NO				
5. Is there a possibility of illness due to extremes in temperatures	NO				
6. Is there a possibility of illness due to poor housekeeping, storage of materials, slips, trips, falls, etc.	YES	Loose debris and unchecked oil leaks on the attachment could increase the risk of slipping when entering or exiting the cab of the host machine.	4	The operate should keep the attachment clean in accordance with the maintenance schedule in the Maintenance Manual.	A/T

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7. Is there a possibility of injury due to a fall from height, unprotected holes, inadequate guard rails, collapse of structures, etc.	NO				

G. PLANT LOCATION (Environment)					
Is it possible for injury, illness or damage to occur due to the location of the plant					
Sub-Terranian locations?	N/A				
Confined Spaces?	NO				
Near Excavations?	YES	Uneven ground could lead to host machine rolling over	4	The operator should inspect the area prior to entering	A/T
On different levels of buildings?	NO				
On days of still climatic conditions?	NO				
On backfill or uncompacted ground?	YES	Uneven ground could lead to host machine rolling over		The operator should inspect the area prior to entering	A/T
Has the plant an identified lifting point that is compatible to the weight being lifted?	YES	Quick coupler is fitted to the attachment	6	Operator should regularly inspect the condition of the quick coupler in accordance with the maintenance manual	A/T

H. OTHER HAZARDS					
Transportation	YES	If the attachment is not secured when transporting, there is a risk that it will fall off damaging property or personnel injury.	3	Operator to ensure that the attachment is adequately secured prior to transportation.	A/T
Tyre failure due to condition	NO				
Loads falling on operator	YES	If attachment is raised without engaging the locking pins of the quick coupler, the attachment may fall off the quick coupler onto the operator or bystander	3	The operator should secure the quick couplers locking pins prior to lifting the attachment off the ground	A/T
Inadvertent operations of controls	NO				

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