

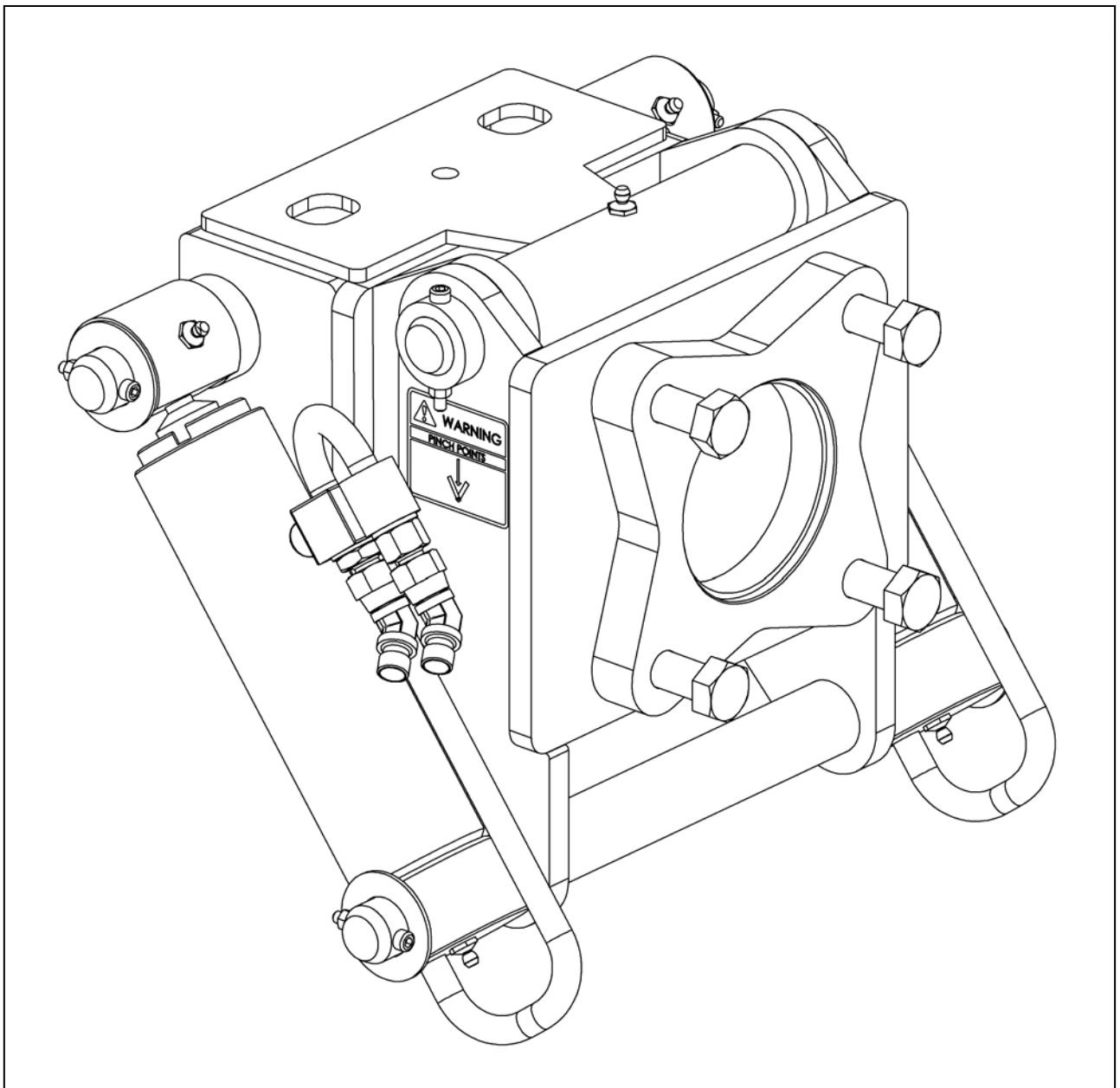
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ORBITER HEAD KIT

Single & Twin Ram Models

Operator & Parts Manual



EC DECLARATION OF CONFORMITY

*Conforming to EEC Machinery Directive 98/37/EC**

We,

McCONNEL LIMITED,

Temeside Works, Ludlow, Shropshire SY8 1JL.

Declare under our sole responsibility that:

The product (type) Hydraulic Arm Mounted Orbiter Head Kit
.....

Product Code ORBH.....

Serial No. & Date Type

Manufactured by the above company/*

.....
(insert business name and full address if not stated above)*

Complies with the required provisions of the Machinery Directive 98/37/EC, * previously Directive 89/392/EEC as amended by Directives 91/368/EEC, 93/44/EEC and 93/68/EEC.

The machinery directive is supported by;

- BS EN ISO 12100:2003 Safety of Machinery. This standard is made up of two parts; Part 1 Terminology, methodology, Part 2 Technical Specifications.
- BS EN 1050 Safety of machinery - Principles of risk assessment.
- and other national standards associated with its design and construction as listed in the Technical File.

The Machinery Directive is fully implemented into UK law by means of the Supply of Machinery (Safety) Regulations 1992 (SI 1992/3073) as amended by The Supply of Machinery (Safety) (Amendment) Regulations 1994 (SI 1994/2063).

Signed 

.....
on behalf of McCONNEL LIMITED
Person

Responsible

Status: Chief Design Engineer

Date: January 2007

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GENERAL INFORMATION

Read this manual before fitting or operating this equipment. Whenever any doubt exists contact your dealer or the McConnell Service Department for assistance.

Always use 'Genuine McConnell Parts' on McConnell machinery and accessories.

DEFINITIONS:

The following definitions apply throughout this manual:

WARNING:

An operating procedure, technique etc., which can result in personal injury or loss of life if not observed carefully.

CAUTION:

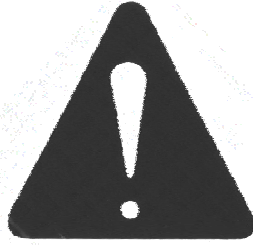
An operating procedure, technique etc., which can result in the damage of either machine or equipment if not observed carefully.

NOTE:

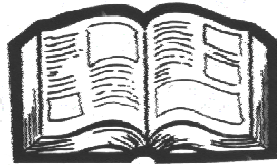
An operating procedure, technique etc. which is considered essential to emphasise.

LEFT & RIGHT HAND:

This term is applicable to the machine when it is fitted to the tractor and viewed from the rear. This also applies to tractor references.



SAFETY INFORMATION



This component / accessory is primarily designed for fitment to McConnel Power Arm Hedge and Grass Cutters, therefore all safety aspects for this component relate to the safe use of those machines and will be stated in the safety section of its operation manual. A copy of the same safety information is provided below in order to reiterate and refresh your memory.

This machine has the potential to be extremely dangerous, in the wrong hands it can kill or maim. It is therefore imperative that the owner, and the operator of this machine, read the following section to ensure that they are both fully aware of the dangers that do, or may exist, and their responsibilities surrounding its use.

The operator of this machine is responsible not only for their own safety but equally for the safety of others who may come into the close proximity of the machine, as the owner you are responsible for both.

POTENTIAL SIGNIFICANT DANGERS ASSOCIATED WITH THE USE OF A MACHINE:

- ▲ *Being hit by debris thrown by rotating components.*
- ▲ *Being hit by machine parts ejected through damage during use.*
- ▲ *Being caught on a rotating power take-off (PTO) shaft.*
- ▲ *Being caught in other moving parts i.e.: belts, pulleys and cutting heads.*
- ▲ *Electrocution from Overhead Power Lines (by contact with or 'flashover' from).*
- ▲ *Being hit by cutting heads or machine arms as they move.*
- ▲ *Becoming trapped between tractor and machine when hitching or unhitching.*
- ▲ *Tractor overbalancing when machine arm is extended.*
- ▲ *Injection of high-pressure oil from hydraulic hoses or couplings.*
- ▲ *Machine overbalancing when freestanding (out of use).*
- ▲ *Road traffic accidents due to collision or debris on the road.*

BEFORE USING A MACHINE YOU MUST:

- ▲ *Ensure you read all sections of the operator handbook.*
- ▲ *Ensure the operator is, or has been, properly trained to use the machine.*
- ▲ *Ensure the operator has been issued with and reads the operator handbook.*
- ▲ *Ensure the operator understands and follows the instructions in operator handbook.*
- ▲ *Ensure the tractor front, rear and sides are fitted with metal mesh or polycarbonate guards of suitable size and strength to protect the operator against thrown debris or parts.*
- ▲ *Ensure tractor guards are fitted correctly, are undamaged and kept properly maintained.*
- ▲ *Ensure that all machine guards are in position, are undamaged, and are kept maintained in accordance with the manufacturer's recommendations.*
- ▲ *Ensure flails and their fixings are of a type recommended by the manufacturer, are securely attached and that none are missing or damaged.*
- ▲ *Ensure hydraulic pipes are carefully and correctly routed to avoid damage by chaffing, stretching or pinching and that they are held in place with the correct fittings.*
- ▲ *Always follow the manufacturer's instructions for attachment and removal of the machine from the tractor.*
- ▲ *Check that the machine fittings and couplings are in good condition.*
- ▲ *Ensure the tractor meets the minimum weight recommendations of the machine's manufacturer and that ballast is used as necessary.*
- ▲ *Always inspect the work area thoroughly before starting to note obstacles and remove wire, bottles, cans and other debris.*
- ▲ *Use clear suitably sized warning signs to alert others to the nature of the machine working within that area. Signs should be placed at both ends of the work site. (It is recommended that signs used are of a size and type specified by the Department of Transport and positioned in accordance with their, and the Local Highways Authority, guidelines).*
- ▲ *Ensure the operator is protected from noise. Ear defenders should be worn and tractor cab doors and windows must be kept closed. Machine controls should be routed through proprietary openings in the cab to enable all windows to be shut fully.*
- ▲ *Always work at a safe speed taking account of the conditions i.e.: terrain, highway proximity and obstacles around and above the machine. Extra special attention should be applied to Overhead Power Lines. Some of our machines are capable of reach in excess of 8 metres (26 feet) this means they have the potential to well exceed, by possibly 3 metres (9' 9"), the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines. It cannot be stressed enough the dangers that surround this capability, it is therefore vital that the operator is fully aware of the maximum height and reach of the machine, and that they are fully conversant with all aspects regarding the safe minimum distances that apply when working with machines in close proximity to Power Lines. (Further information on this subject can be obtained from the Health & Safety Executive or your Local Power Company).*

- ▲ *Always disengage the machine, kill the tractor engine, remove and pocket the key before dismounting for any reason.*
- ▲ *Always clear up all debris left at the work area, it may cause hazard to others.*
- ▲ *Always ensure when you remove your machine from the tractor that it is left in a safe and stable position using the stands and props provided and secured if necessary.*

WHEN NOT TO USE THIS MACHINE:

- ▲ *Never attempt to use this machine if you have not been trained to do so.*
- ▲ *Never use a machine until you have read and understood the operator handbook, are familiar with it, and practiced the controls.*
- ▲ *Never use a machine that is poorly maintained.*
- ▲ *Never use a machine if guards are missing or damaged.*
- ▲ *Never use a machine on which the hydraulic system shows signs of wear or damage.*
- ▲ *Never fit, or use, a machine on a tractor that does not meet the manufacturer's minimum specification level.*
- ▲ *Never use a machine fitted to a tractor that does not have suitable front, rear and side(s) cab guarding made of metal mesh or polycarbonate.*
- ▲ *Never use the machine if the tractor cab guarding is damaged, deteriorating or badly fitted.*
- ▲ *Never turn a machine cutting head to an angle that causes debris to be ejected towards the cab.*
- ▲ *Never start or continue to work a machine if people are nearby or approaching - Stop and wait until they are at a safe distance before continuing. WARNING: Some Cutting Heads may continue to 'freewheel' for up to 40 seconds after being stopped.*
- ▲ *Never attempt to use a machine on materials in excess of its capability.*
- ▲ *Never use a machine to perform a task it has not been designed to do.*
- ▲ *Never operate the tractor or machine controls from any position other than from the driving seat, especially whilst hitching or unhitching the machine.*
- ▲ *Never carry out maintenance of a machine or a tractor whilst the engine is running – the engine should be switched off, the key removed and pocketed.*
- ▲ *Never leave a machine unattended in a raised position – it should be lowered to the ground in a safe position on a level firm site.*
- ▲ *Never leave a tractor with the key in or the engine running.*
- ▲ *Never carry out maintenance on any part or component of a machine that is raised unless that part or component has been properly substantially braced or supported.*
- ▲ *Never attempt to detect a hydraulic leak with your hand – use a piece of cardboard.*
- ▲ *Never allow children near to, or play on, a tractor or machine under any circumstances.*

ADDITIONAL SAFETY ADVICE

Training

Operators need to be competent and fully capable of operating this machine in a safe and efficient way prior to attempting to use it in any public place. We advise therefore that the prospective operator make use of relevant training courses available such as those run by the Agricultural Training Board, Agricultural Colleges, Dealers and McConnel.

Working in Public Places

When working in public places such as roadsides, consideration should be paid to others in the vicinity. Stop the machine immediately when pedestrians, cyclists and horse riders etc. pass. Restart only when they are at a distance that causes no risk to their safety.

Warning Signs

It is advisable that any working area be covered by suitable warning signs and statutory in public places. Signs should be highly visible and well placed in order to give clear advanced warning of the hazard. Contact the Department of Transport or your Local Highways Authority to obtain detailed information on this subject. The latter should be contacted prior to working on the public highway advising them of the time and location of the intended work asking what is required by way of signs and procedure. – ‘*Non-authorised placement of road signs may create offences under the Highways Act*’.

Suggested Warning Signs Required

“Road works ahead” warning sign with a supplementary **“Hedge cutting”** plate. **“For 1 mile”** or appropriate shorter distance may be added to the plate.

“Road narrows” warning sign with supplementary **“Single file traffic”** plate.

White on blue **“Keep right”** (*) arrow sign on rear of machine.

* Note – this applies to UK Market machines where traffic passes to the right of a machine working in the same direction as the traffic flow. The direction, use and colour of the arrow sign will depend on the country of use and the Local Highway Authorities regulations in the locality.

Use of Warning Signs

- ▲ On two-way roads one set of signs is needed facing traffic in each direction.
- ▲ Work should be within 1 mile of the signs.
- ▲ Work only when visibility is good and at times of low risk e.g.: NOT during ‘rush-hour’.
- ▲ Vehicles should have an amber-flashing beacon.
- ▲ Ideally, vehicles should be conspicuously coloured.
- ▲ Debris should be removed from the road and path as soon as practicable, and at regular intervals, wearing high visibility clothing and before removing the hazard warning signs.
- ▲ Collect all road signs promptly when the job is completed.

Although the information given here covers a wide range of safety subjects, it is impossible to predict every eventuality that can occur under differing circumstances whilst operating this machine. No advice given here can replace ‘good common sense’ and ‘total awareness’ at all times, but will go a long way towards the safe use of your McConnel machine.

ORBITER HEAD KIT

The Orbiter Head Kit is a device which allows the flail head to be tilted upwards to a maximum of 70°. It is designed to enable a hedgecutter to 'side' hedges in extremely narrow lanes.

Orbiter Head Kits can be fitted to the following McConnell machines and their equivalent export builds:

PA2050, PA2060, PA2070, PA47, PA48, PA50, PA52, PA53, PA55, PA60, PA5600, PA6400.

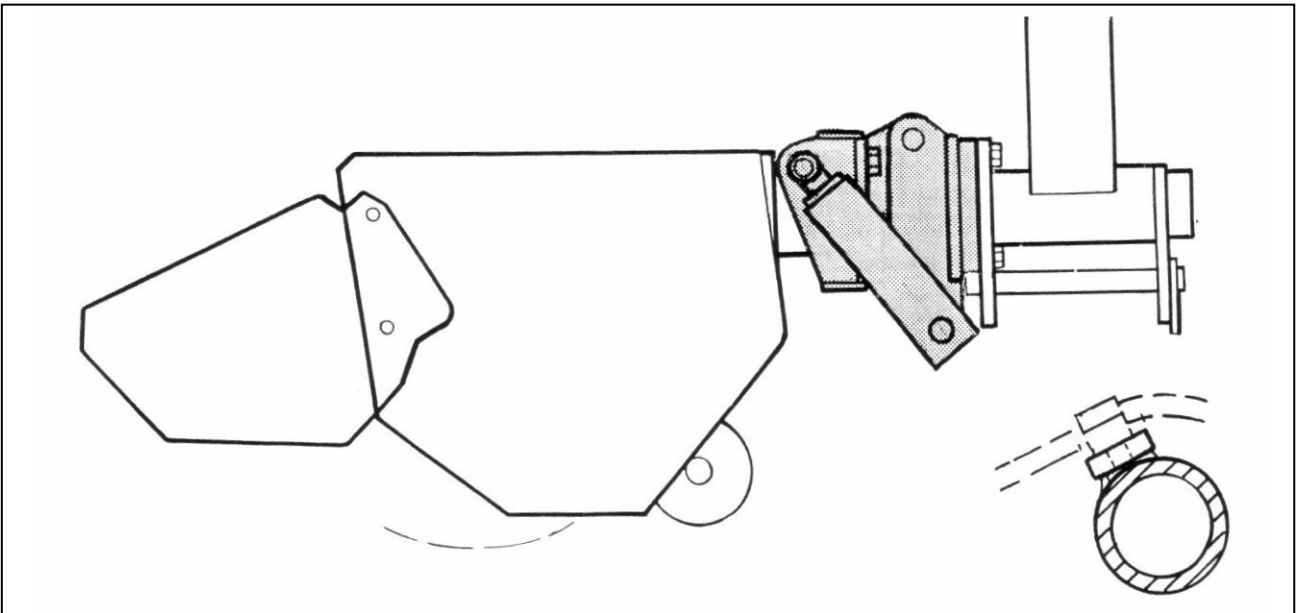
For Midcut machines, Tele machines or other models not listed above please contact the McConnell Service Department for advice on suitability.

FITTING

NOTE: The Orbiter Kit may contain items which are not required for certain installations.

Disconnect the existing flail hoses at the dipper arm hose junction bracket – *On sliding mount flail heads this is not necessary.*

Remove the hose protection tray.



Unbolt the dipper arm from the flail head mounting flange. *On belt drive heads a tapped plate is welded to the flail head mounting tube at the angle shown nearest to the flail motor.*

Bolt the head orbiter between the flail head and the dipper as shown above. *On sliding mount flail heads a spacer block is required between the orbiter and the flail head.*

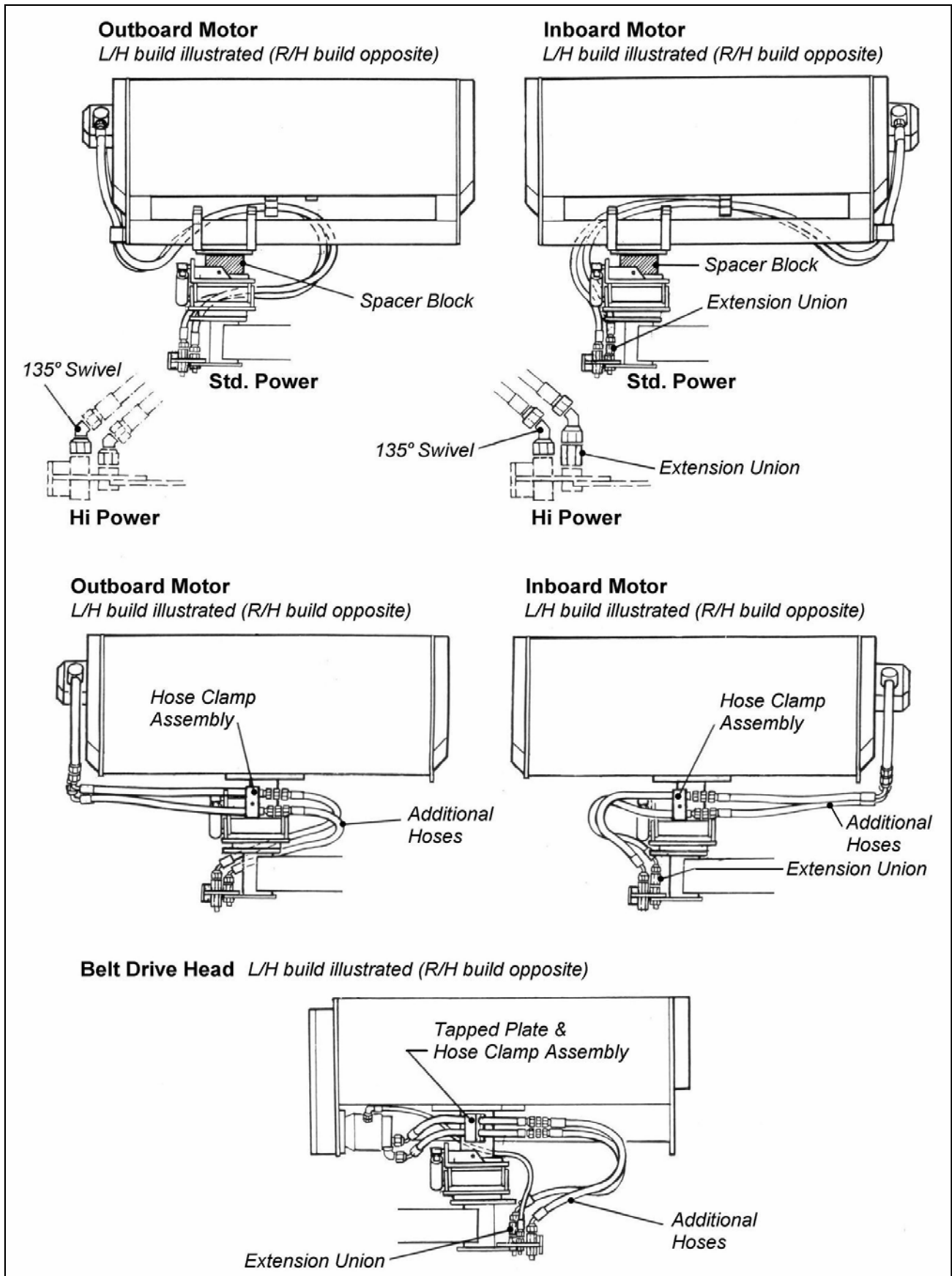
NOTE: Sliding heads must be mounted and operated in their 'mid-point' position with the orbiter kit.

Attach the flail motor extension hoses (if required) and route as shown in the diagrams on the following page using the fittings indicated in the drawings that suit your particular installation.

A selection of the ¼" BSP hoses supplied are connected to the orbiter ram(s), routed down the arms and connected to the tractor's double acting auxiliary service using a suitable self seal coupling.

The hose guards are removed from the arms and the hoses secured to the existing hoses using the ties supplied. On Tele dipper only the guard remains and the hoses are fixed using the clamps supplied which are attached to the tapped bosses on the top edge of the guard - ensure there is sufficient slack over the arm pivots to allow the hoses to flex correctly. Refit the hose guards.

HOSE INSTALLATION & ROUTING DIAGRAMS (Single ram version illustrated)



OPERATION

The device has been specifically designed to allow the siding of hedges in extremely narrow lanes.

The slew facility must be selected on the machine controls and the arms must be folded back sufficiently to allow the hedge to be cut. The head can then be tilted inwards until it has regained its normal working approach angle.

When working in this mode some breakaway angle remains, but after breakaway has occurred the head position will require re-positioning. Take care to replace the head in the same position as prior to breakaway and check that the Orbiter tilt angle is properly aligning the head in relation to the hedge before commencing cutting.

WARNING

Never tilt the head beyond the normal working approach angle in relation to the hedge as the guards will become increasingly ineffective and the likelihood of dangerous debris escaping the flail casing and causing injury or damage is greatly increased.

Working in the 'broken back' or 'slew back' mode moves the flail head to the rear and inwards and therefore the potential 'debris throw' area may be moved to such a degree that debris may be thrown against the rear window of the tractors cab. If there is a likelihood or risk of this taking place additional operator guarding must be constructed to protect all vulnerable areas.

To further limit the likelihood of escaping debris it is strongly recommended that the flail rotor is set to cut with an anti clockwise rotation.

WARNING

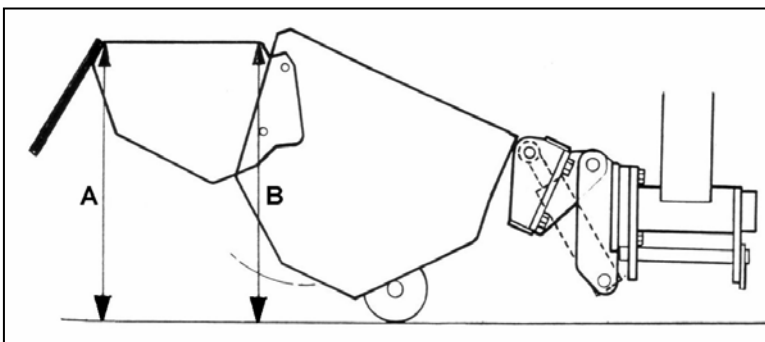
At no time when 'siding' in the normal working position must the flail head be tilted out of its normal position.

When hedging it is usual for the hedge front hood to be in the raised position.

For the finishing ground cut it is strongly recommended that the roller is adjusted down to prevent the flails 'scalping' the ground, however it is permissible to tilt the head up by a certain amount sufficient only to lower the roller in relation to the flails to a point where the flails do not 'scalp' the ground. *If the latter procedure is used as an alternative to adjusting the roller position, the front hood must be adjusted to its lowest position to compensate for the upward angle of head tilt prior to commencing - It is strongly recommended that a front flap kit is fitted if this practise is adopted.*

WARNING

The head must never be tilted back to a point where the leading edge of the front hood is higher than the trailing edge.



WITH FRONT FLAP KIT

A < B ✓

A = B ✓ = 25° Max tilt permitted

A > B ✗

WITHOUT FRONT FLAP KIT

A < B - 100mm ✓

A = B ✓ = 15° Max tilt permitted

A > B - 100mm ✗

When topping hedges in areas that are well away from public access the head may be tilted upwards when in the normal working position to enable the flails to cut closer to obstacles such as trees and telegraph poles - If this is done be aware that debris will be thrown and therefore great care must always be taken to ensure that no one or any thing that may be hurt or damaged is within the 'danger area'. ***NOTE: This danger area may extend for anything up to 400 or 500 metres from the working machine.***

WARNING

If areas of public access come within the potential debris danger area the flail head must never be tilted backwards under any circumstances when topping hedges.



For best performance ...

USE ONLY GENUINE McCONNEL SERVICE PARTS

*To be assured of the latest design improvements purchase your
'Genuine Replacements' from the 'Original Equipment Manufacturer'*

McCONNEL LIMITED

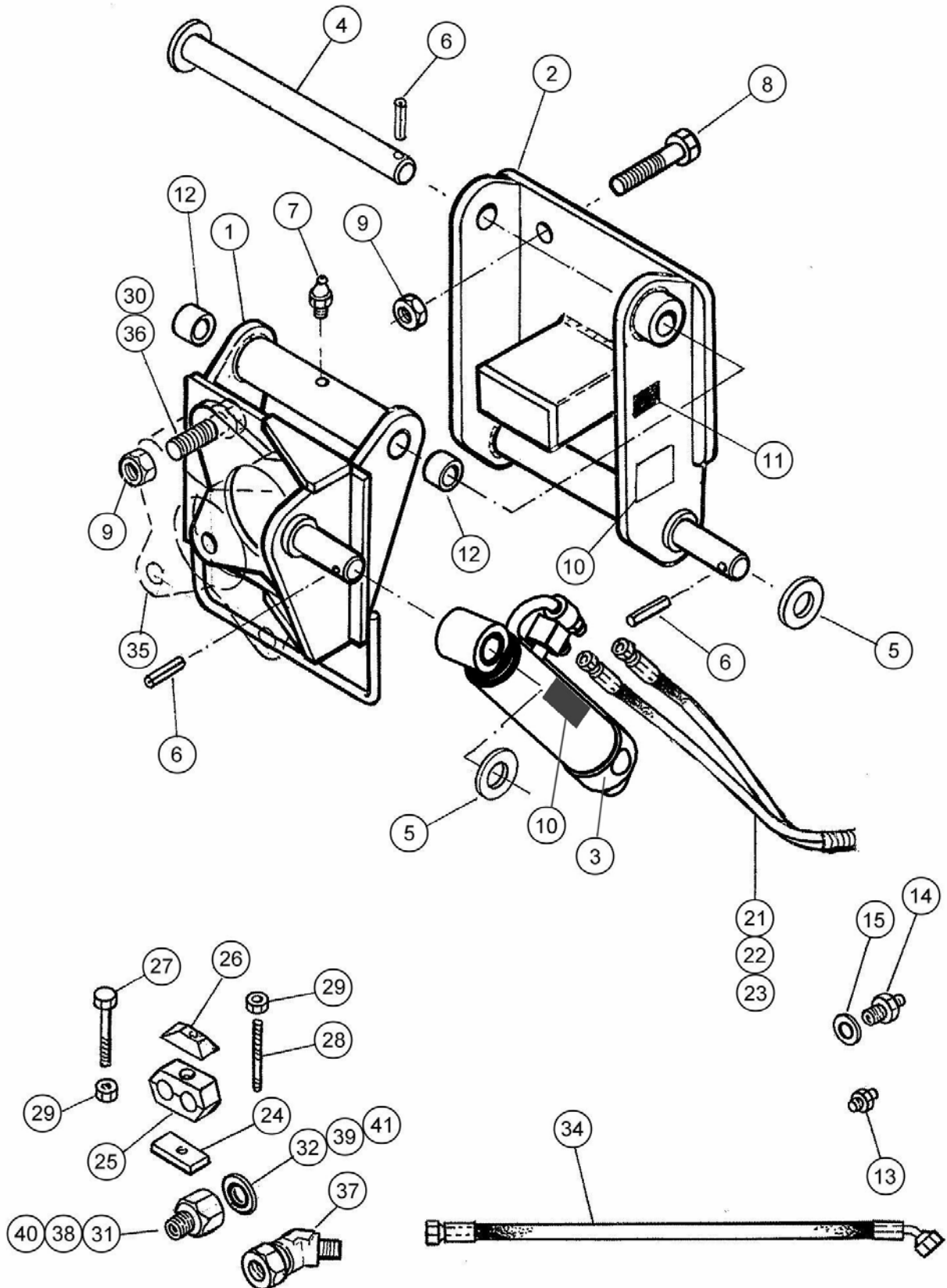
Through your local Dealer or Stockist

Always quote:

- ***Machine Type***
- ***Serial Number***
- ***Part Number***

*Design improvements may alter some of the parts listed in this manual –
the latest part will always be supplied when it is interchangeable with an earlier one.*

Module:
7190912



SINGLE RAM ORBITER KIT

REF.	QTY.	PART No.	DESCRIPTION
		7190912	ORBITER ASSEMBLY - Single Ram Model
Common Parts			
1	1	41.234.01	ORBITER FRONT BRACKET
2	1	41.233.01	ORBITER REAR BRACKET
3	1	43377.03	RAM ASSEMBLY
4	1	41.235.01	PIN
5	1	7192001	WASHER
6	3	0425540	SPRING DOWEL
7	1	0901121	GREASER
8	4	0211246	BOLT
9	8	0141006	SELF-LOCKING NUT
10	1	09.821.26	DECAL - ORBITAL
11	2	02962764	DECAL - PINCH POINT
12	2	7101083	BUSH
13	8	8581169	UNION
14	2	8581172	UNION
15	2	8650102	BONDED SEAL
16	2	42024.07	PIPE CLAMP
17	2	7193066	CLAMP PLATE
18	2	9213084	SETSCREW
19	2	9100204	SPRING WASHER
20	3	7135084	HOSE TIE
		41312.03	ORBITER HOSE KIT <i>comprising of:</i>
21	2	8515222	HOSE - 1/4" BSP x 248" LONG
22	4	8515052	HOSE - 1/4" BSP x 40" LONG
23	1	7213005	NYLON HOSE ARMOUR
Additional items supplied for Centre Mount Flailheads			
24	1	41.742.02	TAPPED PLATE - <i>Belt Drive Heads</i>
25	1	7193063	HOSE CLAMP
26	1	06.418.05	CLAMP PLATE
27	1	9213165	BOLT - <i>Direct Drive Heads</i>
28	1	04.282.09	STUD - <i>Belt Drive Heads</i>
29	1	9143005	SELF-LOCKING NUT
30	4	0211206	BOLT
31	1	8581211	EXTENSION UNION
32	1	8650108	BONDED SEAL
33	2	8121052	UNION
34	2	8501238	HOSE - 1" BSP x 36" LONG
Additional items supplied for Sliding Mount Flailheads			
35	1	7190487	SPACER BLOCK
36	4	0211486	BOLT
37	2	8581347	ADAPTER ELBOW - 135°
38	1	8581211	EXTENSION UNION
39	1	8650108	BONDED SEAL
40	1	8581224	EXTENSION UNION
41	1	8650106	BONDED SEAL

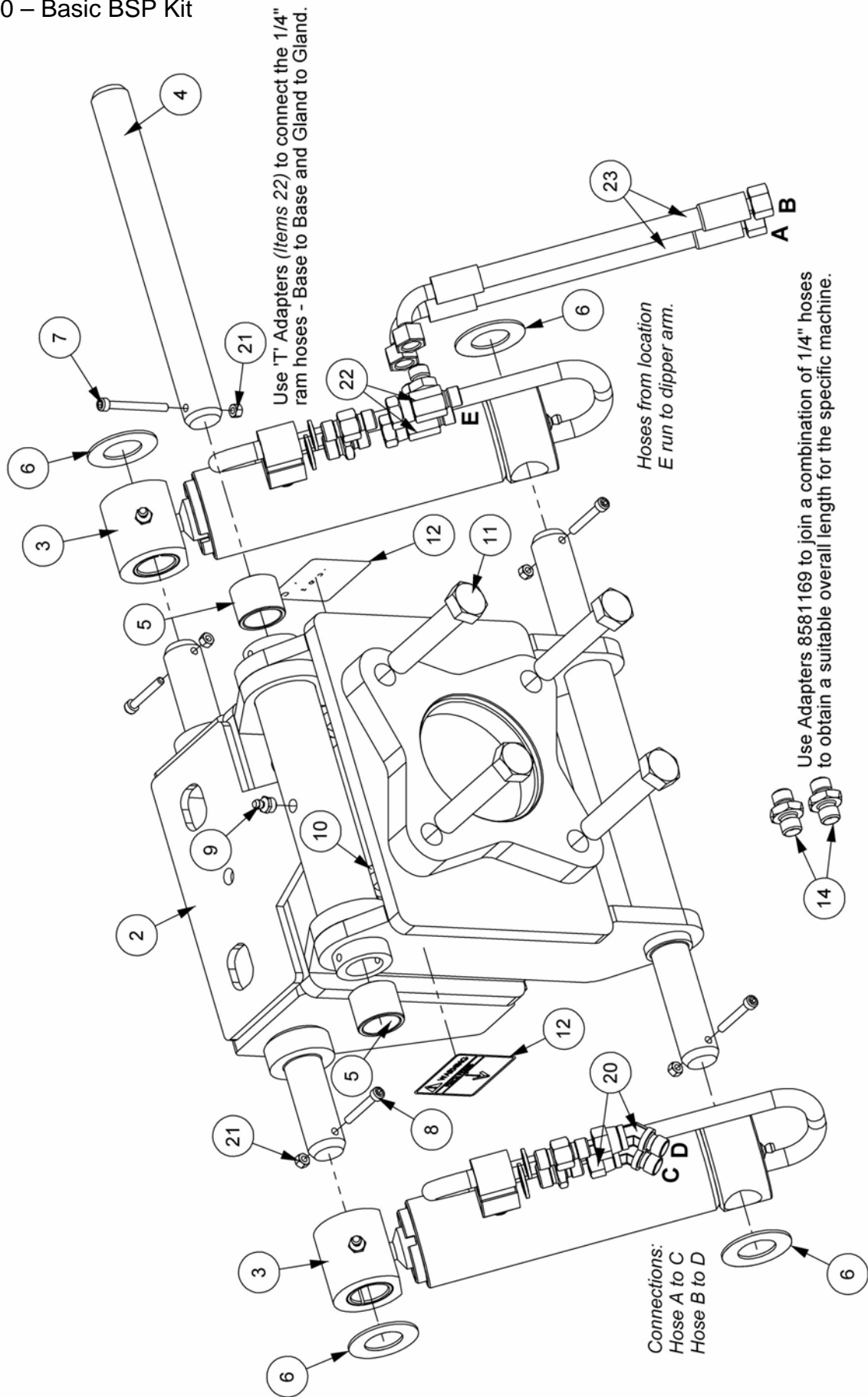
} *Hi Power*} *Std. Power*

TWIN RAM ORBITER KIT

Module:

7190930 – Basic BSP Kit

Illustration shows orbiter assembled for fitment on L/H build machines - where fitment is required on a R/H build machine elbows and tee's (Items 20 & 22) should be assembled on their opposing sides.



Run hoses through junction bracket centre and protect with hose armour fixed to the tee's - fit hose ties as required.

TWIN RAM ORBITER KIT

REF.	QTY.	PART No.	DESCRIPTION
		7190930	BASIC BSP ORBITER KIT - Twin Ram
1	1	41.233.03	ORBITER REAR BRACKET
2	1	41.234.03	ORBITER FRONT BRACKET
3	2	43377.03	RAM ASSEMBLY
4	1	41.235.02	PIN
5	2	7101083	LINK BUSH
6	4	7192001	WASHER - THIN
7	1	9243102	CAPSCREW
8	4	9343072	CAPSCREW
9	1	0901121	GREASE NIPPLE - STRAIGHT
10	4	9143007	SELF-LOCKING NUT
11	4	9210167	BOLT
12	2	02962764	DECAL - PINCH POINTS
13	2	10.001.73	HOSE - 1/4" BSP FS/FS x 6300mm (<i>not shown</i>)
14	6	8581169	ADAPTOR
15	2	8581172	ADAPTOR
16	2	8650104	BONDED SEAL
17	8	7135084	CABLE TIE
18	1	7213005	HOSE ARMOUR
19	6	10.001.20	HOSE - 1/4" BSP FS/FS x 1000mm (<i>not shown</i>)
20	2	8581347	ELBOW - 135°
21	5	9143002	SELF LOCKING NUT
22	2	04.056.10	ADAPTER TEE
23	2	10.002.15	HOSE - 1/4" BSP FS/F90 x 750mm

These items form the basic 'Twin Ram Orbiter Kit' utilised in specific BSP kits - refer to the following pages for details of the specific kits with listings of additional component parts.

TWIN RAM ORBITER KITS (BSP)

REF.	QTY.	PART No.	DESCRIPTION
		7190931	ORBITER KIT - FIXED 1.2M HEADS (3/4" BSP)
1	1	7190930	BASIC BSP ORBITER KIT - Twin Ram
2	4	9213137	BOLT
3	1	7190148	PIPE CLAMP
4	1	9213165	BOLT
5	1	9143005	NUT
6	2	10.009.18	HOSE - 3/4" BSP FS/FS x 1500mm

REF.	QTY.	PART No.	DESCRIPTION
		7190932	ORBITER KIT - FIXED 1.2M HEADS (1" BSP)
1	1	7190930	BASIC BSP ORBITER KIT - Twin Ram
2	4	9213137	BOLT
3	1	7193063	HOSE CLAMP (PAIR)
4	1	7193064	HOSE CLAMP PLATE
5	1	9213165	BOLT
6	1	9143005	NUT
7	2	10.025.25	HOSE - 1" BSP FS/F135 x 1500mm

REF.	QTY.	PART No.	DESCRIPTION
		7190933	ORBITER KIT - FIXED 1.5M & 1.6M HEADS (1" BSP)
1	1	7190930	BASIC BSP ORBITER KIT - Twin Ram
2	4	9213327	BOLT
3	1	7190487	SPACER
4	2	10.011.28	HOSE - 1" BSP FS/FS x 1800mm
5	1	7193063	HOSE CLAMP (PAIR)
6	1	7193064	HOSE CLAMP PLATE
7	1	9213165	BOLT
8	1	9143005	NUT
9	2	9393357	STUD
10	4	9133007	LOCK NUT

**TWIN RAM ORBITER KITS (BSP)**

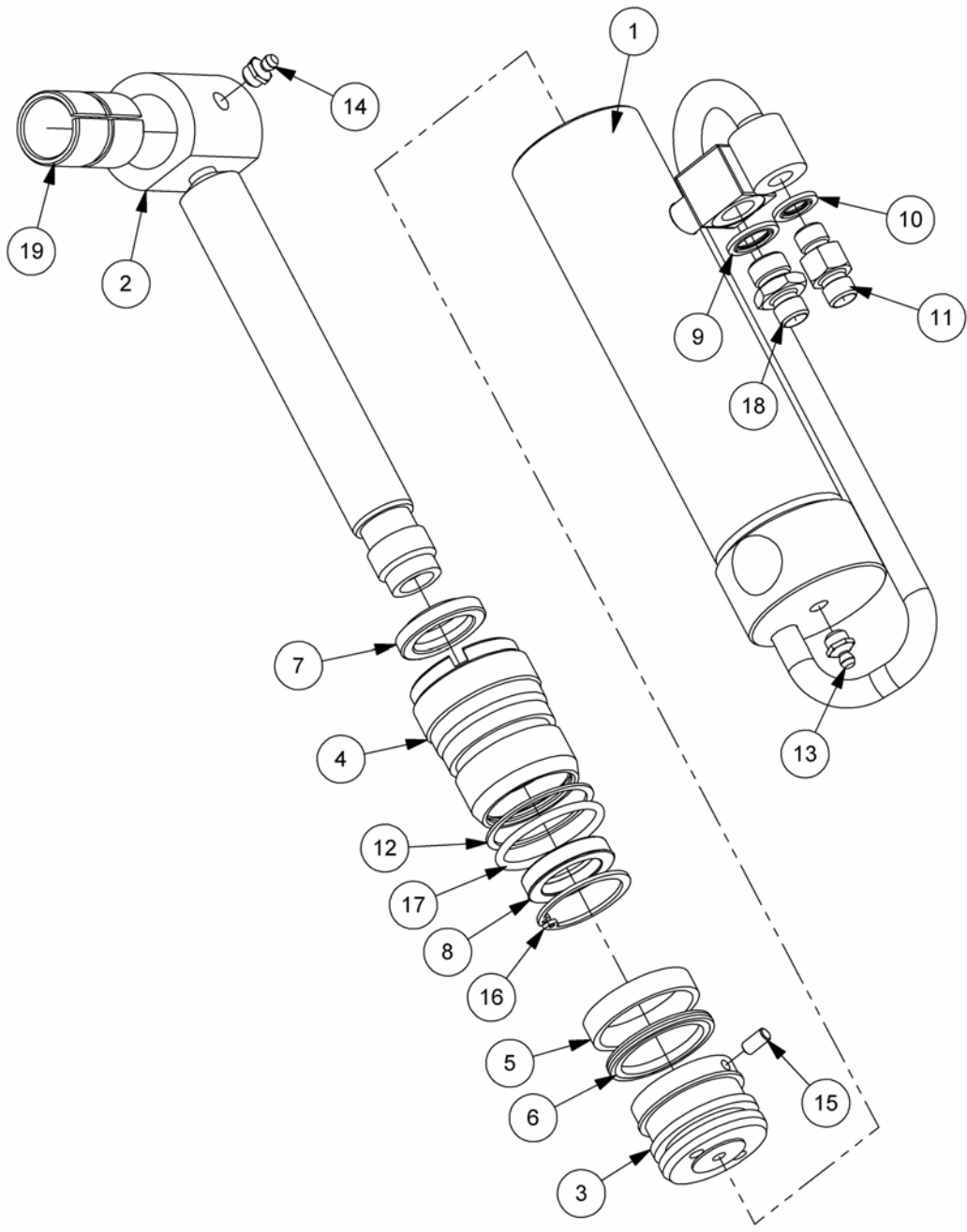
REF.	QTY.	PART No.	DESCRIPTION
		7190934	ORBITER KIT - FIXED PISTON HEADS (1" BSP)
1	1	7190930	BASIC BSP ORBITER KIT - Twin Ram
2	4	9213327	BOLT
3	2	41350.24	HOSE - 1" BSP FS/F135 x 1400mm HP
4	1	10.007.25	HOSE - 5/8" BSP FS/FS x 1500mm
5	1	8581318	UNION

REF.	QTY.	PART No.	DESCRIPTION
		7190935	ORBITER KIT - SLIDING HEADS (3/4" BSP)
1	1	7190930	BASIC BSP ORBITER KIT - Twin Ram
2	4	9213327	BOLT
3	1	7190487	SPACER
4	2	10.009.30	HOSE - 3/4" BSP FS/FS x 2000mm

REF.	QTY.	PART No.	DESCRIPTION
		7190936	ORBITER KIT - SLIDING HEADS (1" BSP)
1	1	7190930	BASIC BSP ORBITER KIT - Twin Ram
2	4	9213327	BOLT
3	1	7190487	SPACER
4	1	8581211	EXTENSION UNION
5	2	10.011.30	HOSE - 1" BSP FS/FS x 2000mm

RAM ASSEMBLY

Module:
43377.03



**RAM ASSEMBLY**

REF.	QTY.	PART No.	DESCRIPTION
		43377.03	RAM ASSEMBLY
1	1	43377.34	BARREL
2	1	09.987.62	PISTON ROD
3	1	7560095	PISTON
4	1	7135291	GLAND HOUSING
5	1	8629188	GUIDE RING
6	1	8629187	PISTON SEAL
7	1	8629149	SCRAPER RING
8	1	8629148	GLAND SEAL
9	1	8650103	BONDED SEAL
10	1	8650102	BONDED SEAL
11	1	8130037	ADAPTER RESTRICTOR - 1.15 'S'
12	1	8609302	AE RING
13	1	0901125	GREASE NIPPLE - 45°
14	1	0901121	GREASE NIPPLE - STRAIGHT
15	1	9363023	GRUB SCREW
16	1	0416240	INTERNAL CIRCLIP
17	1	8600302	O RING
18	1	8130066	ADAPTER RESTRICTOR - 1.15 'S'
19	1	7105050	ROD END BUSH
		8699188	SEAL KIT



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