

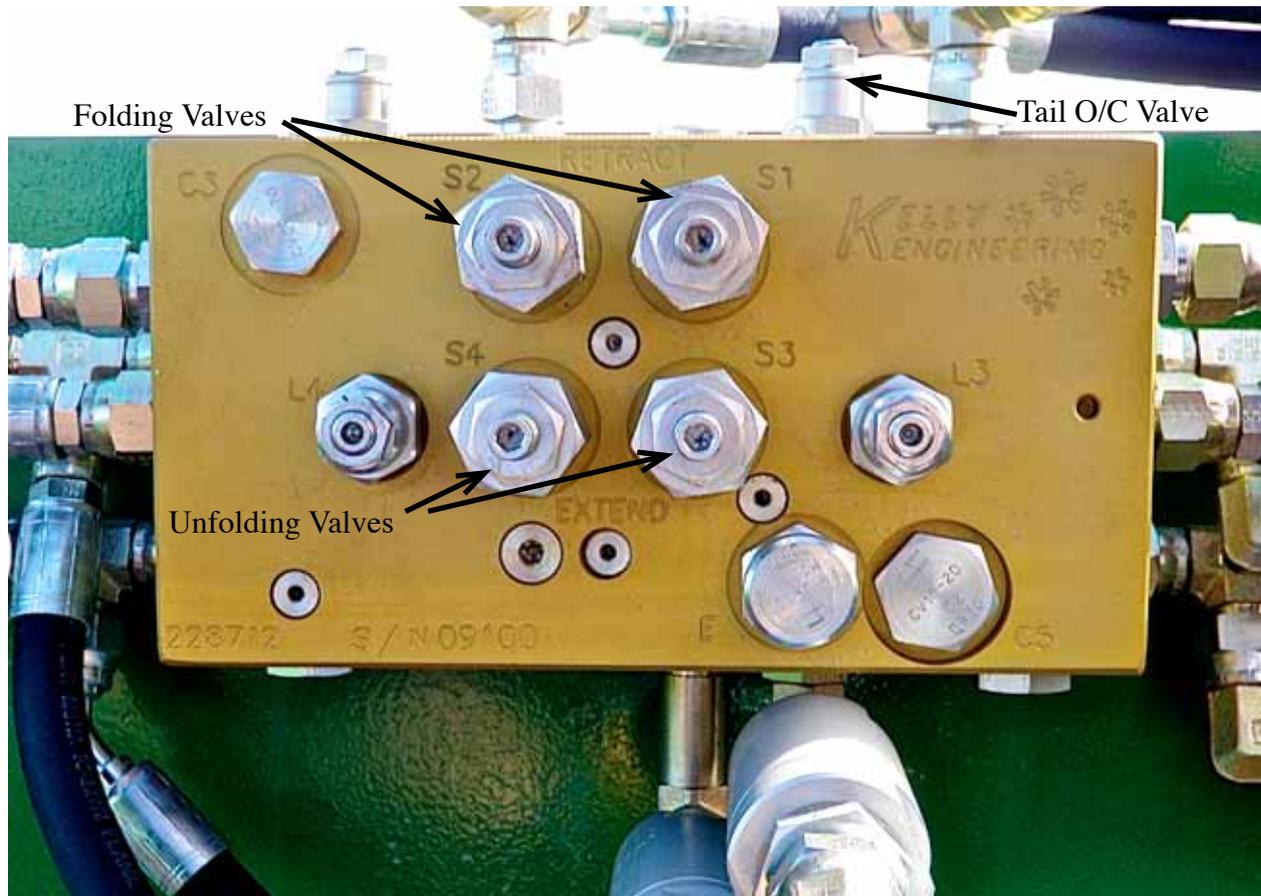
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Hydraulic Sequence Valve Adjustments

KELLY DIAMOND HARROW Models; 40, 45, 45R, 50, 60

**Hydraulic Flow Setting on Tractor must be set
to 20% - Max flow 8 Gallons per minute**

Hydraulic Sequence Valve Manifold



Sequence Valve Overview.

The Sequencing Valve Manifold incorporated in Kelly Engineering Diamond Series Chain Harrows has been designed specifically for our purpose. The Sequence Valve is manufactured by Oilpath Pty Ltd in Adelaide, South Australia to a high standard of accuracy. All components are high quality and very precise.

Like all hydraulic components the main enemy is contamination. Care should be taken at all times to prevent contamination entering the hydraulic circuit.

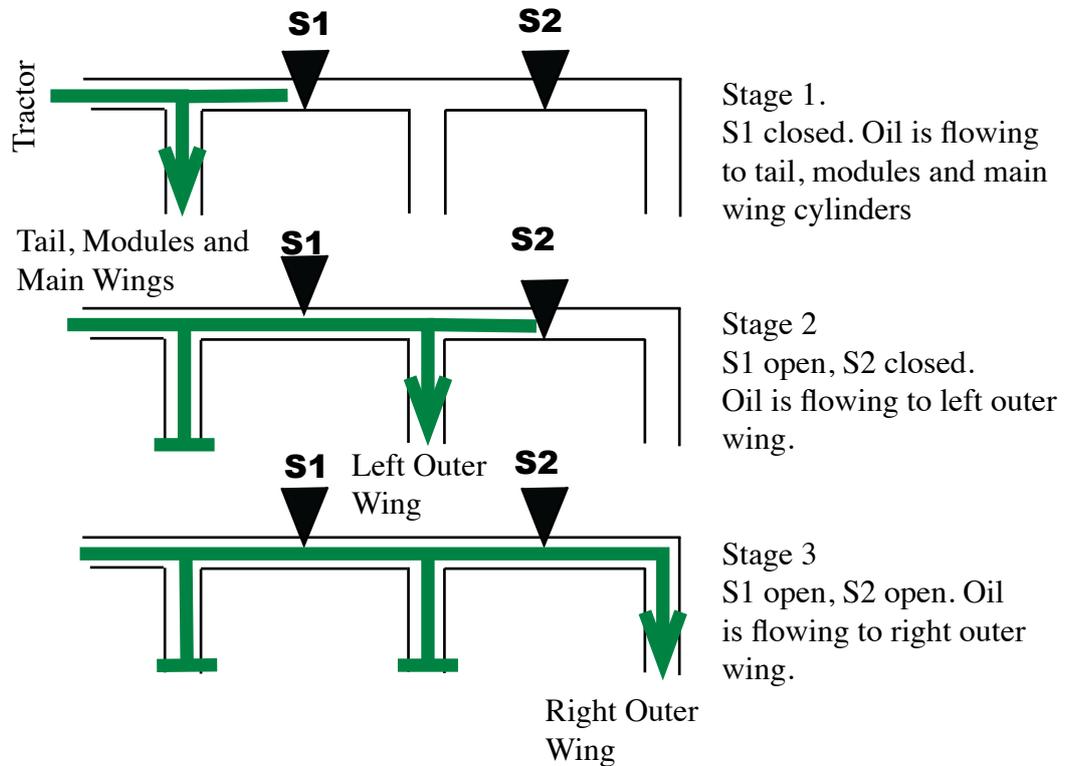
The Valve Manifold controls the folding and unfolding of the Diamond Chain Harrow. A single pair of hoses connect the Valve Manifold to the tractor, oil is directed to the first stage of a fold or unfold sequence. When the cylinders reach the end of their stroke and pressure mounts, a valve is triggered allowing oil to flow to the next stage. The valves automatically reset themselves when system pressure allows.

The Valve Manifold incorporates overcentre valves as a safety measure. These valves prevent the tail or wings from falling in the event that one of the tractor hoses should fail.

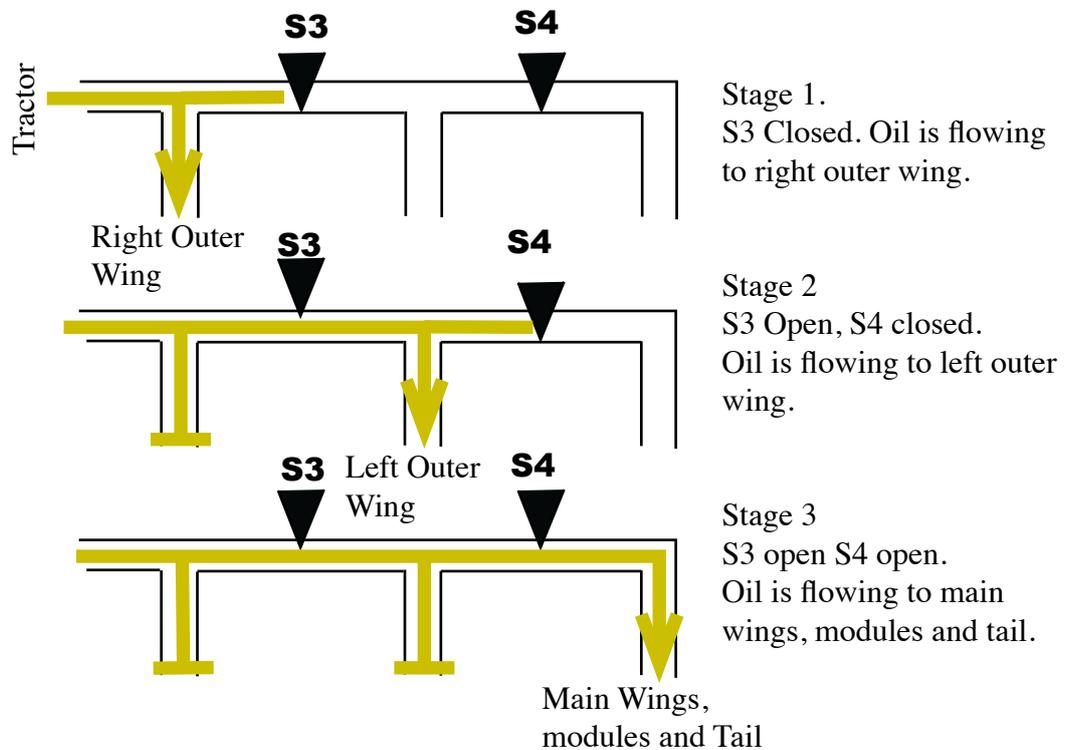
NB. The Sequence Valve Manifold has a maximum flow capacity of 8 Gallons(US) per minute. For the purposes of this instruction view all directions as though standing behind the machine looking forward.

Sequence Valve Manifold Flow Chart

FOLD



UNFOLD



TROUBLE SHOOTING

Problem With:	Symptom	Page
Unfolding	Right Wing won't rise from folded position	4
	Right Wing rises but Left Wing won't rise.	5
	Centre Cylinders Extend before outer wings are both straight (Vertical)	5
	No movement at all.	5
	Sequence was working but has become erratic	5
Folding	Left Hand Outer wing starts to fold first	6
	Centre Cylinders begin to close but Left Outer starts to move before main wings are vertical	6
	Either outer wing starts to move before both main wings are vertical	6
	Chain misses rear carriers - chain low.	7
	Chain misses rear carriers - chain high.	7
	Sequence was working but becomes erratic.	7
Un Resolved	Contact Service Agent or Manufacturer	7

Caution:

Do not remove valve cartridges from Valve Manifold housing as high pressure oil may be present.

UNFOLDING

During Unfolding oil travels directly to the Right Hand Outer Wing cylinders until they are fully extended. Oil then passes over S3 to the Left Hand Outer Wing cylinders. When these are fully extended oil flows past S4 to the Centre cylinders, the tail cylinder and the module cylinders. There is an over-centre valve that protects the main wings from falling. There is also an over-centre valve that holds the tail in the raised position for transport. The tail should be the last section to lower when unfolding.

RIGHT WING WONT RISE FROM FOLDED POSITION

If the pressure required to raise the right wing is greater than tractor pressure then oil will not flow. This may occur if chain is full of mud or other matter increasing the weight of the chain.

Solution

Clean chains of mud and debris. Check that tractor hydraulic oil pressure is adequate. (2200 psi)

UNFOLDING

RIGHT WING WON'T RISE OR WON'T RISE COMPLETELY BUT MAIN WINGS BEGIN TO OPEN.

If the pressure required to raise the right wing is greater than that set by S3 then oil will flow past S3 to the left wing without raising the right wing. As the right wing rests on top of the left wing and neither can move then oil is also forced past S4 to the main wing cylinders causing them to extend while the outer wings are still folded. As the main wings unfold and the weight is transferred from the outer wings then the oil will flow to the outer wing cylinders allowing the wings to straighten.

Solution

If Chains are clean then increase the pressure setting on S3.

Loosen the locknut with a 17mm wrench then using a 5mm Allan Key turn the centre clock wise. Adjust 1/4 of a turn then test. Repeat if necessary.

CENTRE CYLINDERS EXTEND BEFORE OUTER WINGS ARE BOTH STRAIGHT (VERTICAL)

See above. Oil must flow past S3 and S4 to extend the Main Wing Cylinders. Increasing the pressure setting at S4 should be sufficient.

NO MOVEMENT AT ALL

Solution

See first point. Check and if necessary clean chains of mud or debris.

Check that hose tips are correctly engaged in tractor breakaway sockets.

Check that any taps or electronic transport locks are open on the tractor.

Check that hydraulic flow on the tractor is not set to very low or off.

Check Tractor Hydraulic Pressure. (Should exceed 2200 psi - 151 Bar)

Call service technician. Test for oil flow. If flow is present isolate cylinders one at a time to ensure integrity of cylinder piston seal.

MACHINE WAS WORKING BUT HAS BECOME ERRATIC

The Sequence Valve Manifold has an oil flow capacity of **8 Gallons(US) per minute**. At this flow the sequence cartridges are able to cope with the flow of oil and operate at their correct settings. If the flow rate is set too high, pressure in the Manifold builds up and may unseat the sequence valves prematurely or in an unpredictable manner.

Solution.

Set tractor Hydraulic Remote oil flows to slow (20%).

Engage tractor hydraulic lever slowly.

FOLDING

During folding, oil travels directly to the tail and module cylinders and to the main wing cylinders. When these are all closed oil moves past S1 to the left outer wing. When these cylinders close oil moves past S2 to fold the right outer wing.

LEFT HAND OUTER WING STARTS TO FOLD FIRST

If the pressure required to raise the wings to vertical is greater than the pressure setting on S1 then oil will pass S1 and cause the Left hand outer wing cylinders to retract. This may occur if there is excessive load such as mud or debris or on occasions where the chains may have become blocked and buried.

Solution

Check and clean if necessary any mud or debris from chains. Do not attempt to fold the machine if the chains are buried during a blockage. Clear away the soil from the chains first.

If the chains are clean but problem persists it may be necessary to adjust S1. Loosen lock nut using a 3/4" (19mm) spanner then using a 5 mm socket head wrench increase the pressure setting by screwing the centre clockwise 1/4 turn. Test and repeat if needed.

CENTRE CYLINDERS BEGIN TO CLOSE, RAISING THE WINGS BUT LEFT HAND OUTER COMMENCES TO FOLD BEFORE BOTH WINGS ARE VERTICAL

As above, the centre cylinders should be closed before any oil passes S1 to the left outer wing cylinders.

Solution

Clean mud and debris from discs.

Adjust S1. Loosen lock nut using a 3/4" (19mm) spanner then using a 5 mm socket head wrench increase the pressure setting by screwing the centre clockwise 1/4 turn. Test and repeat if needed.

EITHER OUTER WING BEGINS TO FOLD BEFORE BOTH CENTRE WINGS ARE VERTICAL

The centre cylinders should be closed before any oil passes S1 to the left outer wing cylinders or S2 to the right hand outer wing cylinders. For either left or right the oil must first pass over S1 therefore adjustments to S1 as above should cure the problem.

CHAIN MISSES REAR CARRIERS – TOO LOW.

The tail section of the machine is hinged at the rear of the main frame. If the transport cylinder at the front of the machine is raised, the rear chains are loosened when the wings are raised.

Solution

Leave front of the machine in working position until wings are folded and chains locate

FOLDING

in their hangers.

CHAIN MISSES REAR CARRIERS – TOO HIGH

If folding on uneven ground it may be possible for the tail section to be below the level of the machine. This will cause the rear chains to tighten and possibly swing above the transport hangers when folding.

Solution

Move to level ground before folding.

Slightly raise the front of the machine to compensate.

SEQUENCE WAS WORKING FINE BUT HAS BECOME ERRATIC

The Sequence Valve Manifold has an oil flow capacity of 8 Gallons(US) per minute. At this flow the sequence cartridges are able to cope with the flow of oil and operate at their correct settings. If the flow rate is set too high pressure in the Manifold builds up and may unseat the sequence valves prematurely or in an unpredictable manner.

Solution.

Set tractor Hydraulic Remote oil flows to slow.

Restrict oil flow using the Flow Control Valve 'R' (Retract). Loosen the lock nut using a 17mm spanner and then using a 5mm Socket Head Wrench turn the centre screw anticlockwise (out) until problem ceases.

NO MOVEMENT AT ALL

Solution

Check that hose tips are correctly engaged in tractor breakaway sockets.

Check that any taps or electronic transport locks are open on the tractor.

Check that hydraulic flow on the tractor is not set to very low or off.

Check Tractor Hydraulic Pressure. (Should exceed 2200 psi - 151 Bar)

Call service technician. Test for oil flow. If flow is present isolate cylinders one at a time to ensure integrity of cylinder.

IF THESE ADJUSTMENTS DO NOT SOLVE THE PROBLEM

Contact your service Agent for assistance. There may be a fault with one of the cartridges. The Valve Manifolds are tested at factory and again prior to shipping. The assembling Agent will also have ensured the correct operation prior to delivery. Very rarely but occasionally valves do fail. The usual cause is ingress of contaminant.

You may also contact Kelly Engineering for technical advice and assistance.

International : 011 618 8667 2253. USA 417-865-2100. Canda 306-231-6675

From within Australia 08 8667 2253.