Troubleshooting the Version 12 Valve Block

Contact Information

Date _____ Time of Call _____

Technician Name _____ (Cell) _____

Farmer Name _____

Shipping address _____

911 address of farm headquarters _____

City, state, zip _____

Phone _____ Email _____

Kelly Tillage System Information

Salesman _____

Dealership _____

Dealer address _____

Farmer Name _____

Model_____ Acres on machine _____

Harrow Serial Number _____

Tractor Brand / Model _____

Valve Block Model Number _____

Valve Block Production Number _____

(The Block **Model** and **Production** Numbers can be found on the **left** side when facing the block)

Harrows performance prior to the service call & Pre-existing conditions or repairs

Notes _____

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Symptom

- ☐ Will not unfold.
- ☐ Will not fold.
- ☐ Folding out of sequence.
- ☐ No movement when hydraulic circuit is engaged.
- ☐ Other
- ☐ Notes_____

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Pre-Diagnosis Checklist

The following settings and inspections need to be checked before the block or flow control is suspect.

- ☐ Tractor flow set in the 20%-40% range.
- ☐ Ensure hydraulic fluid is getting to the block.
- ☐ When given circuit flow do the hoses move or stiffen?
- ☐ If not, change SCV valves and check hose tip couplings.

Explanation of hydraulic flow

Unfolding

- ☐ When the machine is **folded** and trying to **unfold**, the fluid enters the **bottom** of the block, travels through the **filter** on the left-hand side (**facing block**) then through the **E** flow control valve. The fluid then travels to the **first** stage of the **unfold** circuit which is to stand up the right-hand outer wing. After right hand wing is vertical, **S3** should open and allow oil to the left-hand outer wing. With both wings vertical **S4** should open and allow the wings to unfold to ground level.

Folding

- ☐ When the machine is **unfolded** trying to **fold**, the fluid enters the **bottom** of the block, travels through the **filter** on the right-hand side (**facing block**) then through the **R** flow control valve. The fluid then travels to the **first** stage of the **fold** circuit which is to raise the two main wings straight up. Once the two wings are vertical **S1** valve should open to allow the left-hand outer wing to fold. **S2** valve will then open to allow the right-hand outer wing to complete the folding sequence.

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Tools and supplies required:

- **½ box end wrench**
- **9/16 box end wrench**
- **5/8 box end wrench**
- **¾ box end wrench**
- **1 ¼ deep socket- Thin-walled socket works best**
- **1 ¾ socket- Thin-walled socket works best**
- **SAE Allen Wrenches**
- **Brake Cleaner**
- **Paper Towels**
- **Disposable gloves**

Checklist for establishing hydraulic flow to the valve block.

Step 1 Adjusting the flow control valve

- ☐ Loosen jam nut.
- ☐ Increase flow by turning the **E** & **R** valves **CCW** (counterclockwise) until they stop.
- ☐ When valve stops **do not** force it further.
- ☐ Try **folding** or **unfolding** machine.
- ☐ Expected folding time should be no less than **three minutes**. It may be necessary to adjust flow control (clockwise) so that the disc chains are not swinging as they rest into the L brackets.

Notes

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Step 2 Inspect the flow control valve

- ☐ If the machine will not **fold** or **unfold**, the flow control valves may be faulty and need to be removed and inspected.
- ☐ **Float** tractor hydraulics for this circuit.
- ☐ Turn tractor **off**.
- ☐ Clean area of **all** dust, mud, and debris from the valve block and surrounding area.
- ☐ **DO NOT CONTAMINATE VALVE BLOCK**
- ☐ Remove nonfunctioning valve.
- ☐ Inspect **port** that valve was removed from for **rubber pieces** or **other debris**.
- ☐ Inspect the **end** of the valve for **rubber pieces** or **debris**.

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- You should see a **shiny metal bottom** if you look down into the valve cavity.
- **NOTE**, if debris is found, **move** to **step 3**.
- If debris is **not** found, remove the other **flow control valve**, swap it with the valve that is **not functioning**.
- Tighten valve back into port.
- Try folding or unfolding machine.
- If flow control valve has malfunctioned, the problem will follow the valve. If the machine was not folding, now it will fold but will not unfold. If the machine was not unfolding, now it will unfold but will not fold.
- **Answer**, order a new **flow control valve** to replace the **failed valve**.
- **Answer**, to fold and unfold the machine until the replacement valve arrives, repeat the valve **SWAPPING PROCESS** but do not **contaminate** the **valve block**.

Notes

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Step 3 removal of debris

If rubber pieces or debris are found in the **flow control valves** or **ports**, the filter needs to be **cleaned** and **inspected**.

- Remove filter from the side of the block corresponding to the nonfunctional flow control valve.
- Filter can be found under the large 1 ¾ cap and is under spring load.
- After removal of the nut, there will be a spring which is followed by the filter (**compressed brass BB's**) followed by an internal spring.
- Do not contaminate the **springs** or **filters**.
- Inspect filter port in block and clean.
- Inspect rubber washer that the filter is seated on internally in port. **NOTE**, this is where rubber debris are likely from.
- Remove all rubber and debris.
- Remove the rubber washer from the other flow control cartridge cavity. It will be located between the filter and the block. It is likely that the washer on the functional side is about to fail as well (if working on **E** then remove from **R** if working on **R** remove from **E**)
- **NOTE**, The oil flows from the filter to the flow control at a 90-degree angle. Shine a flashlight in the filter port to see it from the other side.

Notes

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Step 4. If folding out of sequence was the symptom then a small adjustment of the "S" valves should resolve the issue. Turn the relevant valve as described above, clockwise until it gently bottoms out. Then turn it counterclockwise as per the table below. If it is possible to have someone activate the SCV, do so while making the relevant adjustment. Slowly turn the valve counter clockwise until oil is heard to flow, continue until the relevant wing section moves then continue perhaps 1/8 turn more for optimum oil flow.

The settings listed in the table below are starting with the valve screwed all the way clockwise until it bottoms out. Once this is achieved, then screw the valve counterclockwise the number of revolutions listed below.

S1	**Left hand outer wing fold**	**Sequence Valve**	**1/5**	**Counter Clockwise**
S2	**Right hand outer wing fold**	**Sequence Valve**	**3/8**	**Counter Clockwise**
S3	**Left hand outer wing unfold**	**Sequence Valve**	**3/8**	**Counter Clockwise**
S4	**Main wing cylinders unfold**	**Sequence Valve**	**1/3**	**Counter Clockwise**
R	**Flow control for retract**	**Flow Regulator**		**Counter Clockwise**
E	**Flow control for extend**	**Flow Regulator**		**Counter Clockwise**
L1	**Holds pressure on main wings**	**Counterbalance Valve**	**3 1/2**	**Counter Clockwise**
L2	**Holds tail in raised position**	**Counterbalance Valve**	**2**	**Counter Clockwise**
L3	**Holds right hand outer wing straight**	**Counterbalance Valve**	**3 3/4**	**Counter Clockwise**
L4	**Holds left hand outer wing straight**	**Counterbalance Valve**	**3 2/3**	**Counter Clockwise**
L5	**Holds modules in raised position**	**Counterbalance Valve**	**3 1/2**	**Counter Clockwise**

*These settings are a good starting point. It is best to set the sequence valves and flow control to the tractor.

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