

HELPFUL HINTS STANDARD ELECTRIC CONTROLS

S.I.S HY22
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HELPFUL HINTS

Solenoid operated control valves have been fitted to a wide range of our flail machines since 1978.

They are extremely convenient to use and the reduction in operator fatigue is a major advantage for contractors in particular. It is now widely accepted that switched controls are as reliable as mechanically operated cable controls. This bulletin is to assist with diagnosis of intermittent faults, some of which may not be the fault of the machine.

BASIC PRINCIPLE - HOW DOES IT WORK?

Each ram is operated by a double acting spool which is pushed in either direction by the opposing solenoid. The spool is spring loaded to return to its central position on release of the switch lever. Operating pressure is raised by the single solenoid "cut off" valve and the circuitry in the control box is such that the "cut off" is always switching in parallel with any selected movement.

Each solenoid consumes a current of approximately 2.5 Amps - i.e. 5 Amp to operate a ram. If the voltage at the solenoids drops to 11 volts, the valves are likely to malfunction. This is by far the most common problem encountered and typical symptoms are :-

1. Starts to malfunction when hot - this can be due to a 'sticky' spool, but is most probably caused by the slight increase in coil resistance with an already reduced current.
2. Works at low pump speed but fails when oil flow is increased. The low current is insufficient to overcome the increased load resulting from the raised back pressure. A restricted return hose could cause this symptom.
- 3, Works normally if an auxiliary service is switched off. The electrical load is then reduced, enabling the other solenoids to function.

CHECKS AND TEST PROCEDURE

Push pins are fitted at the ends of the solenoid valves so that they can be manually operated. A simple manual test enables electrical faults to be separated from hydro-mechanical malfunctions at check valves or rams etc.,.

Set the tractor at fast idle. Taking care to stand clear of the arms, firmly press in the push pin of the "cut off" solenoid. The feed hose should flex as the pump comes under load. While still holding in the "cut off", firmly press in the lift solenoid push pin. The are should raise. All functions can be checked in turn. Increase tractor revs to operational speed and re-check. If all functions are normal the problem is electrical so proceed as follows:-



- a. Check all spade or herchmann terminals at the control unit for looseness or fretting of the wire.
- b. Ensure the tractor battery and alternator are sound and check battery terminals and the earth strap - clean and re-make connections if in doubt.

NOTE The switch box connections to the tractor should be from a main supply source. We do not recommend using the trailer light socket or cigar lighter point. It is essential that the brown wire is to the positive connection. Any additional cable should be rated at 20 Amp or above.

- c. Check the fuse and fuse holder - any abnormal heating indicates electrical resistance.
- d. Check connections at both portions of the 3 pin plug by removing the covers to reveal the cable screws.

If the problem persists when all the above checks have been carried out - but not before - loosed the four screws and cable clamp to gain access to the switches. Use a propriety contact cleaner spray for cleaning and never use anything coarser than fine "wet & dry" abrasive paper. The contacts can be bridged for test purposes with a copper coin.

Apart from close examination to check that no connections are loose, any further tests should only be carried out by an experienced electrician. Casual probing may damage the diodes.

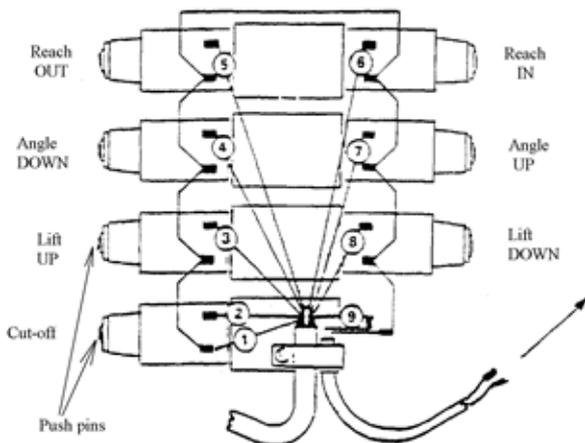
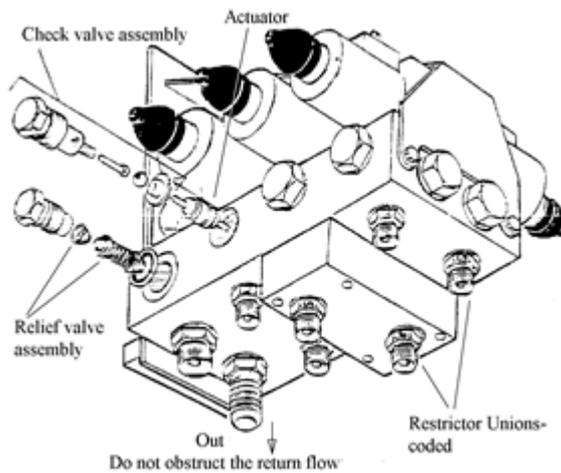
SOLENOID/MANIFOLD BLOCK

The manifold block contains the system relief valve, check valves for each movement and centrally positioned actuators which open the check valves. Rams are held in their neutral position by the check valves - NOT the solenoid spools.

MALFUNCTION ON MANUAL TEST

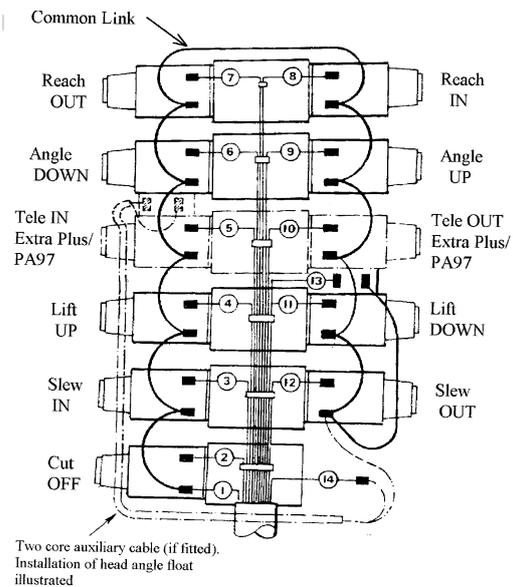
- e. Pressure loss - check supply with flow test meter. If sound then inspect relief valve and cut off valve. Clean or fit new if suspect.
- f. Ram creep - examine check valve to that service. Do not discount a worn ram piston seal. Lift ram creep on machines with slew facility can be due to leakage in the linked slew system - seek advice if necessary, giving details of the machine model, but check to see if the creep stops when the auto-reset function is switched off. This isolates the lift service from the slew system and greatly assists diagnosis.





NOTE:

No. 9 IS CONNECTED FOR AUXILIARY SERVICE ONLY - OTHERWISE KEEP IT TAPED AND ISOLATED FROM THE TERMINALS.



No. 14 IS CONNECTED FOR AUXILIARY SERVICE ONLY - OTHERWISE KEEP IT TAPED AND ISOLATED FROM THE TERMINALS

