

OPERATOR'S MANUAL

BASIC & AUXILIARY

HYDRAULIC SYSTEMS

FOR MF 130 THRU MF 180

TRACTORS



Massey Ferguson

INTRODUCTION

This Manual has been prepared to assist you, the operator of Massey-Ferguson Tractors, in the correct application and operation of the basic and auxiliary hydraulic systems.

Through the use of the basic hydraulic system and accessory equipment, the functions of the system can be greatly increased. Multiple application of several remote cylinders are possible plus various control features such as: Delayed Lift, Selective Lift, Simultaneous Lift and Floating Action.

The money that has been invested will be better spent, if you take time to READ this Manual and get familiar with the operation and application of the Tractor's hydraulic system.

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REMOTE CYLINDERS

DESCRIPTION

SINGLE-ACTING CYLINDERS (See Fig. 1)

MF single-acting cylinders are used advantageously in applications that require hydraulic power to exert force only in one direction. The single-acting cylinder can be conditioned to extend or retract by hydraulic pressure. Implement weight is required to force the return stroke. Single-acting cylinders require only one hose connected to the cylinder. The hose is attached to the piston end if the cylinder is to be "extended." If the cylinder is to be retracted by hydraulic pressure, the hose is connected to the rod end and the breather is installed in the piston end.

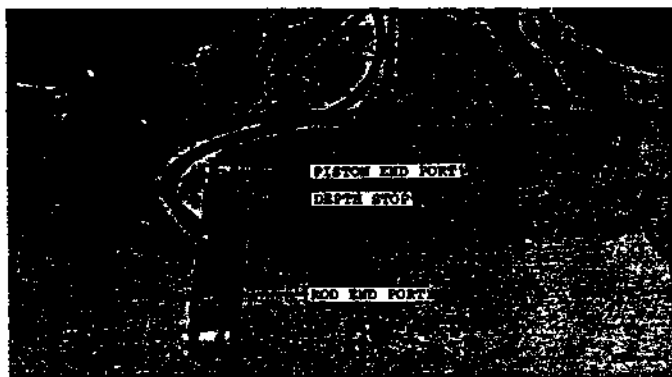


Fig. 1 — Single-Acting Cylinder

DOUBLE-ACTING CYLINDERS (See Fig. 2)

MF double-acting cylinders operate under pressure to "extend" and to "retract". Double-acting cylinders require two hydraulic hoses. To "extend" a double-acting cylinder, oil under pressure flows into the "piston" end port. The oil entrapped in the "rod" side of the double-acting cylinder is forced out the "rod" end port and flows back to the oil reservoir. To "retract" a double-acting cylinder, oil under pressure flows into the "rod" end port. The oil entrapped in the "piston" side of the double-acting cylinder is forced out the "piston" end port and flows back to the oil reservoir.

ADJUSTABLE DEPTH STOP

The extent of the cylinder stroke can be adjusted by means of an adjustable depth stop, Figs. 1 and 2. The adjustable depth stop can be repositioned in the various grooves in the cylinder barrel to control the extent of cylinder travel.

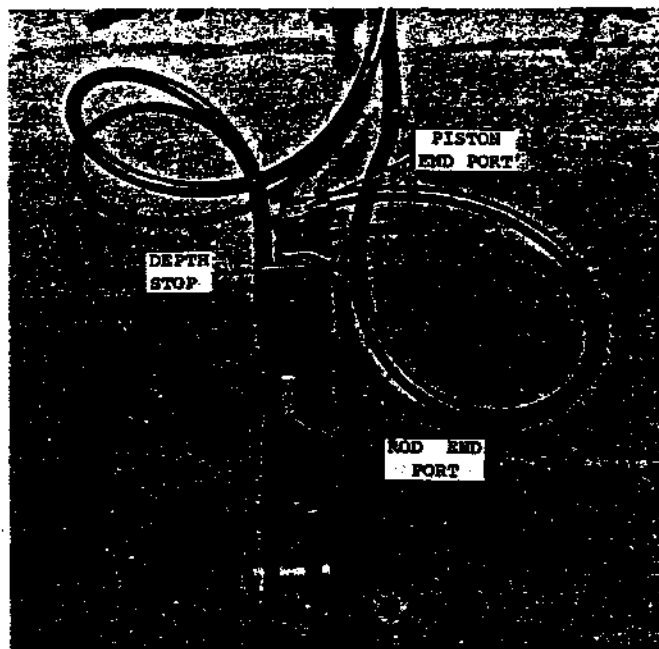


Fig. 2 — Double-Acting Cylinder

PREPARING CYLINDERS FOR USE WITH SINGLE OR TWO-SPOOL DOUBLE-ACTING HYDRAULIC CONTROL VALVES

NOTE: When using a two-spool control valve and a single or a double-acting cylinder, ALWAYS connect hose(s) to the spool valve on the right.

To properly install hydraulic hoses to operate one or two, single or double-acting cylinders, proceed as follows.

SINGLE-ACTING CYLINDER AND ONE-SPOOL VALVE

Attach one end of the hose to the "lift" or rear port of the hydraulic control valve. Attach the other end of the hose to the appropriate port in the single-acting cylinder (see description of single-acting cylinder).

If the double hose and coupler kit is not used, the "drop" or forward port of the control valve will not be used and must be plugged to seal against oil loss and prevent the entrance of foreign material.

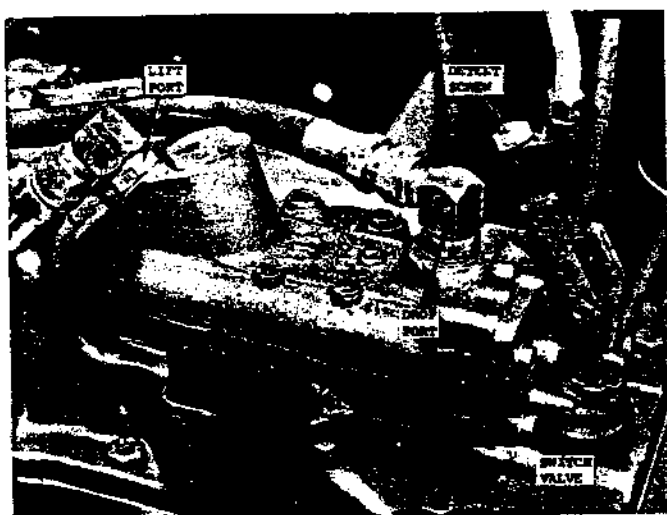


Fig. 3 — Single-Spool, Double-Acting Control Valve (Accessory Code 677 464)

SINGLE-ACTING CYLINDERS AND TWO-SPOOL VALVE

Connect one end of one hose to the "lift" or rear port of the left valve spool. Attach the other end of the hose to the appropriate port in the single-acting cylinder (see description of single-acting cylinder). Attach the second cylinder and hose to the valve spool on the right in the same manner. If the double hose and coupler kit is used with the two-spool, double-acting valve to operate single-acting cylinders, only the "lift" port of the valve will be utilized, therefore, the "drop" port will become inoperative. The check ball within the coupler attached to the "drop" port will prevent entrance of foreign material into the port. If the double hose and coupler is not used, the "drop" port of the valve must be "capped" to prevent the entrance of foreign material.

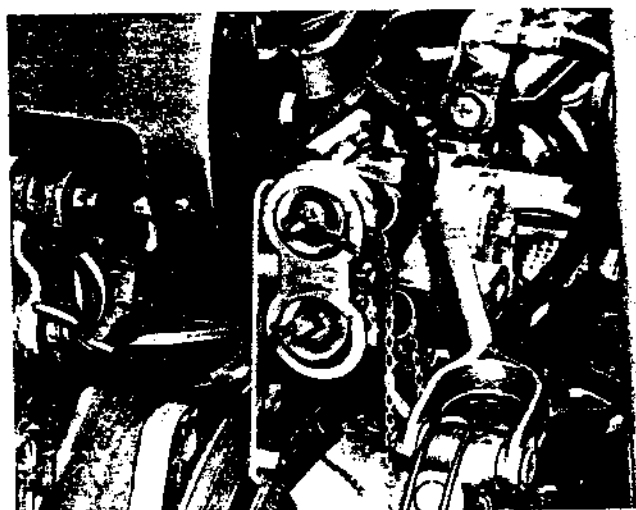


Fig. 4 — Break-Away Couplers — Single-Spool Valve

DOUBLE-ACTING CYLINDER AND ONE-SPOOL VALVE

Connect one end of one hose to the "lift" or rear port of the control valve and connect the other end of the same hose to the port in the "piston" end of the cylinder. Connect one end of the second hose to the "drop" or forward port of the control valve and connect the other end of the second hose to the port in the "rod" end of the cylinder.

If a quick method of hose coupling and uncoupling is desired, a double hose and coupler kit can be installed on the tractor. When connecting the quick couplers, attach the hose running from the "piston" end of the cylinder to the hose running from the "lift" port of the valve. Attach the hose running from the "rod" end of the cylinder to the hose running from the "drop" port of the valve.

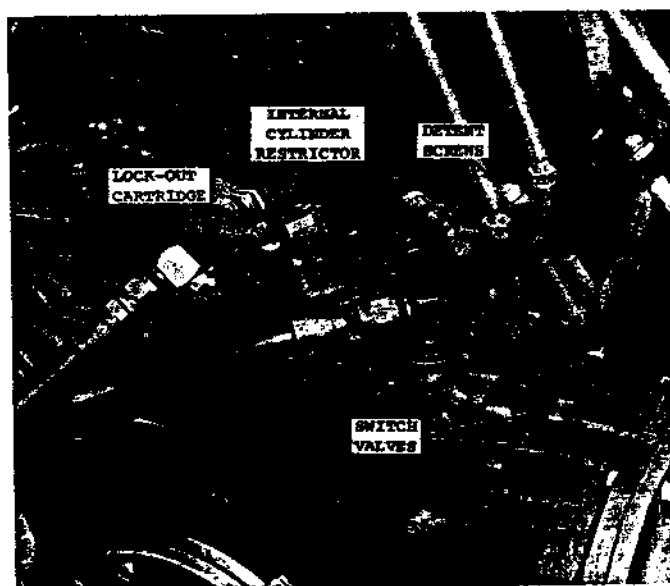


Fig. 5 — Two-Spool, Double-Acting Control Valve (Accessory Code 677 421)

DOUBLE-ACTING CYLINDERS AND TWO-SPOOL VALVE

Connect one end of one hose to the "lift" or rear port of the left valve spool and connect the other end of the same hose to the port in the "piston" end of the cylinder. Connect one end of the second hose to the "drop" or forward port of the left valve and connect the other end of the second hose to the port in the "rod" end of the cylinder. At this point, one double-acting cylinder will be completely attached to the left valve spool. To attach the hoses for the second double-acting cylinder, connect one end of one hose to the "lift" or rear port of the valve spool on the right

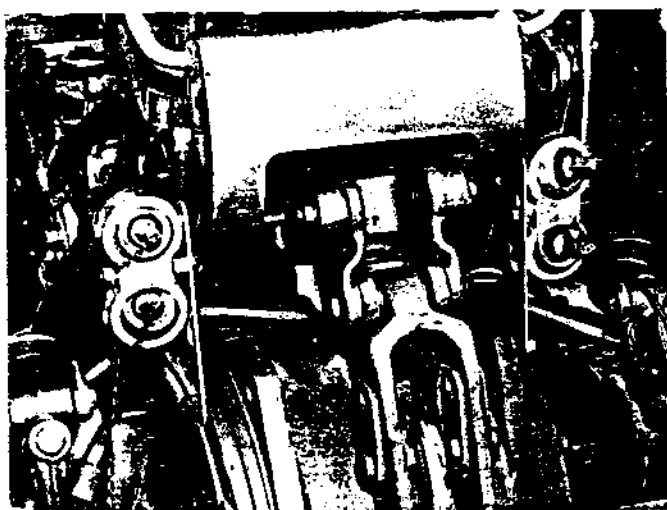


Fig. 6 — Break-Away Couplers — Two-Spool Valve

and connect the other end of this same hose to the port in the "piston" end of the cylinder. Attach the second hose to the "drop" or front port of the valve spool on the right and connect the other end of this second hose to the port in the "rod" end of the cylinder.

If a quick method of hose coupling and uncoupling is desired, two double hose and coupler kits can be installed on the tractor. When connecting the quick couplers, attach the hose running from the port in the "piston" end of the cylinder to the coupler hose running from the "lift" port of the valve. Attach the hose running from the port in the "rod" end of the cylinder to the hose running from the "drop" port of the valve.

NOTE: Before attempting to operate a single-acting cylinder, the switch valve, located directly below the valve spool, will have to be screwed "out" to provide proper fluid flow through the valve, see Fig. 3.

Before operating a double-acting cylinder, the switch valves, located directly below the valve spools, must be turned "in" to provide proper oil flow through the valve to the double-acting cylinders, see Fig. 5.

COMBINATION OF ONE SINGLE AND ONE DOUBLE-ACTING CYLINDER (TWO-SPOOL CONTROL VALVE)

To properly install the hydraulic hoses to operate one single and one double-acting cylinder, connect one end of one hose to the "lift" port of the left valve

spool. Attach the other end of the hose to the appropriate port in the single-acting cylinder (see description of single-acting cylinder). The front or "drop" port of the left valve spool will not be used and must be capped to prevent the entrance of foreign material. The switch valve, located directly below the left valve spool, must be turned all the way "out".

Attach a hose to the rear or "lift" port of the right valve spool on the right and attach the other end of the hose to the port in the "piston" end of the double-acting cylinder. Attach one end of the second hose for the double-acting cylinder to the "drop" or forward port of the right valve spool and attach the other end of this hose to the port in the "rod" end of the cylinder. The switch valve, located directly below the right valve spool, must be turned "in" completely to provide proper fluid flow to operate a double-acting cylinder.

CYLINDERS PREPARED FOR DELAYED LIFT (TWO-SPOOL CONTROL VALVE)

The delayed lift system is primarily used for mid-mounted cultivators that also utilize a rear gang attached to the 3-point hitch, i.e.: MF 129 and MF 149 Cultivator. This type of system allows the mid-mounted cultivator gangs to be raised and lowered independently of the rear-mounted gangs. The delayed lift operation may be prepared to provide pressure on the lift side of the cylinders only (single-acting), or it may be prepared to provide pressure on both sides of the cylinders (double-acting).

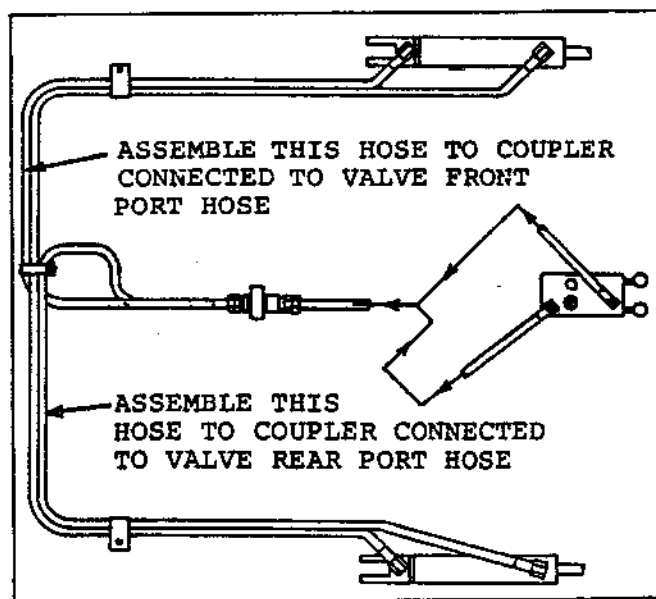


Fig. 6A — Hose Arrangement For Delayed Lift

To properly prepare the system for delayed lift operation, turn the switch valve for the left valve spool fully "out".

SINGLE-ACTING

Attach a hose to the rear or "lift" port of the right valve spool on the right and attach the other end of the hose to the port in the "rod" end of the right cylinder. Attach a hose in the port in the "piston" end of the right cylinder and attach the other end of this hose in the port in the "rod" end of the left cylinder. Attach a hose to the port in the "piston" end of the left cylinder and attach the other end of this hose to

a non-pressurized port in the hydraulic lift cover or a quick coupler.

DOUBLE-ACTING

The attaching procedure for double-acting delayed lift is the same as for single-acting, except the hose running from the port in the "piston" end of the left cylinder would not be attached to a non-pressurized port in the hydraulic lift cover. The other end of this hose must be attached to the "drop" port of the right valve spool or a quick coupler to provide an oil supply to the cylinders. Right switch valve must be turned "in".

OPERATING SINGLE-ACTING HYDRAULIC CYLINDERS WITH BASIC HYDRAULIC SYSTEM (MF 130 — MF 180 Tractors)

This section of the Manual describes the preparation and operation of single-acting hydraulic cylinders with the basic hydraulic system using the Quadrant Control Lever (MF 130) or the Draft Control Lever (MF 135-MF 180). With the basic system a total of two single-acting hydraulic cylinders can be operated without the use of any auxiliary control valves.

TRACTOR PREPARATION

MF 130 TRACTOR

1. Lock lower links in transport position with transport lock. (Fig. 7)

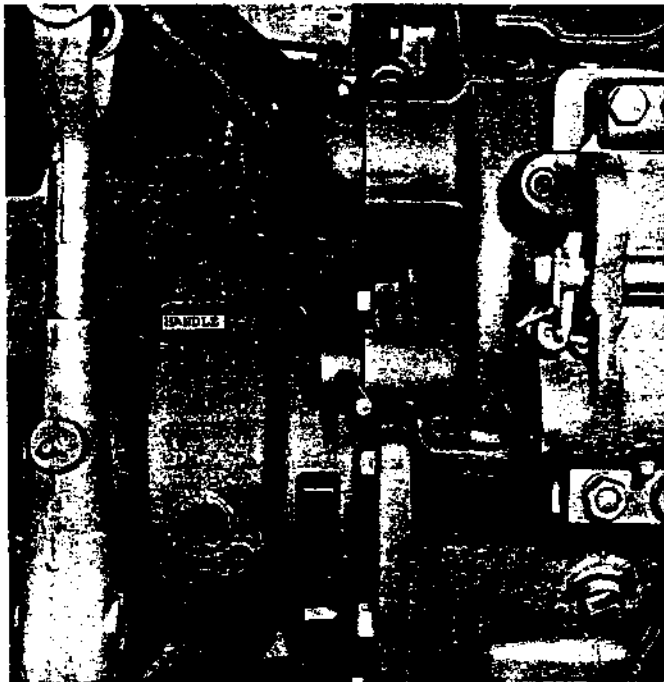


Fig. 7 — Transport Lock — MF 130 Tractor

2. Attach hydraulic hose(s) to pressure port(s) on hydraulic lift cover. See (Figs. 8 and 9).
3. Attach hydraulic hose(s) to hydraulic cylinder(s). (See section on "Remote Cylinders".)

MF 135 — MF 180 Tractors

1. Install a cross drawbar on lower links and locate links at a near horizontal position with stay links. See (Fig. 10).
2. Attach hydraulic hose(s) to pressure port(s) on hydraulic lift cover. See (Fig. 11).

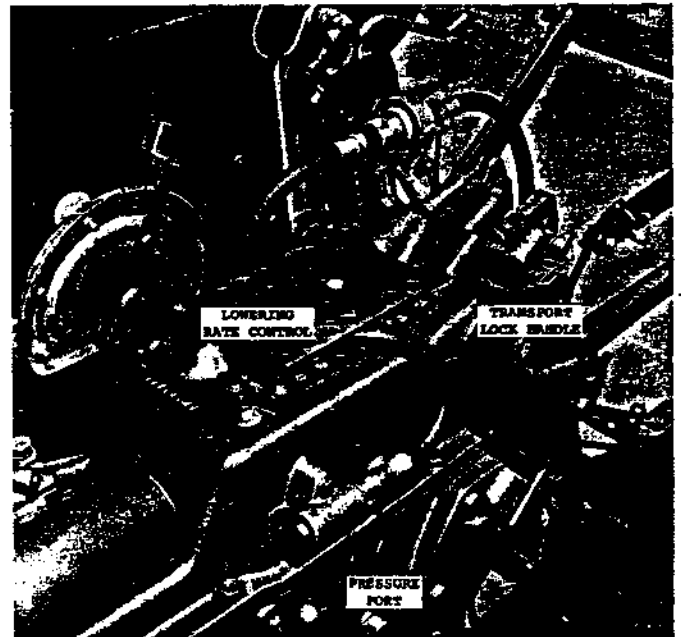


Fig. 8 — Operating One Single-Acting Cylinder with Basic System — MF 130 Tractor

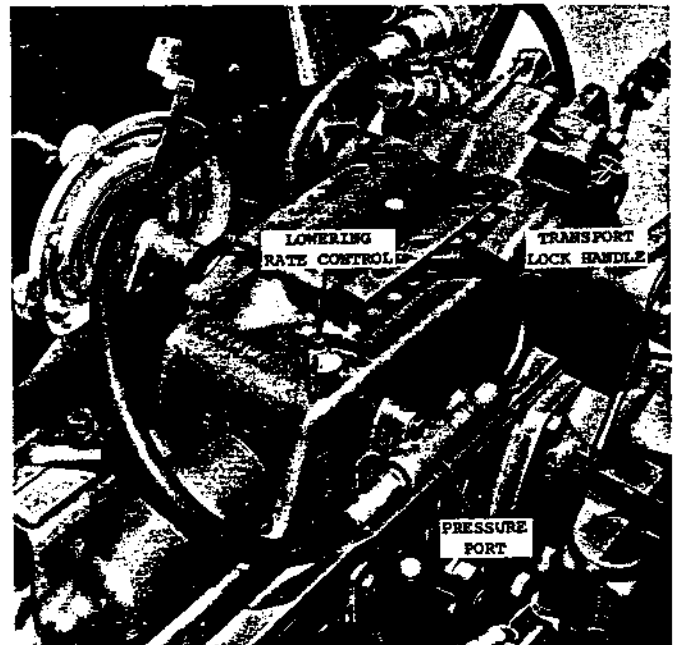


Fig. 9 — Operating Two Single-Acting Cylinders with Basic System — MF 130 Tractor

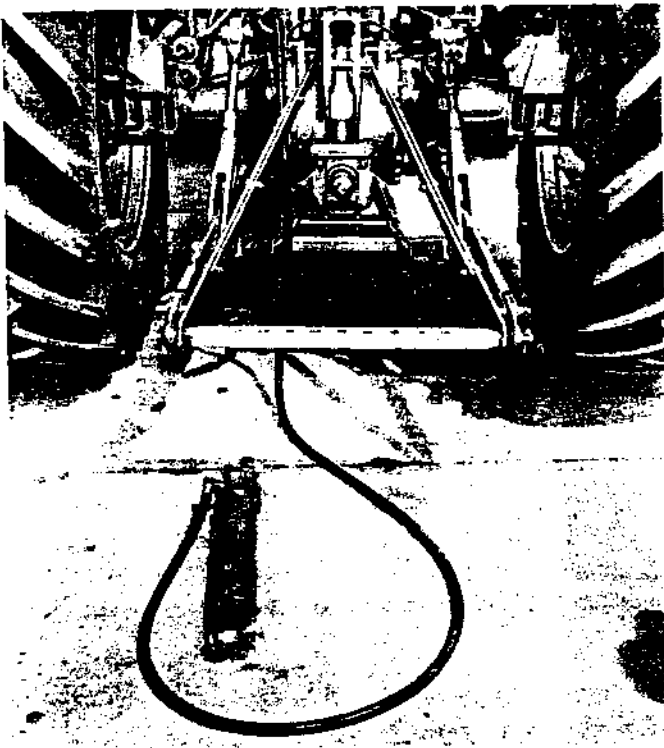


Fig. 10 — Cross Drawbar And Stay Links

3. Attach hydraulic hose(s) to hydraulic cylinder(s). (See section on "Remote Cylinders".)

4. Place Inner Quadrant Control Lever in constant pumping position.

5. Move Draft Control Lever until a "Neutral" position is found (cylinder(s) will not "extend" or "retract"). Move adjustable locator to "Neutral" position for later reference. (See Fig. 12)

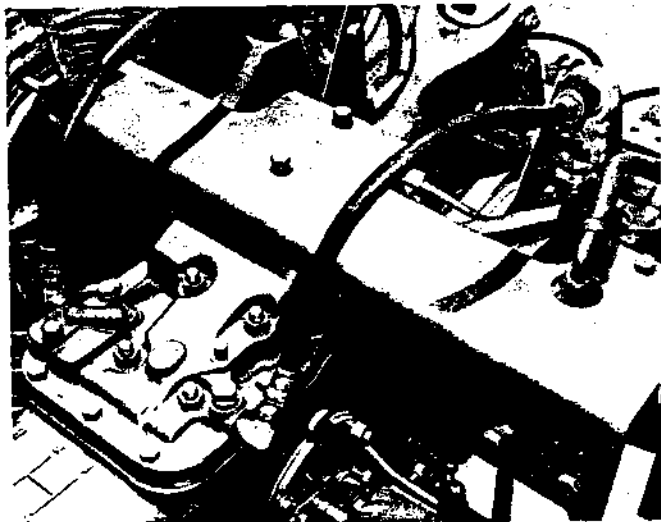


Fig. 11 — Hoses Attached to Pressure Ports

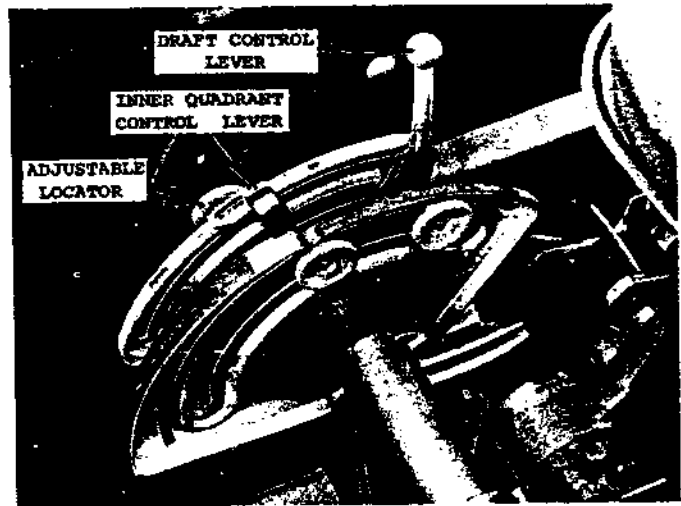


Fig. 12 — Hydraulic Control Quadrant — MF 135 — MF 180 Tractors

OPERATION

MF 130 TRACTOR

1. Position adjustable stop, Fig. 13, at arrow between sector grooves on quadrant. This is maximum lift position.

NOTE: The rear sector groove, Fig. 13, is the "Neutral" position for the control lever. At this position, oil will not leave or enter the hydraulic cylinder(s).

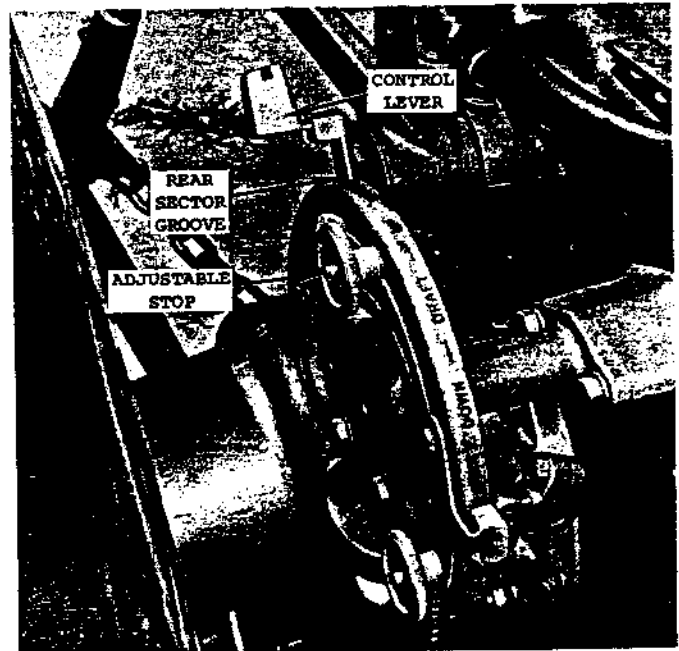


Fig. 13 — Hydraulic Control Quadrant — MF 130 Tractor

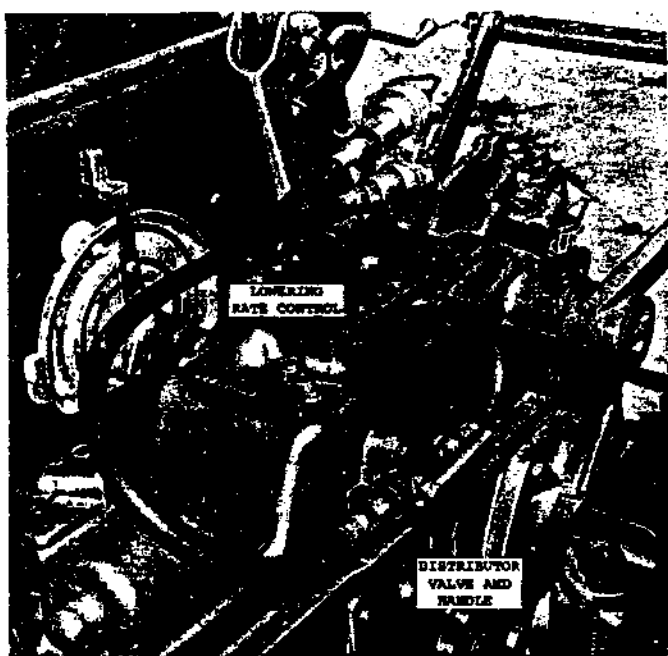


Fig. 14 — Distributor Valve

2. To "extend" cylinder(s), move control lever forward. When cylinder(s) reaches desired length, return control lever to "Neutral".

3. To retract cylinder(s) move control lever rearward. When cylinder(s) retracts to desired length, return control lever to "Neutral".

NOTE: The rate or speed of oil returning from the cylinder(s) to sump can be controlled by the implement lowering adjustment knob, Fig. 14. This knob can be set at "fast", "slow" or intermediate positions to control the cylinder(s) rate of decent.

If two cylinders are to be operated independently of each other, a distributor valve, Fig. 14, is installed on the lift cover in place of the hydraulic outlet. Moving the valve control lever, Fig. 14, forward, directs oil through forward port; moving it rearward directs oil through rear port. Move lever to vertical position to close both ports.

MF 135 — MF 180 Tractors

NOTE: The adjustable locator, Fig. 12, is located at the "Neutral" position for the Draft Control Lever; at this position oil will not leave or enter the hydraulic cylinder(s).

1. To "extend" cylinder(s), move Draft Control Lever upward from "Neutral" position. When cylinder(s) reaches desired length, return lever to "Neutral".

2. To "retract" cylinder(s), move Draft Control Lever downward from "Neutral" position. When cylinder retracts to desired length, return lever to "Neutral".

OPERATION OF THE AUXILIARY HYDRAULIC SYSTEM USING A SINGLE-SPOOL (ACCESSORY CODE 677 464) OR A TWO-SPOOL (ACCESSORY CODE 677 421) DOUBLE-ACTING CONTROL VALVE (MF 130 — MF 175 Tractors)

TRACTOR PREPARATION

MF 130 TRACTOR (ACCESSORY CODE 677 464 ONLY)

1. Install control valve on tractor per "Product Information and Installation Instructions" received with Accessory Kit.

2. a. Lock lower links in transport position with transport lock, if using conventional swing drawbar. (See Fig. 7)

b. If using cross drawbar, determine drawbar height, then fix with stay links. (See Fig. 10)

3. Place Quadrant Control Lever in auxiliary pumping position.

4. Attach one end of hydraulic hose(s) to control valve and other end to hydraulic cylinder(s). (See section on "Remote Cylinders".)

NOTE: If operating a double-acting cylinder, the switch valve must be turned "in" to provide correct oil flow to the cylinder.

If operating a single-acting cylinder, the switch valve must be turned "out" to provide proper oil flow through the control valve.

MF 135 — MF 175 TRACTORS

1. Install control valve on tractor per "Product Information and Installation Instructions" received with Accessory Kit.

2. a. Lock lower links in transport position with the right check chain and stay plate as shown in Fig. 16. This allows the swinging drawbar (if equipped) to be used for pull-type implements.

b. If not equipped with a swinging drawbar, install a cross drawbar, determine drawbar height, then fix with stay link. (See Fig. 10)

3. Place Draft Control Lever in fully raised position, and the Inner Quadrant Control Lever in constant pumping position.

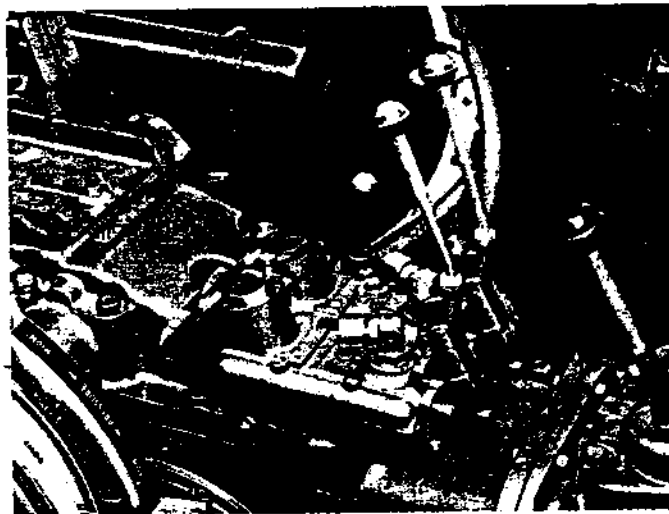


Fig. 15 — Two-Spool Control Valve Installed

4. Attach one end of hydraulic hose(s) to control valve and other end to hydraulic cylinder(s). (See section on "Remote Cylinders".)

NOTE: If operating a double-acting cylinder, the switch valve must be turned "in" to provide correct oil flow to the cylinder.

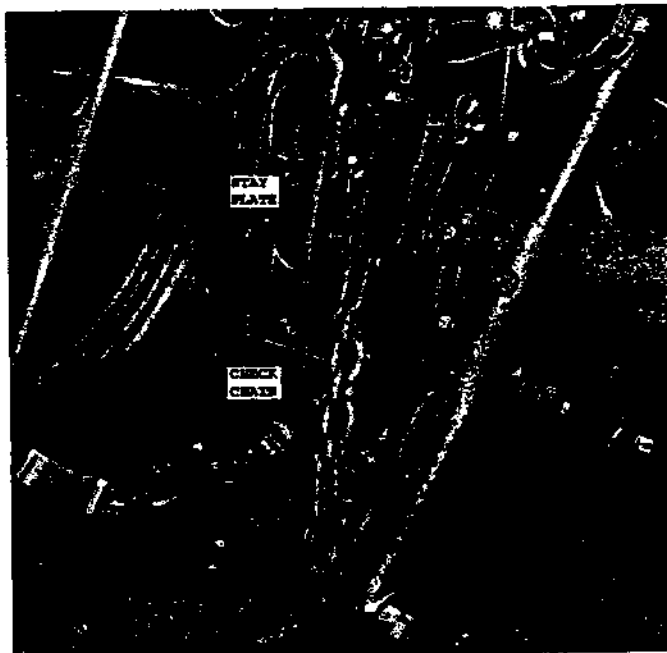


Fig. 16 — Lower Links Held in Transport — MF 135 — MF 180 Tractors

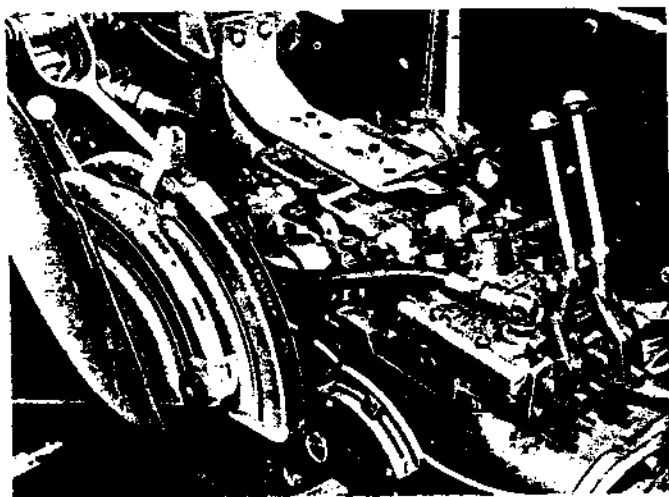


Fig. 17 — Hydraulic Control Quadrant And Two-Spool Control Valve — MF 135 — MF 175 Tractors

If operating a single-acting cylinder, the switch valve must be turned "out" to provide proper oil flow through the control valve.

PREPARING FOR COMBINED OPERATION OF A LINKAGE-MOUNTED IMPLEMENT AND A SINGLE OR A DOUBLE-ACTING CYLINDER (MF 135 — MF 175 TRACTORS)

NOTE: The two-spool double-acting control valve can be conditioned to operate a 3-point hitch-mounted implement that has a single or a double-acting cylinder to assist in the operation of the implement. An example of this type of implement would be a semi-mounted plow.

1. Attach one end of hydraulic hose(s) to control valve and other end to hydraulic cylinder(s). (See section on "Remote Cylinders".)

2. Move control valve lever for the left spool to lift "Detent" position.

NOTE: If operating a double-acting cylinder, the switch valve must be turned "in" to provide correct oil flow to the cylinder.

If operating a single-acting cylinder, the switch valve must be turned "out" to provide proper oil flow through the control valve.

OPERATION

COMBINED OPERATION OF LINKAGE-MOUNTED IMPLEMENT (DRAFT OR POSITION CONTROLLED) AND A SINGLE-ACTING CYLINDER (MF 135 — MF 175 TRACTORS)

To operate a linkage-mounted implement that has a single-acting cylinder to assist in the operation of the implement, the Draft or Position Control Lever will be used to control the internal hydraulic system. If the implement is not of the soil-engaging type, it would then be controlled with the Position Control Lever. If the implement is of the soil-engaging type, such as a semi-mounted plow, the Draft Control Lever would then be used. To raise the rear of the semi-mounted implement, the control lever on the right must be moved rearward. To lower the rear of the semi-mounted implement, push forward on the right control lever.

NOTE: The external cylinder will raise only when the tractor lift links are raised or being raised. Kick-out of either spool will not occur in this instance.

COMBINED OPERATION OF ONE SINGLE AND ONE DOUBLE-ACTING CYLINDER (MF 135 — MF 175 TRACTORS)

To operate a combination of one single and one double-acting cylinder, the single-acting cylinder would be operated with the left control lever and the double-acting cylinder would be operated with the right control lever.

To operate the single-acting cylinder, pull rearward on the left control lever to produce an oil flow to activate the single-acting cylinder. Push forward on the left control lever to return the oil from the single-acting cylinder to the reservoir.

To operate the double-acting cylinder, pull rearward on the right control lever to "extend" the double-acting cylinder. Push forward on the right control lever to "retract" the double-acting cylinder.

If the two cylinders are lowered together and the double-acting cylinder drops faster than the single-acting cylinder, a lock-out and variable drop cartridge (see Fig. 18) may have to be installed in the lift port for the right valve spool. The lock-out and variable drop cartridge must be adjusted to obtain a slow rate of drop equal to that of the single-acting cylinder in order to avoid premature kick-out of the spool for the single-acting cylinder. This is the only

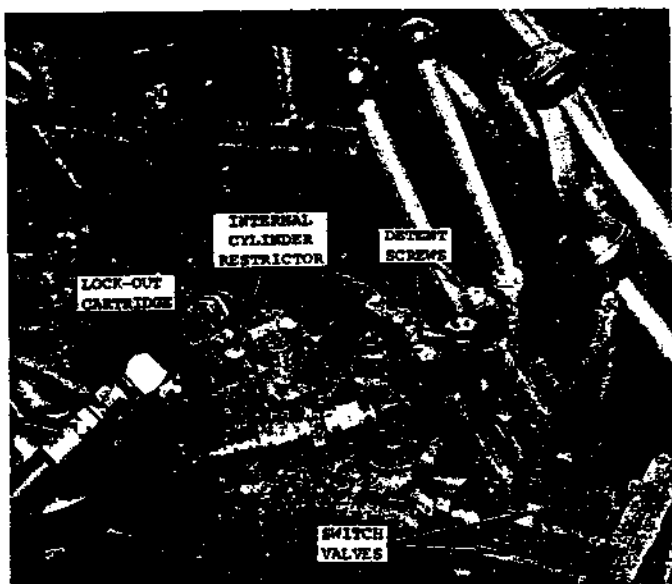


Fig. 18 — Two-Spool Control Valve (Accessory Code 677 421)

condition where kick-out will occur in the drop position when operating a single-acting cylinder.

When it is necessary to drop loads of unequal weight at the same rate, a lock-out cartridge should be installed in the lift port for the heavier load and adjusted to slow the rate of drop to match that of the lighter load. The internal cylinder restrictor, Fig. 18, can be used to do this, if the load on the left spool is heavier. To adjust the internal cylinder restrictor, turn it fully "out" to provide a "fast", unrestricted rate of drop. Turning it "in" through its adjustment range progressively slows down the rate of "drop".

OPERATING CYLINDERS FOR DELAYED LIFT (TWO-SPOOL CONTROL VALVE)

To operate cylinders for delayed lift, the external cylinders will be operated with the control lever on the right and the tractor lift links will be operated with the control lever on the left. Delayed lift operation is most applicable to mid-mounted cultivators. The operator would prefer to raise the front gangs of the cultivator before raising the rear gangs when leaving the crop row. Upon entering the crop row, the operator would then prefer to lower the front gangs of the cultivator before lowering the rear gangs. To properly operate the control valve to accomplish this type of operation: Pull rearward on the right-hand control lever to "retract" the cylinders, causing the cultivator to raise. To lower the cultivator, the control lever on the right would be pushed forward, "extending" the cylinder. To raise the 3-point hitch, pull rearward on the left control lever and, to lower the 3-point

hitch, push forward on the left control lever. To provide a means of adjusting the rate of lowering for the 3-point hitch-mounted tools, an internal cylinder restrictor is provided as a part of the control valve. The internal cylinder restrictor, Fig. 18, can be turned fully "out" to provide a "fast", unrestricted rate of drop. Turning it "in" through its adjustment range progressively slows down the rate of drop.

TRACTOR LIFT LINKS OPERATED WITH AUXILIARY VALVE (ONE OR TWO-SPOOL CONTROL VALVE)

With the auxiliary valve installed, the operator may choose to operate the tractor lift links only, excluding the use of any remote cylinders. To prepare the valve for this type of operation, turn the switch valve for the valve spool fully "out" (on a two-spool valve, turn switch valve for left valve spool) and place the Draft Control Lever in the fully raised position and the Position Control Lever in the Constant Pumping Position.

NOTE: On the MF 130 Tractor, place the Quadrant Control Lever in Auxiliary Pumping Position.

Raise the tractor lift links by pulling rearward on the left-hand control lever. Lower the tractor lift links by pushing forward on the left-hand control lever.

OPERATING THE TRACTOR LIFT LINKS IN DRAFT CONTROL (ONE OR TWO-SPOOL CONTROL VALVE)

The operator may choose to operate the tractor lift links in Draft Control to do plowing or operate other draft-controlled implements. This can be done with the auxiliary control valve installed, but will not allow simultaneous operation of the Draft Control System and the auxiliary hydraulic system.

Move the auxiliary valve control lever to the lift "detent" position: the switch valve can be either "in" or "out". (Two-spool valve, move left control lever to lift "detent" position and keep right valve lever in neutral.) The Draft Control System would then be operated in its regular manner, as described in the tractor Operator's Manual.

VALVE SPOOL CONTROL LEVER DETENT POSITIONS

Adjustable, spring-loaded detents hold the control lever(s) in either "lift" or "drop" positions, against the force of the centering spring. When ex-

tending or retracting a hydraulic cylinder, to its maximum stroke, the control lever can be retained in its rearward or forward detent position, allowing the hydraulic cylinder to "extend" or "retract" to its maximum stroke. After the cylinder has reached its maximum stroke, the internal kick-out cartridge will automatically return the valve spool to neutral.

If the operator chooses not to use the detent positions, the Allen screws, Fig. 18, that pressurize the detent springs can be backed off, making the detents inoperative.

CYLINDER FLOTATION

To float external hydraulic cylinder(s), (single or double-acting), turn the switch valves fully "out" and move the control lever to the "detent drop" position. The cylinder will then be allowed to "extend" or "retract" freely, allowing the implement to follow ground undulations.

LOCK-OUT AND VARIABLE DROP CARTRIDGE (ACCESSORY)

The lock-out and variable drop cartridge is available as an accessory for installation in the one or two-spool double-acting valve. The cartridge serves two purposes: it acts as a positive check valve on the lift side of the cylinder to provide a positive means of maintaining cylinder position as well as providing the operator a physical means of selecting a desired implement lowering rate. When the cartridge is installed, the operator can turn the knurled knob, Fig.

18, "in" to provide a fast, unrestricted rate of drop. Turning the knurled knob "out" through its adjustment range progressively slows down the rate of implement drop. Turning the knob all the way "out" will prevent the implement from being lowered. If a heavy implement is lifted with the knob screwed all the way "out", it may be necessary to turn the knob "in" sufficiently so the implement will lower at a faster rate.

COMBINED OPERATION OF A PRESSURE CONTROL IMPLEMENT AND AN EXTERNAL CYLINDER (MF 135 — MF 175 TRACTORS)

To operate a pressure controlled implement, and an external cylinder (single or double-acting), refer to the section on preparing a double-acting or single-acting cylinder. After the cylinder has been properly prepared and the hoses properly attached to the quick couplers, the Pressure Control System would be used to transfer implement weight, as described in the tractor Operator's Manual. The pull-type pressure controlled implement would be raised and lowered with the auxiliary hydraulic system. Place the Inner Quadrant Control Lever in the high range of the Pressure Control area, then to raise the implement, the cylinder must be extended by moving the auxiliary control lever rearward. If the operator chooses to raise the implement to its maximum transport height, the auxiliary valve control lever can be moved rearward to its maximum transport height. To lower the implement, push forward on the auxiliary valve control lever.

INDEPENDENT AUXILIARY HYDRAULIC SYSTEM

MF 165 — MF 180 TRACTORS

The auxiliary hydraulic system, as found in the MF 165 through MF 180 Tractors, is completely independent of the internal lift system, and is capable of providing 8 U.S. gpm @ 2,000 engine rpm for external hydraulic services. The auxiliary hydraulic system is used to assist in the operation or control of 3-point hitch mounted implements (Draft or Position Controlled), Pressure Control implements or semi-mounted implements that require a remote cylinder (single or double-acting).

TRACTOR PREPARATION

Install a single or double-spool Auxiliary Hydraulic Control Valve on tractor per "Product Information and Installation Instructions" received with the Accessory Kit.

NOTE: The control valves are field installed on MF 165 and MF 175 Tractors only. The MF 180 Tractor has a factory installed control valve, but the operation of the valves are the same.

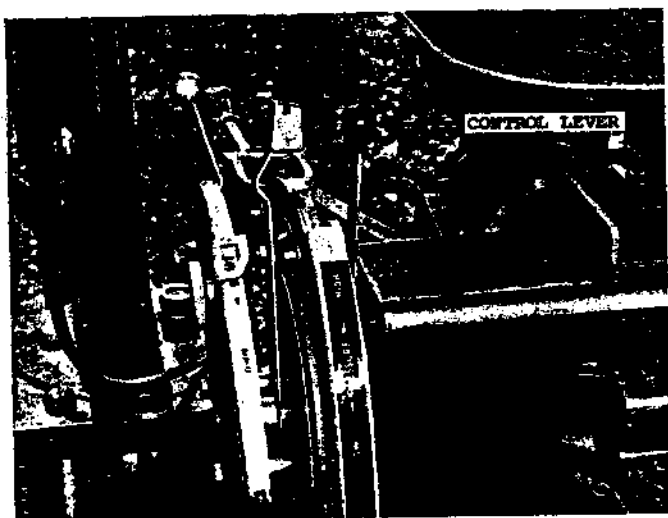


Fig. 19 — Single-Spool Control Lever — MF 165 — MF 175 Tractors

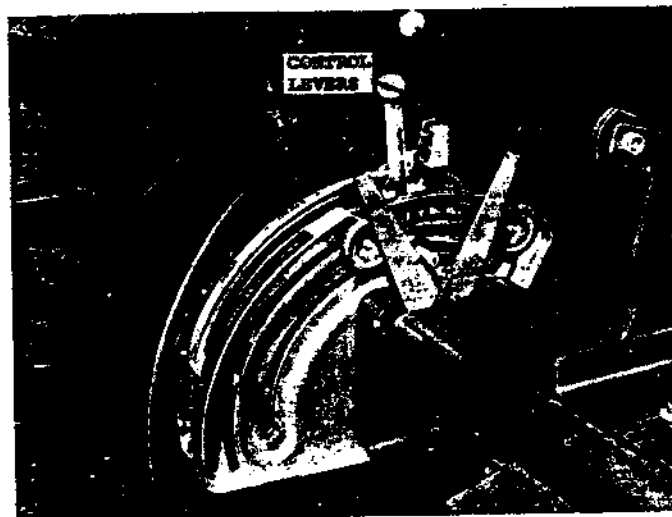


Fig. 20 — Two-Spool Control Levers — MF 165 — MF 175 Tractors

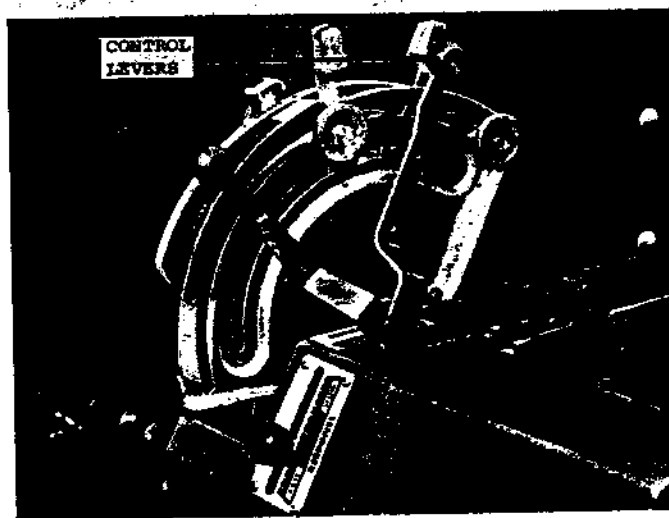


Fig. 21 — Two-Spool Control Levers — MF 180 Tractor

SINGLE-SPOOL VALVE MODELS

Single-spool valve models are capable of operating one single or one double-acting hydraulic cylinder.

TWO-SPOOL VALVE MODELS

Two-spool valve models are capable of operating two single-acting hydraulic cylinders, two double-acting hydraulic cylinders or a combination of one single and one double-acting hydraulic cylinder.

PREPARING A DOUBLE-ACTING CYLINDER

To properly install the hydraulic hoses to the cylinder to provide proper cylinder action in relation to valve lever movement, attach the shortest of the two cylinder hoses to the port in the "piston" end of the cylinder (see Fig. 2) and attach the other end of this



Fig. 22 — Adjusting Switch Valve — MF 165
— MF 175 Tractors

hose to the lower hose quick coupler. Attach the longest of the two hoses to the port in the "rod" end of the cylinder (see Fig. 2) and attach the other end of this hose to the upper hose quick coupler. When operating double-acting cylinders, the switch valve, located directly below the valve spool, must be turned "in" to provide correct oil flow through the valve to the double-acting cylinder (see Figs. 22 and 23).

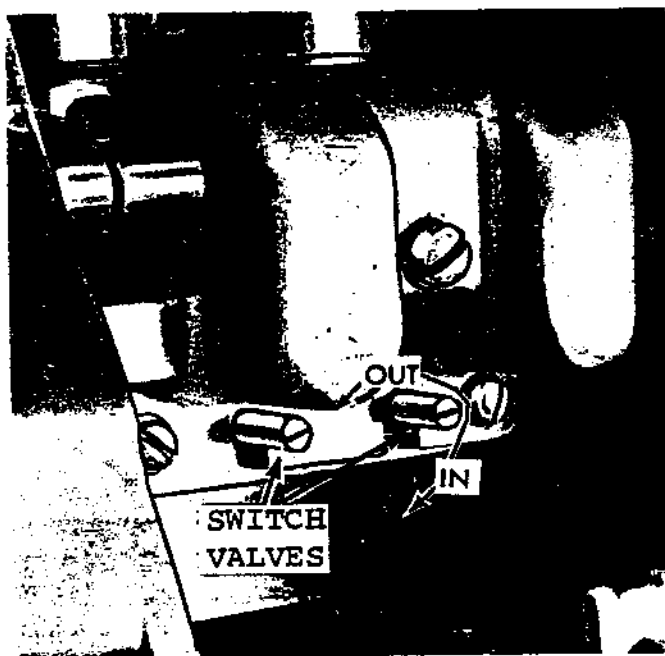


Fig. 23 — Adjusting Switch Valve — MF 180
Tractor

PREPARING A SINGLE-ACTING CYLINDER

To properly install the hydraulic hose to operate a single-acting cylinder, attach one end of the hose to the lower hose quick coupler. Attach the other end of the hose to the appropriate port of the single-acting cylinder (see description of single-acting cylinder).

Before attempting to operate the single-acting cylinder, the switch valve, located directly below the valve spool, will have to be screwed "out" to provide proper fluid flow through the valve (see Figs. 22 and 23).

CYLINDERS PREPARED FOR DELAYED LIFT OPERATION

The delayed lift system is primarily used for mid-mounted cultivators that also utilize a rear gang attached to the 3-point hitch (i.e.: MF 129 and MF 149 Cultivator). This type of system allows mid-mounted cultivator gangs to be raised and lowered independently of the rear-mounted gangs. The delayed lift operation may be prepared to provide pressure on the lift side of the cylinder only (single-acting), or it may be prepared to provide pressure on both sides of the cylinders (double-acting).

PREPARING FOR A SINGLE-ACTING

Attach a hose to the port in the "rod" end of the right cylinder and attach the other end of this hose to the lower hose quick coupler. Attach a hose in the port of the "piston" end of the right cylinder and attach the other end of this hose in the port to the "rod" end of the left cylinder. Attach a hose to the port in the "piston" end of the left cylinder and attach the remaining end of this hose to the upper quick coupler. The switch valve, located below the valve spool, must be turned all the way "out" to provide proper fluid flow through the valve.

PREPARING FOR DOUBLE-ACTING

The attaching procedure for double-acting delayed lift is the same as for single-acting, except the hose running from the port in the "piston" end of the left cylinder would be attached to the upper hose quick coupler and the switch valve must be turned "in".

OPERATION

OPERATING DOUBLE-ACTING CYLINDER

To produce an oil flow through the auxiliary hydraulic system control valve to operate a double-acting cylinder, pull rearward on the auxiliary valve control lever to "extend" the double-acting cylinder. Push forward on the auxiliary valve control lever to "retract" the double-acting cylinder.

OPERATING SINGLE-ACTING CYLINDER

To operate one single-acting cylinder, pull rearward on the auxiliary valve control lever to produce an oil flow to "activate" the single-acting cylinder. Push forward on the auxiliary valve control lever to "return" the oil from the single-acting cylinder to the reservoir.

DETENT POSITIONS

An adjustable spring-loaded detent holds the valve spool in either the "lift" or "drop" position, against the force of the centering spring. When extending or retracting a hydraulic cylinder to its maximum stroke, the control valve handle will be retained in its rearward or forward detent position, allowing the hydraulic cylinder to extend or retract to its maximum stroke. After the cylinder has reached its maximum stroke, the internal kick-out cartridge will automatically return the control valve to "Neutral". If the operator chooses not to use the detent positions, the Allen screw that pressurizes the detent spring, see

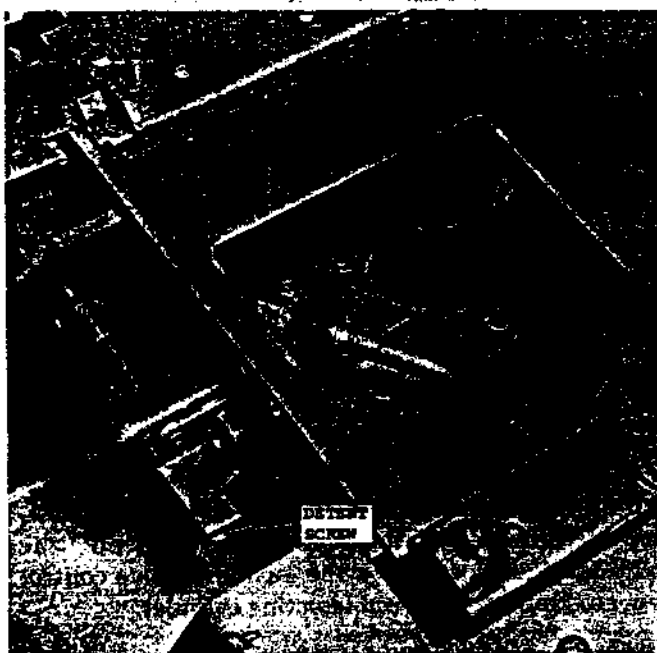


Fig. 24 — Detent Adjustment Screw Location



Fig. 25 — Adjusting Lock-Out And Variable Drop Cartridge

Fig. 24, can be backed off, making the detent inoperative. The same Allen screw can be turned "in" to compress the "detent" spring. This will lock the control lever in either the "lift" or "drop" detent position, overriding the kick-out cartridge.

CYLINDER FLOTATION

To float an external hydraulic cylinder (single or double-acting), turn the switch valve fully "out" and move the control lever to the detent "drop" position. The cylinder will then be allowed to extend or retract freely, allowing the implement to follow ground undulations.

LOCK-OUT AND VARIABLE DROP CARTRIDGE (Accessory)

The lock-out and variable drop cartridge is available as an accessory for installation in the double-acting auxiliary valve. The cartridge serves two purposes. It acts as a positive check valve on the lift side of the cylinder to provide a positive means of maintaining cylinder position as well as providing the operator a physical means of selecting a desired implement lowering rate. When the cartridge is installed, the operator can turn the knurled knob, Fig. 25, "in" to provide a fast, unrestricted rate of drop. Turning the knob "out" through its adjustment range progressively slows down the rate of drop. Turning the knob all the way "out" will prevent the implement from being lowered. If a heavy implement is

lifted with the knob screwed all the way "out", it may be necessary to use a screwdriver to turn the knob "in" sufficiently so the implement will lower.

OPERATING CYLINDERS FOR DELAYED LIFT

To operate cylinders for delayed lift, the external cylinders will be operated with the control lever (right-hand control lever if using a two-spool control valve) and the tractor lift links will be operated with the Position Control Lever. Delayed lift operation is most applicable to mid-mounted cultivators. The operator would prefer to raise the front gangs of the cultivator before raising the rear gangs when leaving the crop row. Upon entering the row crop, the operator would then prefer to lower the front gangs of the cultivator before lowering the rear gangs. To properly operate the control valve to accomplish this type of operation: Pull rearward on the control lever to "retract" the cylinders, causing the cultivator to raise. To lower the cultivator, the control lever would be pushed forward, "extending" the cylinder. To raise the 3-point hitch, pull rearward on the Position Control Lever and, to lower the 3-point hitch, push forward on the Position Control Lever.

COMBINED OPERATION OF A LINKAGE-MOUNTED IMPLEMENT (DRAFT OR POSITION CONTROLLED) AND AN EXTERNAL CYLINDER

To operate a linkage-mounted implement (Draft or Position Controlled) and an external cylinder (single or double-acting), refer to the section on preparing a double-acting or single-acting cylinder. After the cylinder has been properly prepared and the hoses properly attached to the quick couplers, the operator would then determine whether the implement would be controlled with the Draft Control system or Position Control system. If the implement is of the soil-engaging type and requires implement depth control and implement weight transfer, such as a semi-mounted plow, the Draft Control Lever would be used to control the front of the implement. To raise the rear of semi-mounted implement, the Auxiliary Valve Control Lever must be moved rearward. To lower the rear of the semi-mounted implement, push forward on the Auxiliary Valve Control Lever.

NOTE: Refer to the tractor Operator's Manual for instructions on operating the Ferguson Hydraulic System in Draft or Position Control.

COMBINED OPERATION OF A PRESSURE CONTROLLED IMPLEMENT AND AN EXTERNAL CYLINDER

To operate a pressure controlled implement, and an external cylinder (single or double-acting), refer to the section on preparing a double-acting or single-acting cylinder. After the cylinder has been properly prepared and the hoses properly attached to the quick couplers, the Pressure Control system would be used to transfer implement weight, as described in the tractor Operator's Manual. The pull-type pressure controlled implement would be raised and lowered with the auxiliary hydraulic system. To raise the implement, the cylinder must be extended by moving the auxiliary valve control lever rearward. If the operator chooses to raise the implement to its maximum transport height, the auxiliary valve control lever can be moved rearward to its maximum transport height, the auxiliary valve control lever can be moved rearward to its "detent lift" position. After the cylinder has reached its maximum extended stroke, the internal kick-out cartridge will automatically return the auxiliary valve control lever to neutral. To lower the implement, push forward on the auxiliary valve control lever. If the cylinder is to be retracted to its maximum stroke, place the auxiliary valve control lever in its "detent drop" position. After the cylinder has reached its maximum retracted position, the internal kick-out cartridge will automatically return the auxiliary valve control lever to neutral.

COMBINED OPERATION OF ONE SINGLE AND ONE DOUBLE-ACTING CYLINDER (TWO-SPOOL VALVE)

To operate a combination of one single and double-acting remote cylinder, refer to the section on preparing a double-acting and a single-acting cylinder.

To operate the single-acting cylinder, pull rearward on the auxiliary valve control lever, corresponding to the single-acting cylinder, to produce an oil flow to activate the single-acting cylinder. Push forward on the auxiliary valve control lever to return oil from the single-acting cylinder to the reservoir.

To operate the double-acting cylinder, pull rearward on the auxiliary valve control lever corresponding to the double-acting cylinder to "extend" the cylinder. Push forward on the auxiliary valve control lever to "retract" the double-acting cylinder.

If the two cylinders are lowered together and one cylinder drops faster than the other, a lock-out and

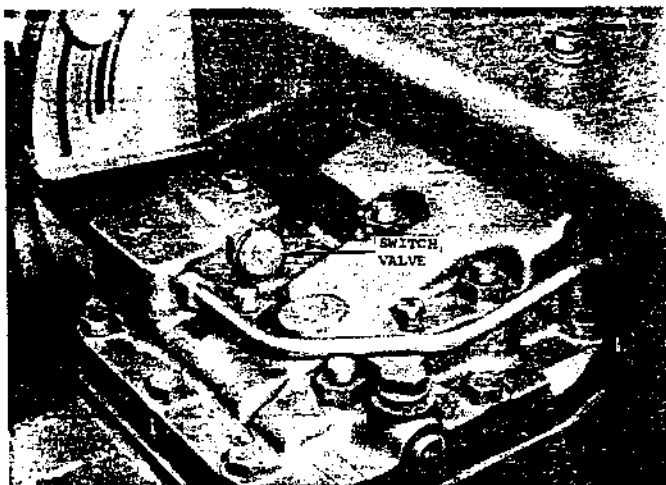


Fig. 26 — Combining Valve Installed — MF 175 Tractor

variable drop cartridge can be installed in the valve corresponding to the cylinder with the fastest rate of drop and adjusted to slow down the rate of drop equal to that of the slower cylinder.

OPERATION OF THE AUXILIARY HYDRAULIC SYSTEM USING THE COMBINING VALVE

The combining valve is an accessory for the auxiliary hydraulic system on the MF 175 and MF 180 Tractors only. The purpose of this valve is to combine the output of the internal Ferguson System pump and the auxiliary hydraulic system pump providing a flow of 12.8 gpm @ 2,000 engine rpm.

Install the combining valve on the right front of the hydraulic lift cover in place of the oil transfer cap, see Fig. 26. Attach the hydraulic line to the port in one of the auxiliary control valves and to the fitting

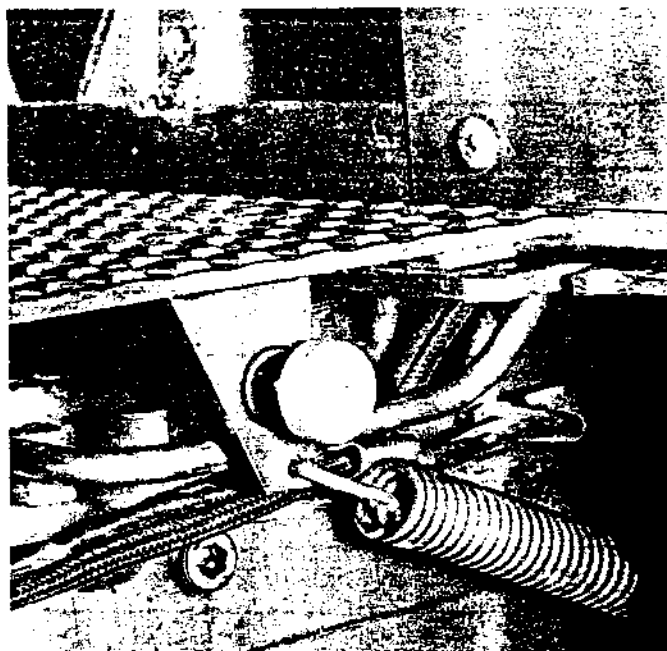


Fig. 27 — Combining Switch Valve Knob — MF 180 Tractor

on the combining valve. To provide the combined flow, turn the switch valve all the way out and place the Inner Quadrant Control Lever in constant pumping. The combined flow would then be controlled by the auxiliary control valve. One single-acting or one double-acting cylinder can be operated. To return the system to normal operation, move the Inner Quadrant Control Lever from the constant pumping position to the position control area of the quadrant. Turn the combining valve switch valve completely "in". The internal Ferguson System and the Auxiliary Hydraulic System can now be operated in their normal manner. The switch valve for the MF 180 Tractor is illustrated in Fig. 27.