

# SERVICE MANUAL

**TS6020 / TS6030 / TS6030HC**  
Tractor

**Part number 84547569**

English

December 2011

*Replaces part number 84188817*



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# INTRODUCTION

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## INTRODUCTION

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## Foreword - Ecology and the environment

Soil, air, and water are vital factors of agriculture and life in general. When legislation does not yet rule the treatment of some of the substances which are required by advanced technology, sound judgement should govern the use and disposal of products of a chemical and petrochemical nature.

**NOTICE:** *The following are recommendations which may be of assistance:*

- Become acquainted with and ensure that you understand the relative legislation applicable to your country.
- Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, antifreeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances.
- Agricultural consultants will, in many cases, be able to help you as well.

### HELPFUL HINTS

- Avoid filling tanks using cans or inappropriate pressurized fuel delivery systems which may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when draining off used engine coolant mixtures, engine, gearbox and hydraulic oils, brake fluids, etc. Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
- Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of properly.
- Do not open the air-conditioning system yourself. It contains gases which should not be released into the atmosphere. Your NEW HOLLAND AGRICULTURE dealer or air conditioning specialist has a special extractor for this purpose and will have to recharge the system properly.
- Repair any leaks or defects in the engine cooling or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
- Protect hoses during welding as penetrating weld splatter may burn a hole or weaken them, allowing the loss of oils, coolant, etc.

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## Safety rules

### Personal safety



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual and on machine decals, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

 **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

 **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

 **CAUTION**, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

### FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

### Machine safety

**NOTICE:** Notice indicates a situation which, if not avoided, could result in machine or property damage. The color associated with Notice is BLUE.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

### Information

**NOTE:** Note indicates additional information which clarifies steps, procedures, or other information in this manual.

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

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## Safety rules - Personal safety

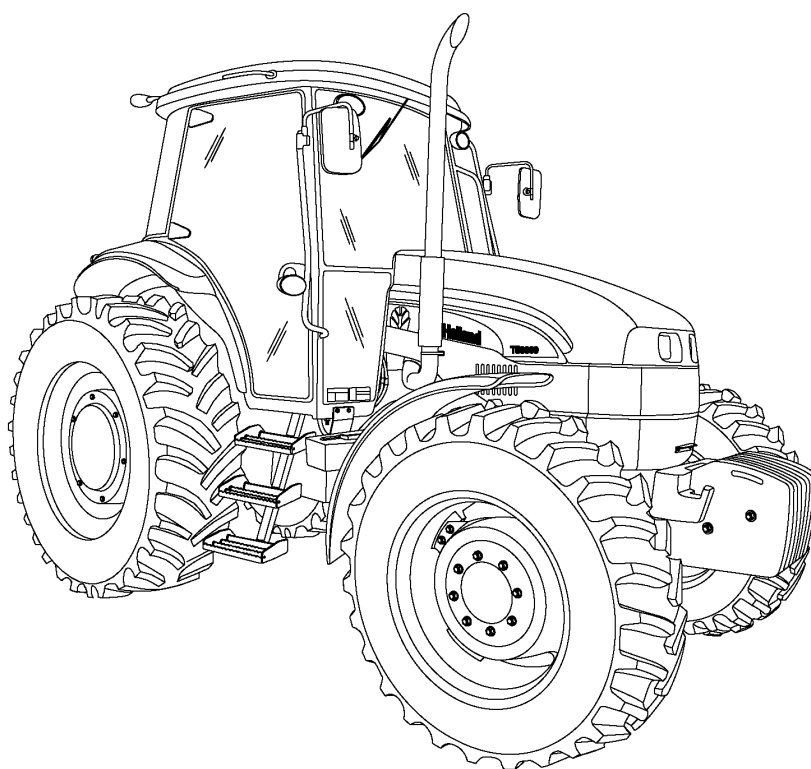
**Carefully study these precautions, and those included in the external attachment operators manual, and insist that they be followed by those working with and for you.**

1. Thoroughly read and understand this manual and the attachment Operator's Manual before operating this or any other equipment.
2. Be sure all people and pets are clear of the machine before starting. Sound the horn, if equipped, three times before starting engine.
3. Only the operator should be on the machine when in operation. Never allow anyone to climb on to the machine while it is in motion. If the machine is equipped with an Instructors Seat, this must only be used for training purposes. Passengers must not be allowed to use the Instructors Seat.
4. Keep all shields in place. Never work around the machine or any of the attachments while wearing loose clothing that might catch on moving parts.
5. Observe the following precautions whenever lubricating the machine or making adjustments.
  - Disengage all clutching levers or switches.
  - Lower the attachment, if equipped, to the ground or raise the attachment completely and engage the cylinder safety locks. Completing these actions will prevent the attachment from lowering unexpectedly.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all machine movement to stop before leaving the operators platform.
6. Always keep the machine in gear while travelling downhill.
7. The machine should always be equipped with sufficient front or rear axle weight for safe operation.
8. Under some field conditions, more weight may be required at the front or rear axle for adequate stability. This is especially important when operating in hilly conditions or/when using heavy attachments.
9. Always lower the attachment, shut off the engine, set the parking brake, engage the transmission gears, remove the key and wait for all machine movement to stop before leaving the operators platform.
10. If the attachment or machine should become obstructed or plugged; set the parking brake, shut off the engine and remove the key, engage the transmission gears, wait for all machine or attachment motion to come to a stop, before leaving the operators platform to removing the obstruction or plug.
11. Never disconnect or make any adjustments to the hydraulic system unless the machine and/or the attachment is lowered to the ground or the safety lock(s) is in the engaged position.
12. Use of the flashing lights is highly recommended when operating on a public road.
13. When transporting on a road or highway, use accessory lights and devices for adequate warning to the operators of other vehicles. In this regard, check local government regulations. Various safety lights and devices are available from your NEW HOLLAND AGRICULTURE dealer.
14. Practice safety 365 days a year.
15. Keep all your equipment in safe operating condition.
16. Keep all guards and safety devices in place.
17. Always set the parking brake, shut off the engine and remove the key, engage the transmission gears, wait for all machine or attachment motion to come to a stop, before leaving the operators platform to service the machine and attachment.
18. Remember: A careful operator is the best insurance against an accident.
19. Extreme care should be taken in keeping hands and clothing away from moving parts.



## **SERVICE MANUAL**

**HYDRAULIC, PNEUMATIC, ELECTRICAL, ELECTRONIC SYSTEMS**



**TS6020  
TS6030 HC  
TS6030**

## **PRIMARY HYDRAULIC POWER SYSTEM - Overview**

The hydraulic system provides oil flow at regulated pressures for the operation and lubrication of various circuits within the tractor, as well as providing accurate and sensitivity control of implements over a wide range of operating conditions.

The standard hydraulic system consists of a top link sensing and three-point linkage system, a fixed displacement tandem (gear type) main pump, an engine mounted auxiliary pump (optional), lift cylinder assembly, and remote control valve(s). The rear axle center casing functions as the hydraulic system reservoir.

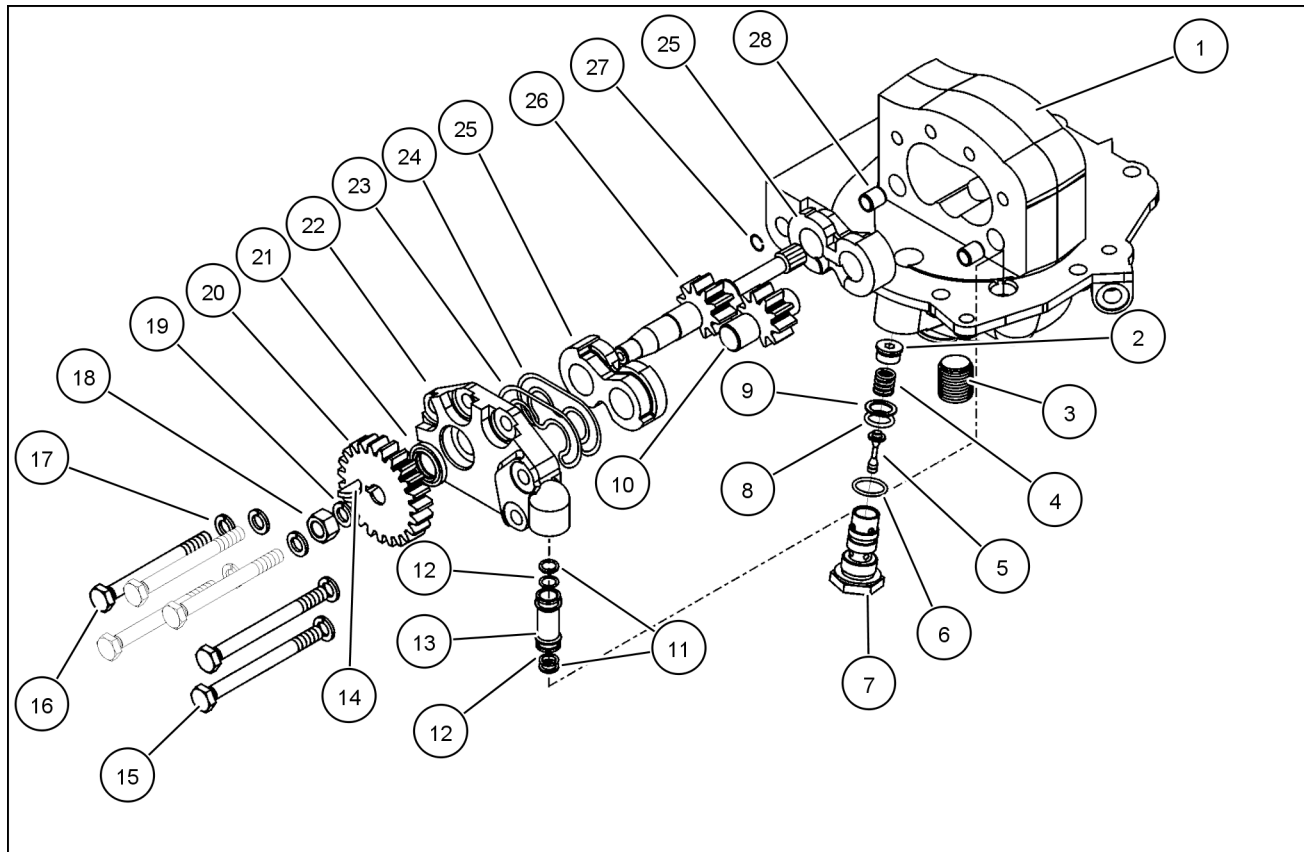
A lift control valve, and priority valve pack containing several valves, function together to direct the hydraulic oil as needed. A pressure regulator, and various relief and check valves protect the circuits and components from overload conditions, encountered during normal and arduous operation. The configuration and combination of valves prevents oil back flow.

The hydraulic system consists of two major circuits:

- High Pressure Circuit (includes optional engine mounted auxiliary pump if equipped)
- Low Pressure, Steering and Lubrication Circuit

## Hydraulic pump Tandem gear pump - Exploded view

Tandem gear exploded view (front pump - hydraulic lift/remote valves/high pressure)

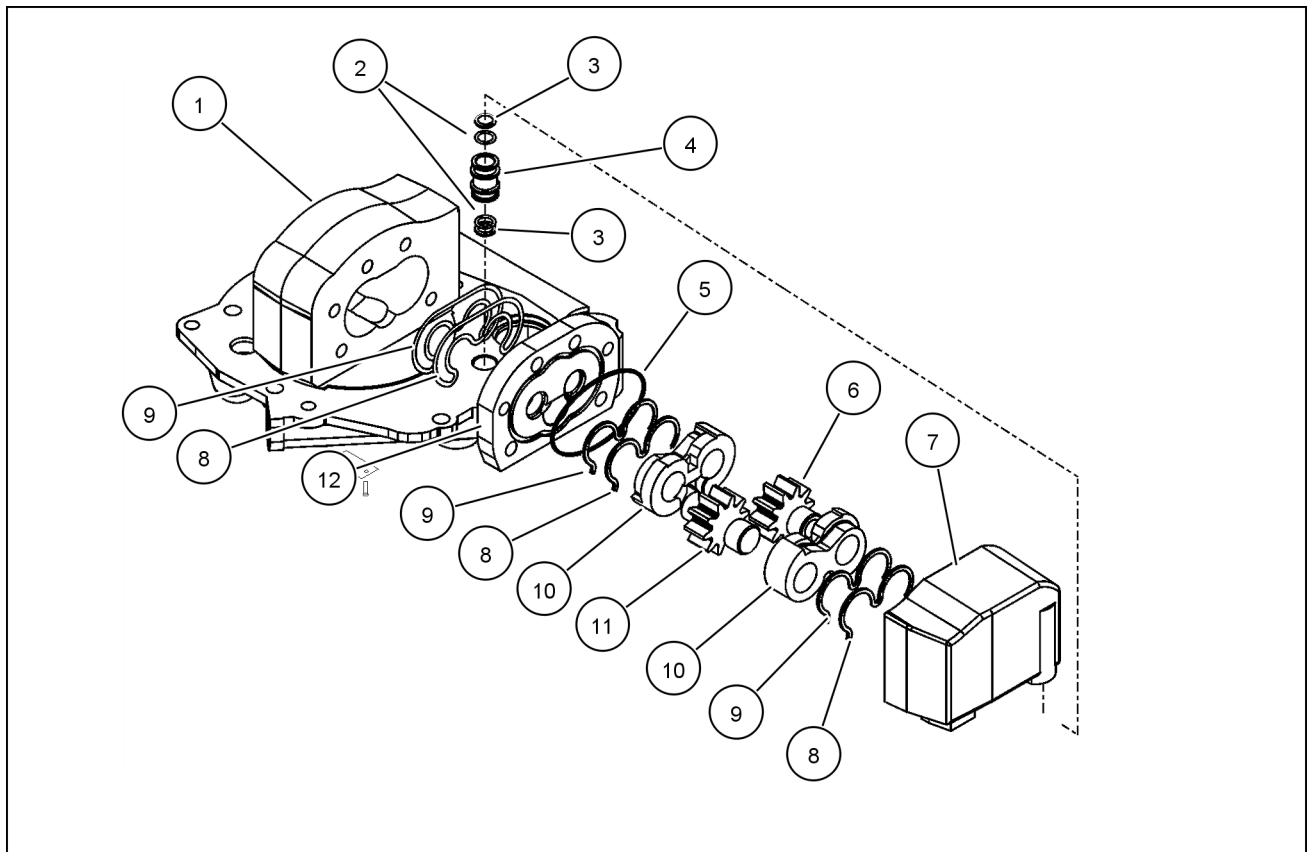


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### Front pump internal components

- |                                         |                                  |
|-----------------------------------------|----------------------------------|
| (1) Pump body                           | (15) Hex bolt M10 x 1.5 x 115 mm |
| (2) Rear plug (relief valve)            | (16) Hex bolt M10 x 1.5 x 110 mm |
| (3) Filter support                      | (17) Grower washer 10 mm         |
| (4) Spring (relief valve)               | (18) Hex nut 1/2 in              |
| (5) Lower piston (relief valve)         | (19) Lock washer 1/2 in          |
| (6) O-ring (relief valve)               | (20) Drive gear                  |
| (7) Body (relief valve)                 | (21) Oil seal                    |
| (8) O-ring (relief valve)               | (22) Front pump cover plate      |
| (9) Backup ring (relief valve)          | (23) Hoop O-ring seal            |
| (10) Driven gear                        | (24) Backup O-ring seal          |
| (11) O-ring (transfer tube)             | (25) Double bearing block        |
| (12) Backup spiral seal (transfer tube) | (26) Drive gear shaft            |
| (13) Transfer tube (long connector)     | (27) Plug with O-ring            |
| (14) Woodruff cotter pin                | (28) Elastic pin                 |

## Tandem gear exploded view (rear pump - steering/lubrication/low pressure)



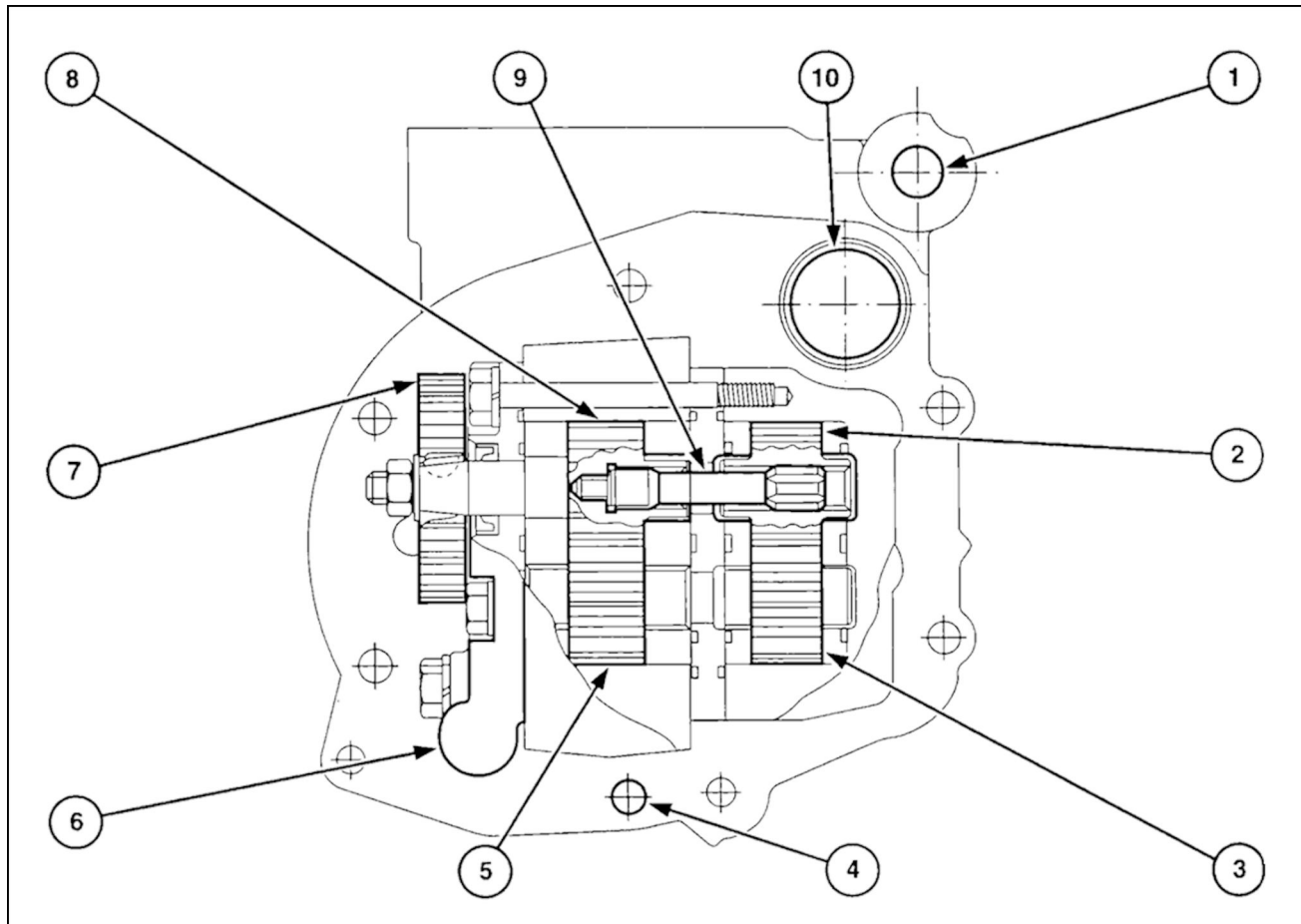
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### Rear pump internal components

- |                                               |                                  |
|-----------------------------------------------|----------------------------------|
| <b>(1)</b> Pump body                          | <b>(7)</b> Rear pump cover plate |
| <b>(2)</b> Backup spiral seal (transfer tube) | <b>(8)</b> Hoop O-ring seal      |
| <b>(3)</b> O-ring (transfer tube)             | <b>(9)</b> Backup O-ring seal    |
| <b>(4)</b> Transfer tube (short connector)    | <b>(10)</b> Double bearing block |
| <b>(5)</b> O-ring                             | <b>(11)</b> Driven gear          |
| <b>(6)</b> Drive gear                         | <b>(12)</b> Spacer plate         |

## Hydraulic pump Tandem gear pump - Sectional view

### Tandem gear pump (cross section view)



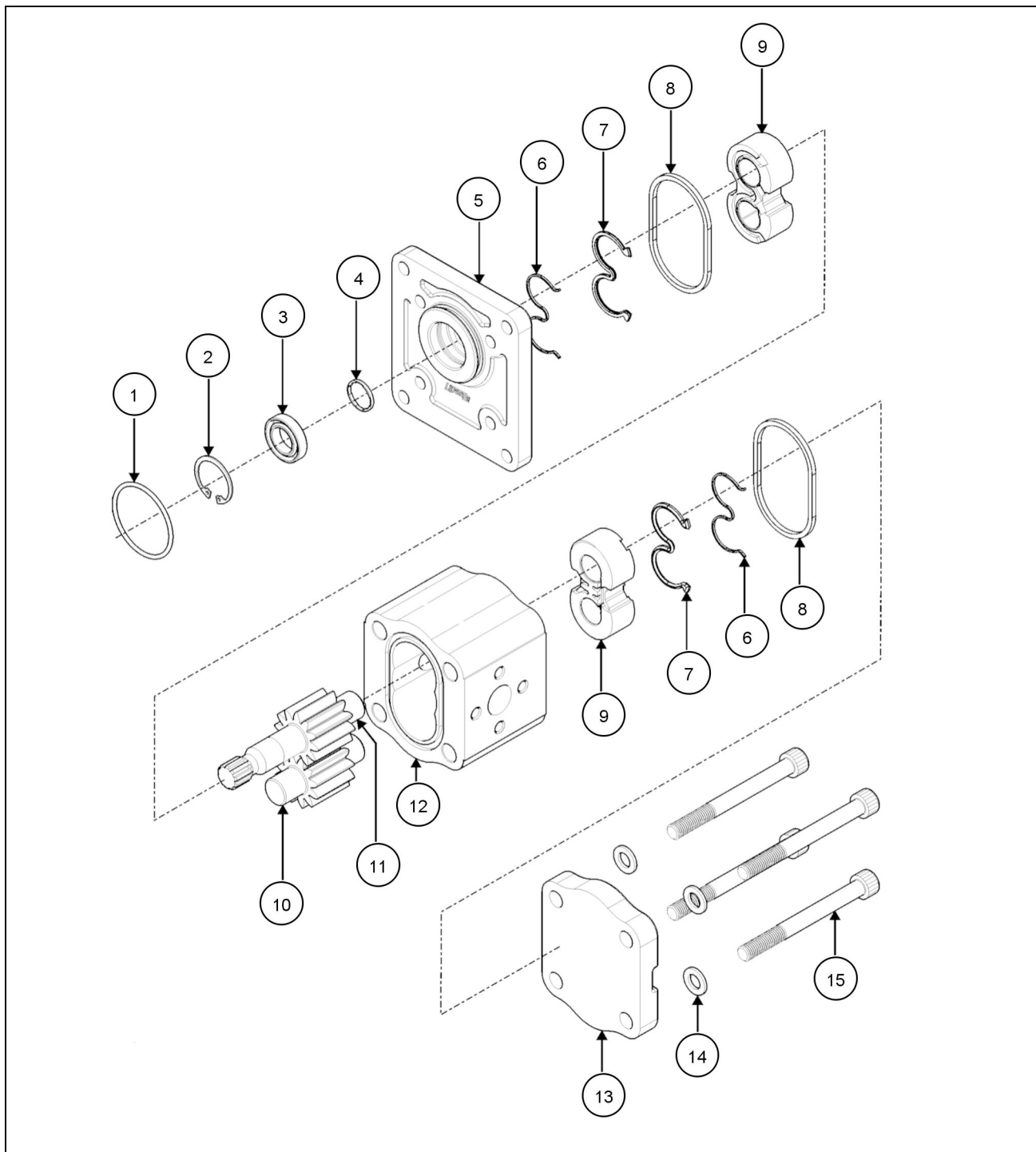
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#### Cross section of transmission mounted tandem gear pump

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| (1) Outlet port to hydraulic lift   | (6) Hydraulic lift pump outlet port |
| (2) Steering pump drive gear        | (7) Pump assembly drive gear        |
| (3) Steering pump driven gear       | (8) Hydraulic lift pump driven gear |
| (4) Outlet port to PTO              | (9) Drive link                      |
| (5) Hydraulic lift pump driven gear | (10) Pump inlet port (both pumps)   |

## Hydraulic pump - Exploded view

### Auxiliary engine mounted hydraulic pump (optional)



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- |                     |                          |                                   |
|---------------------|--------------------------|-----------------------------------|
| (1) O-ring          | (6) Hoop O-ring seal     | (11) Drive gear                   |
| (2) Ring retainer   | (7) Backup O-ring seal   | (12) Pump body                    |
| (3) Seal retainer   | (8) Gasket               | (13) Pump cover plate             |
| (4) Ring guide      | (9) Double bearing block | (14) Flat washer                  |
| (5) Pump base cover | (10) Driven gear         | (15) Allen bolt M10 x 1.5 x 95 mm |

## **Control valve Priority/Regulator valve - Exploded view**

The priority valve group (PVG), located on top of the hydraulic lift cover contains a set of valves, that establishes pump oil priority, and controls the flow of oil to the lift cylinder, remote valves, and auxiliary equipment.

### **Flow control valve (FCV)**

The flow control valve, located in the priority valve group, controls oil flow to the lift control valve, by sensing pressure variations. The flow control valve also diverts surplus oil to the combining valve.

### **Unload valve (UV)**

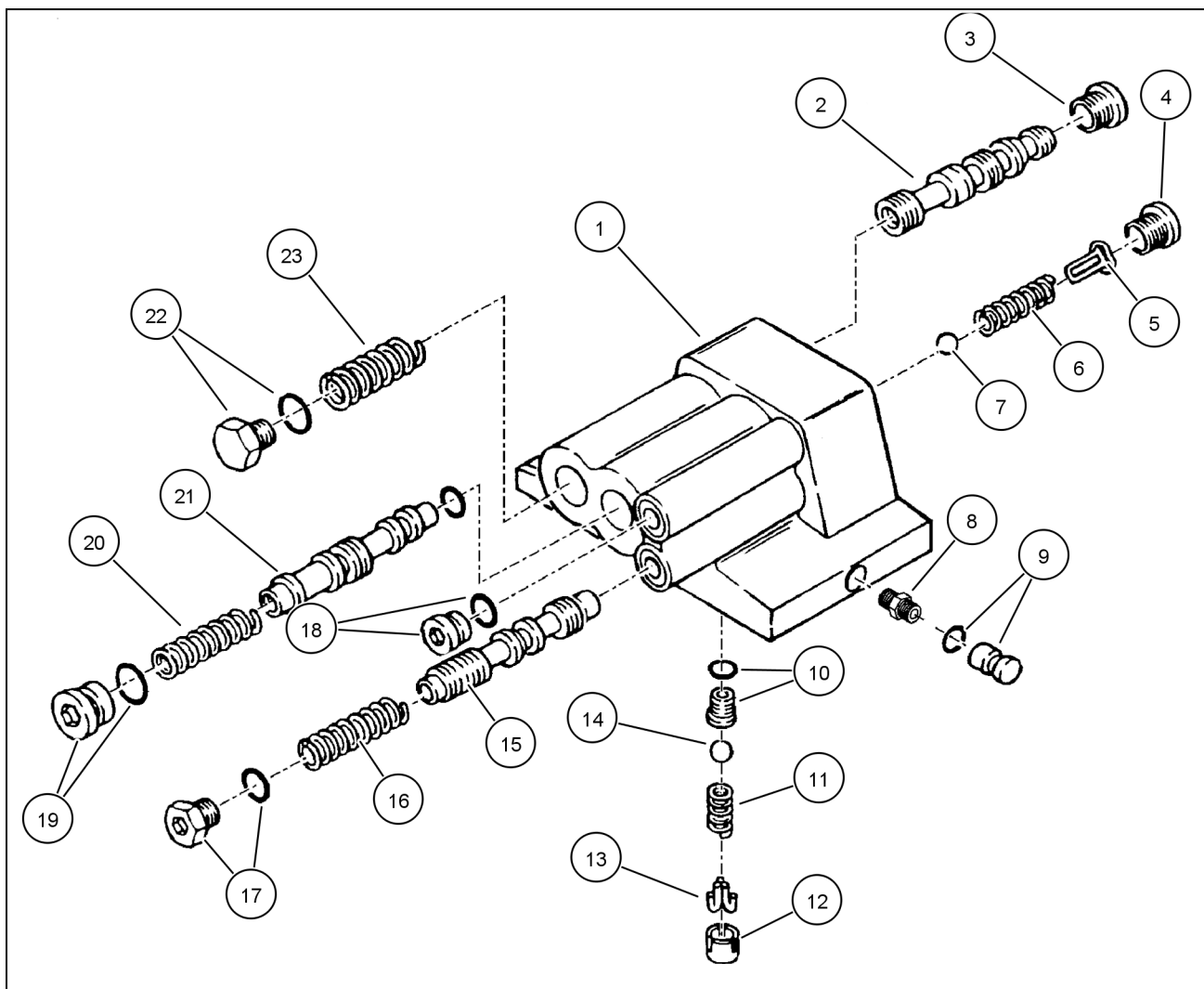
The unload valve, located in the priority valve group, responds to flow control valve movement, and operates in two positions. In the raised position, the valve allows oil to flow to the lift cylinder. In the neutral or lowering position, the valve directs oil to the reservoir (rear axle center casing).

### **Combining valve (CV)**

The combining valve regulates the flow of oil to the remote valve circuit, and combines the flow of oil from the main and auxiliary pumps as required.

The combining valve performs the following functions:

- Directs main hydraulic and optional auxiliary pump oil flow to remote circuits on demand, and returns oil flow to sump when no demand exists.
- Directs oil flow to sump if pump output exceeds remote circuit demand.
- Protects the remote circuits and auxiliary pump circuit from excessive pressure.



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**(1)** Priority valve group (PVG)

**(2)** Flow control valve (FCV) spool

**(3)** FCV hex socket plug

**(4)** Auxiliary pump circuit (APC) check valve plug with O-ring

**(5)** APC check valve spring stop

**(6)** APC check valve spring

**(7)** APC check valve ball

**(8)** PVG restrictor

**(9)** PVG restrictor O-ring and plug

**(10)** Lift circuit (LC) check valve seat/slot and O-ring

**(11)** LC check valve spring

**(12)** LC check valve spacer with plug

**(13)** LC check valve cage

**(14)** LC check valve ball

**(15)** Combined valve (CV) spool with internal relief valve

**(16)** CV spring

**(17)** CV plug and O-ring

**(18)** APC check valve plug with O-ring

**(19)** Unload valve (UV) plug with O-ring

**(20)** UV spring LC check valve spring

**(21)** UV spool with O-ring

**(22)** FCV plug with O-ring

**(23)** FCV spring

## Control valve - Dynamic description

### Control valve oil flow – Neutral

With the control valve in the neutral position, the following functions occurs:

- The trapped hydraulic oil within the lift cylinder holds the cylinder in the desired position.
- Pressurized oil enters the combining valve, located in the priority valve pack on top of the hydraulic lift cover. The combining valve either returns the oil to the reservoir, or directs it to the remote valve(s), depending on demand.
- Hydraulic circuits without remote valves installed, do not require a combining valve.

With the control valve in the neutral position, the following oil flow occurs:

- Pump pressure enters the lift cover at Gallery E, where the control valve prevents the oil from entering Galleries C and D.
- Pressurized oil flows up Gallery E to the flow control valve and unload valve.
- The unload valve opens to return at the left side via Gallery C, and the control valve center.
- Oil pressure applied to the center face of the spool in the unload valve holds the spool to the left.
- With the unload valve held to the left, oil in Gallery D, and in the spring-loaded end of the flow control valve, returns to sump through Gallery G, by way of a small internal drilling in the unload valve.
- Oil pressure in Gallery E now acts on the right-hand face of the flow control valve via an internal drilling, and moves the valve full left, which allows the oil to flow from Gallery E to Gallery F.
- With the remote valve(s) in neutral, the load sensing, line pressure vents to sump through the remote valve(s). Pressurized oil in Gallery F acts on the right-hand side of the combining valve, and moves the valve to the left, which ports oil from Gallery F to return through Gallery G.
- The oil in the lift cylinder remains trapped in Galleries A and B by the control valve land, and the check valve.

 – Pump pressurized oil

 – Suction oil / return to deposit

 – Trapped oil

 – Auxiliary pump oil (if equipped)

(1) To remote valves

(2) Combining valve

(3) Unload valve

(4) Flow control valve

(5) From main pump

(6) Control valve

(7) Exhaust valve

(8) To lift cylinder

(9) Check valve

(10) To rear axle reservoir

(11) Remote valve pilot (load sense) line

(12) From auxiliary pump (if equipped)

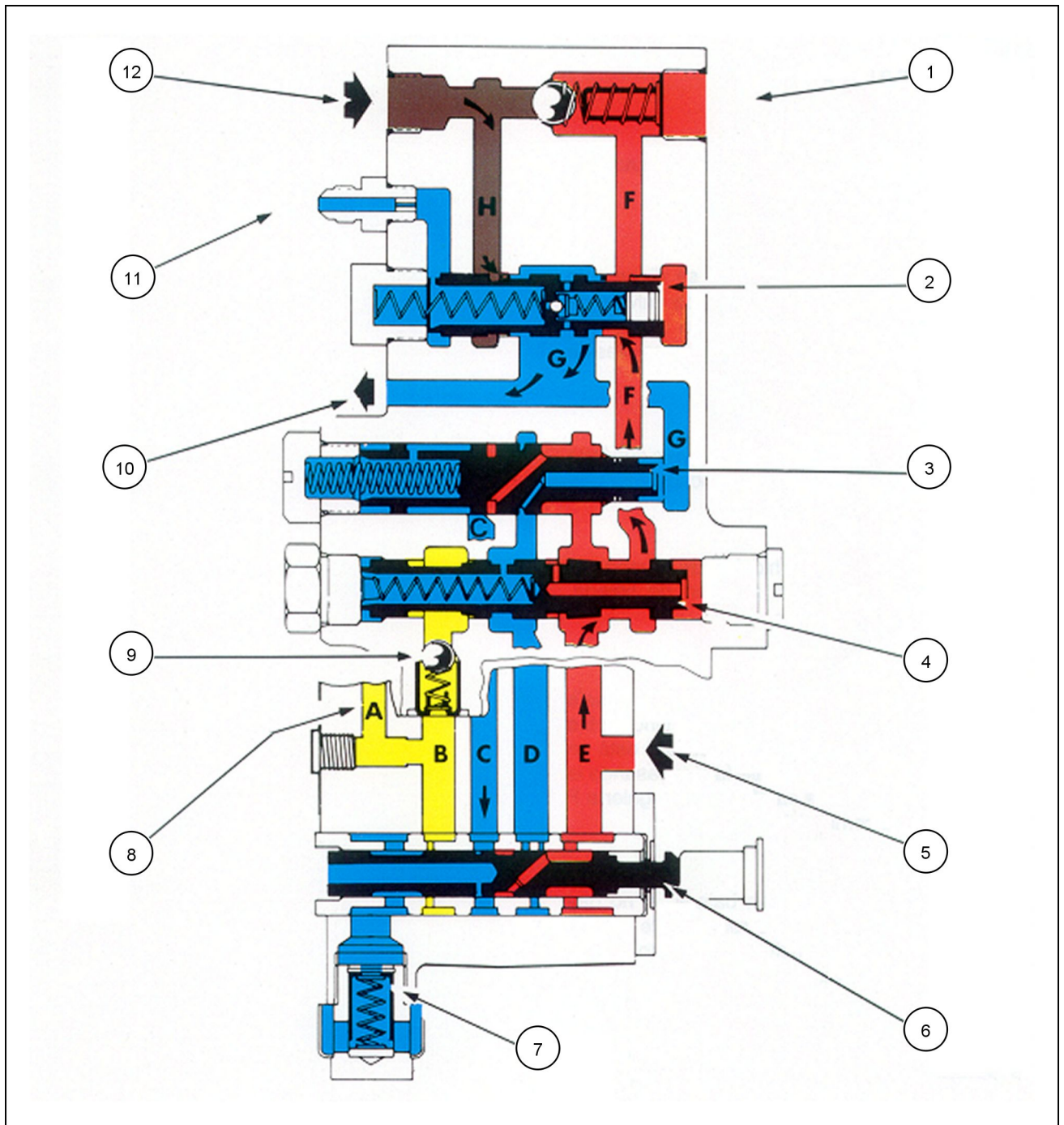


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