



SERVICE MANUAL



MAXXUM 100 , MAXXUM 110 Multicontroller , MAXXUM 110 , MAXXUM 115 Multicontroller , MAXXUM 115 , MAXXUM 120 Multicontroller , MAXXUM 120 , MAXXUM 125 Multicontroller , MAXXUM 125 , MAXXUM 130 Multicontroller , MAXXUM 130 , MAXXUM 140 Multicontroller , MAXXUM 140

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INTRODUCTION

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Foreword [5195725]

Technical Information

This manual has been produced by a new technical information system. This new system is designed to deliver technical information electronically through CD-ROM and in paper manuals. A coding system called ICE has been developed to link the technical information to other Product Support functions e.g. Warranty.

Technical information is written to support the maintenance and service of the functions or systems on a customer's machine. When a customer has a concern on his machine it is usually because a function or system on his machine is not working at all, is not working efficiently, or is not responding correctly to his commands. When you refer to the technical information in this manual to resolve that customer's concern, you will find all the information classified using the new ICE coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system then you will find all the mechanical, electrical or hydraulic devices, components, assemblies and sub assemblies for that function or system. You will also find all the types of information that have been written for that function or system, the technical data (specifications), the functional data (how it works), the diagnostic data (fault codes and troubleshooting) and the service data (remove, install adjust, etc.).

By integrating this new ICE coding into technical information, you will be able to search and retrieve just the right piece of technical information you need to resolve that customer's concern on his machine. This is made possible by attaching 3 categories to each piece of technical information during the authoring process.

The first category is the Location, the second category is the Information Type and the third category is the Product:

- LOCATION - is the component or function on the machine, that the piece of technical information is going to describe e.g. Fuel tank.
- INFORMATION TYPE - is the piece of technical information that has been written for a particular component or function on the machine e.g. Capacity would be a type of Technical Data that would describe the amount of fuel held by the Fuel tank.
- PRODUCT - is the model that the piece of technical information is written for.

Every piece of technical information will have those 3 categories attached to it. You will be able to use any combination of those categories to find the right piece of technical information you need to resolve that customer's concern on his machine.

That information could be:

- the description of how to remove the cylinder head
- a table of specifications for a hydraulic pump
- a fault code
- a troubleshooting table
- a special tool

How to Use this Manual

This manual is divided into Sections. Each Section is then divided into Chapters. Contents pages are included at the beginning of the manual, then inside every Section and inside every Chapter. An alphabetical Index is included at the end of a Chapter. Page number references are included for every piece of technical information listed in the Chapter Contents or Chapter Index.

Each Chapter is divided into four Information types:

- Technical Data (specifications) for all the mechanical, electrical or hydraulic devices, components and assemblies.
- Functional Data (how it works) for all the mechanical, electrical or hydraulic devices, components and assemblies.
- Diagnostic Data (fault codes, electrical and hydraulic troubleshooting) for all the mechanical, electrical or hydraulic devices, components and assemblies.
- Service data (remove disassembly, assemble, install) for all the mechanical, electrical or hydraulic devices, components and assemblies.

Sections

Sections are grouped according to the main functions or a systems on the machine. Each Section is identified by a letter A, B, C etc. The amount of Sections included in the manual will depend on the type and function of the machine that the manual is written for. Each Section has a Contents page listed in alphabetic/numeric order. This table illustrates which Sections could be included in a manual for a particular product.

PRODUCT	SECTION										
	A - Distribution Systems										
	B - Power Production										
	C - Power Train										
	D - Travelling										
	E - Body and Structure										
	F - Frame Positioning										
	G - Tool Positioning										
	H - Working Arm										
	J - Tools and Couplers										
	K - Crop Processing										
L - Field Processing											
Tractors	X	X	X	X	X	X		X	X		
Vehicles with working arms: backhoes, excavators, skid steers,	X	X	X	X	X	X	X	X	X		
Combines, forage harvesters, balers,	X	X	X	X	X	X	X	X	X	X	
Seeding, planting, floating, spraying equipment,	X	X	X	X	X	X		X			X
Mounted equipment and tools,					X	X	X		X		

This manual contains these Sections. The contents of each Section are explained over the following pages.

Contents

INTRODUCTION	
DISTRIBUTION SYSTEMS	A
POWER PRODUCTION	B
POWER TRAIN	C
TRAVELLING	D
BODY AND STRUCTURE	E
TOOL POSITIONING	G
CROP PROCESSING	K

Section Contents

SECTION A, DISTRIBUTION SYSTEMS

This Section covers the main systems that interact with most of the functions of the product. It includes the central parts of the hydraulic, electrical, electronic, pneumatic, lighting and grease lubrication systems. The components that are dedicated to a specific function are listed in the Chapter where all the technical information for that function is included.

SECTION B, POWER PRODUCTION

This Section covers all the functions related to the production of power to move the machine and to drive various devices.

SECTION C, POWER TRAIN

This Section covers all the functions related to the transmission of power from the engine to the axles and to internal or external devices and additional Process Drive functions.

SECTION D, TRAVELLING

This Section covers all the functions related to moving the machine, including tracks, wheels, steering and braking. It covers all the axles both driven axles and non-driven axles, including any axle suspension.

SECTION E, BODY AND STRUCTURE

This Section covers all the main functions and systems related to the structure and body of the machine. Including the frame, the shields, the operator's cab and the platform.

SECTION G, TOOL POSITIONING

This Section covers all the functions related to the final and/or automatic positioning of the tool once the tool is positioned using the Working Arm or the machine frame.

SECTION K, CROP PROCESSING

This Section covers all the functions related to crop processing.

Chapters

Each Chapter is identified by a letter and number combination e.g. Engine B.10.A The first letter is identical to the Section letter i.e. Chapter B.10 is inside Section B, Power Production.

CONTENTS

The Chapter Contents lists all the technical data (specifications), functional data (how it works), service data (remove, install adjust, etc..) and diagnostic data (fault codes and troubleshooting) that have been written in that Chapter for that function or system on the machine.

Contents

POWER PRODUCTION
ENGINE _ 10.A

TECHNICAL DATA

ENGINE - General specification (B.10.A - D.40.A.10)
CS6050

FUNCTIONAL DATA

ENGINE - Dynamic description (B.10.A - C.30.A.10)
CS6050

SERVICE

ENGINE - Remove (B.10.A - F.10.A.10)
CS6050

DIAGNOSTIC

ENGINE - Troubleshooting (B.10.A - G.40.A.10)
CS6050

INDEX

The Chapter Index lists in alphabetical order all the types of information (called Information Units) that have been written in that Chapter for that function or system on the machine.

Index

POWER PRODUCTION - B
ENGINE

ENGINE - Dynamic description (B.10.A - C.30.A.10)
CS6050

ENGINE - General specification (B.10.A - D.40.A.10)
CS6050

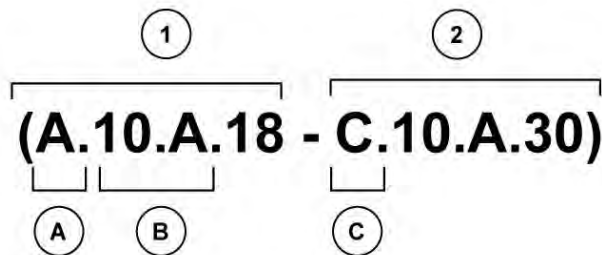
ENGINE - Remove (B.10.A - F.10.A.10)
CS6050

ENGINE - Troubleshooting (B.10.A - G.40.A.10)
CS6050

Information Units and Information Search

Each chapter is composed of information units. Each information unit has the ICE code shown in parentheses which indicates the function and the type of information written in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

example information unit	Stack valve - Sectional View (A.10.A.18 - C.10.A.30)				
Information Unit ICE code	A	10.A	18	C	10.A.30
ICE code classification	Distribution systems	Primary hydraulic power	Stack valve	Functional data	Sectional view



CRIL03J033E01 1

Navigate to the correct information unit you are searching for by identifying the function and information type from the ICE code.

- **(1)** Function and **(2)** Information type.
- **(A)** corresponds to the sections of the repair manual.
(B) corresponds to the chapters of the repair manual.
(C) corresponds to the type of information listed in the chapter contents, Technical data, Functional Data, Diagnostic or Service.
(A) and **(B)** are also shown in the page numbering on the page footer.
THE REST OF THE CODING IS NOT LISTED IN ALPHANUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.
You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

Page Header and Footer

The page header will contain the following references:

- Section and Chapter description

The page footer will contain the following references:

- Publication number for that Manual, Section or Chapter.
- Version reference for that publication.
- Publication date
- Section, chapter and page reference e.g. A.10.A / 9

Important information

All repair and maintenance works listed in this manual must be carried out only by staff belonging to the Case I H Service network, strictly complying with the instructions given and using, whenever required, the special tools.

Anyone who carries out the above operations without complying with the prescriptions shall be responsible for the subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional or local dealers, reject any responsibility for damages due to the anomalous behaviour of parts and/or components not approved by the manufacturer himself, including those used for the servicing or repair of the product manufactured or marketed by the Manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the Manufacturer in case of damages due to an anomalous behaviour of parts and/or components not approved by the Manufacturer.

Safety rules [3964943]

IMPORTANT NOTICE

All maintenance and repair operations described in this manual should be carried out exclusively by authorised workshops. All instructions should be carefully observed and special equipment where indicated should be used. Anyone who carries out service operations described without carefully observing these instructions will be directly responsible for any damage caused.

NOTES FOR EQUIPMENT

Equipment shown in this manual is:

- designed expressly for use on these tractors;
- necessary to make a reliable repair;
- accurately built and strictly tested to offer efficient and long-lasting working life.

NOTICES

The words “front”, “rear”, “right hand”, and “left hand” refer to the different parts as seen from the operator’s seat oriented to the normal direction of movement of the tractor.

SAFETY RULES

PAY ATTENTION TO THIS SYMBOL



This warning symbol points out important messages involving personal safety. Carefully read the safety rules contained herein and follow advised precautions to avoid potential hazards and safeguard your safety. In this manual you will find this symbol together with the following key-words:
 WARNING -it gives warning about improper repair operations and potential consequences affecting the service technician’s personal safety.
 DANGER - it gives specific warning about potential dangers for personal safety of the operator or other persons directly or indirectly involved in the operation.



TO PREVENT ACCIDENTS

Most accidents and personal injuries taking place in workshops are due from non-observance of some essential rules and safety precautions.

The possibility that an accident might occur with any type of machines should not be disregarded, no matter how well the machine in question was designed and built.

A wise and careful service technician is the best precautions against accidents.

Careful observance of this basic precaution would be enough to avoid many severe accidents.



DANGER



Never carry out any cleaning, lubrication or maintenance operations when the engine is running.

B013

SAFETY RULES

Generalities

- Carefully follow specified repair and maintenance procedures.

INTRODUCTION

- Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get caught on moving parts. Use approved safety clothing such as anti-slipping footwear, gloves, safety goggles, helmets, etc.
- Wear safety glasses with side guards when cleaning parts using compressed air.
- Damaged or frayed wires and chains are unreliable. Do not use them for lifting or towing.
- Wear suitable protection such as approved eye protection, helmets, special clothing, gloves and footwear whenever welding. All persons standing in the vicinity of the welding process should wear approved eye protection. NEVER LOOK AT THE WELDING ARC IF YOUR EYES ARE NOT SUITABLY PROTECTED.
- Never carry out any repair on the machine if someone is sitting on the operator's seat, except if they are qualified operators assisting in the operation to be carried out.
- Never operate the machine or use attachments from a place other than sitting at the operator's seat or at the side of the machine when operating the fender switches.
- Never carry out any operation on the machine when the engine is running, except when specifically indicated. Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.
- All repair and maintenance operations should be carried out with the greatest care and attention.
- Disconnect the batteries and label all controls to warn that the tractor is being serviced. Block the machine and all equipment which should be raised.
- Never check or fill fuel tanks or batteries, nor use starting liquid if you are smoking or near open flames as such fluids are flammable.
- The fuel filling gun should always remain in contact with the filler neck. Maintain this contact until the fuel stops flowing into the tank to avoid possible sparks due to static electricity build-up.
- To transfer a failed tractor, use a trailer or a low loading platform trolley if available.
- To load and unload the machine from the transportation means, select a flat area providing a firm support to the trailer or truck wheels. Firmly tie the machine to the truck or trailer platform and block wheels as required by the transporter.
- Always use lifting equipment of appropriate capacity to lift or move heavy components.
- Chains should always be safely fastened. Ensure that fastening device is strong enough to hold the load foreseen. No persons should stand near the fastening point.
- The working area should be always kept CLEAN and DRY. Immediately clean any spillage of water or oil.
- Never use gasoline, diesel oil or other flammable liquids as cleaning agents. Use non-flammable non-toxic proprietary solvents.
- Do not pile up grease or oil soaked rags, as they constitute a great fire hazard. Always place them into a metal container.

START UP

- Never run the engine in confined spaces which are not equipped with adequate ventilation for exhaust gas extraction.
- Never bring your head, body, arms, legs, feet, hands, fingers near fans or rotating belts.

ENGINE

- Always loosen the radiator cap very slowly before removing it to allow pressure in the system to dissipate. Coolant should be topped up only when the engine is stopped.
- Do not fill up fuel tank when the engine is running.
- Never adjust the fuel injection pump when the tractor is moving.
- Never lubricate the tractor when the engine is running.

ELECTRICAL SYSTEMS

- If it is necessary to use auxiliary batteries, cables must be connected at both sides as follows: (+) to (+) and (-) to (-). Avoid short-circuiting the terminals. GAS RELEASED FROM BATTERIES IS HIGHLY FLAMMABLE.

During charging, leave the battery compartment uncovered to improve ventilation. Avoid sparks or flames near the battery area. Do no smoke.

- Do not charge batteries in confined spaces.
- Always disconnect the batteries before performing any type of service on the electrical system.

HYDRAULIC SYSTEMS

- Some fluid coming out from a very small port can be almost invisible and be strong enough to penetrate the skin. For this reason, NEVER USE YOUR HANDS TO CHECK FOR LEAKS, but use a piece of cardboard or a piece of wood for this purpose. If any fluid is injected into the skin, seek medical aid immediately. Lack of immediate medical attention may result in serious infections or dermatitis.
- Always take system pressure readings using the appropriate gauges.

WHEELS AND TYRES

- Check that the tyres are correctly inflated at the pressure specified by the manufacturer. Periodically check for possible damage to the rims and tyres.
- Stay at the tyre side when inflating.
- Check the pressure only when the tractor is unloaded and tyres are cold to avoid wrong readings due to over-pressure.
- Never cut, nor weld a rim with the inflated tyre assembled.
- To remove the wheels, block both front and rear tractor wheels. Raise the tractor and install safe and stable supports under the tractor in accordance with regulations in force.
- Deflate the tyre before removing any object caught into the tyre tread.
- Never inflate tyres using flammable gases as they may generate explosions and cause injuries to bystanders.

REMOVAL AND INSTALLATION

- Lift and handle all heavy components using lifting equipment of adequate capacity. Ensure that parts are supported by appropriate slings and hooks. Use lifting eyes provided to this purpose. Take care of the persons near the loads to be lifted.

HEALTH AND SAFETY

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HEALTH AND SAFETY PRECAUTIONS

Many of the procedures associated with vehicle maintenance and repair involve physical hazards or other risks to health. This section lists, alphabetically, some of these hazardous operations and the materials and equipment associated with them. The precautions necessary to avoid these hazards are identified.

The list is not exhaustive and all operations and procedures and the handling of materials, should be carried out with health and safety in mind.

ACIDS AND ALKALIS

see Battery acids, e.g. caustic soda, sulphuric acid.
Used in batteries and cleaning materials.

Irritant and corrosive to the skin, eyes, nose and throat. Causes burns.

Avoid splashes to the skin, eyes and clothing. Wear suitable protective gloves and goggles. Can destroy ordinary protective clothing. Do not breathe mists.

Ensure access to water and soap is readily available for splashing accidents.

ADHESIVES AND SEALERS

see Fire

Highly Flammable, Flammable, combustible.

Generally should be stored in "No Smoking" areas; cleanliness and tidiness in use should be observed, e.g. disposable paper covering benches; should be dispensed from applicators where possible; containers, including secondary containers, should be labelled.

Solvent based Adhesives/Sealers

See Solvents.

Follow manufacturers instructions.

Water based Adhesives/Sealers

Those based on polymer emulsions and rubber lattices may contain small amounts of volatile toxic and harmful chemicals. Skin and eye contact should be avoided and adequate ventilation provided during use.

Follow manufacturers instructions.

Resin based Adhesives/Sealers

e.g. epoxide and formaldehyde resin based.

Mixing should only be carried out in well ventilated areas as harmful or toxic volatile chemicals may be released.

Skin contact with uncured resins and hardeners can result in irritation; dermatitis and absorption of toxic or harmful chemicals through the skin. Splashes can damage the eyes.

Provide adequate ventilation and avoid skin and eye contact. Follow manufacturers instructions.

Anaerobic, Cyanoacrylate and other Acrylic Adhesives

Many are irritant, sensitizing or harmful to the skin. Some are eye irritants.

Skin and eye contact should be avoided and the manufacturers instructions followed.

Cyanoacrylate adhesives (super-glues) must not contact the skin or eyes. If skin or eye tissue is bonded cover with a clean moist pad and get medical attention. do not attempt to pull tissue apart. Use in well ventilated areas as vapours can cause irritation of the nose and eyes.

For two-pack systems see Resin based adhesives/sealers.

Isocyanate (Polyurethane) Adhesives/ Sealers

see Resin based Adhesives.

Individuals suffering from asthma or respiratory allergies should not work with or near these materials as sensitivity reactions can occur.

Any spraying should preferably be carried out in exhaust ventilated booths removing vapours and spray droplets from the breathing zone. Individuals working with spray applications should wear supplied air respirators.

ANTIFREEZE

see Fire, Solvents e.g. Isopropanol, Ethylene Glycol, Methanol.

Highly Flammable, Flammable, Combustible.

Used in vehicle coolant systems, brake air pressure systems, screenwash solutions.

Vapours given off from coolant antifreeze (glycol) arise only when heated.

Antifreeze may be absorbed through the skin in toxic or harmful quantities. Antifreeze if swallowed is fatal and medical attention must be found immediately.

ARC WELDING

see Welding.

BATTERY ACIDS

see Acids and Alkalis.

Gases released during charging are explosive.

Never use naked flames or allow sparks near charging or recently charged batteries.

BRAKE AND CLUTCH FLUIDS (Polyalkylene Glycols)

see Fire.

Combustible.

Splashes to the skin and eyes are slightly irritating.

Avoid skin and eye contact as far as possible.

Inhalation of vapour hazards do not arise at ambient temperatures because of the very low vapour pressure.

BRAZING

see Welding.

CHEMICAL MATERIALS - GENERAL

see Legal Aspects.

Chemical materials such as solvents, sealers, adhesives, paints, resin foams, battery acids, antifreeze, brake fluids, oils and grease should always be used with caution and stored and handled with care. They may be toxic, harmful, corrosive, irritant or highly inflammable and give rise to hazardous fumes and dusts.

The effects of excessive exposure to chemicals may be immediate or delayed; briefly experienced or permanent; cumulative; superficial; life threatening; or may reduce life-expectancy.

DO'S

Do remove chemical materials from the skin and clothing as soon as practicable after soiling. Change heavily soiled clothing and have it cleaned.

Do carefully read and observe hazard and precaution warnings given on material containers (labels) and in any accompanying leaflets, poster or other instructions. Material health and safety data sheets can be obtained from Manufacturers.

Do organise work practices and protective clothing to avoid soiling of the skin and eyes; breathing vapours/aerosols/dusts/fumes; inadequate container labelling; fire and explosion hazards.

Do wash before job breaks; before eating, smoking, drinking or using toilet facilities when handling chemical materials.

Do keep work areas clean, uncluttered and free of spills.

Do store according to national and local regulations.

Do keep chemical materials out of reach of children.

DO NOTS

Do Not mix chemical materials except under the manufacturers instructions; some chemicals can form other toxic or harmful chemicals; give off toxic or harmful fumes; be explosive when mixed together.

Do Not spray chemical materials, particularly those based on solvents, in confined spaces e.g. when people are inside a vehicle.

Do Not apply heat or flame to chemical materials except under the manufacturers' instructions. Some are highly inflammable and some may release toxic or harmful fumes.

Do Not leave containers open. Fumes given off can build up to toxic, harmful or explosive concentrations. Some fumes are heavier than air and will accumulate in confined areas, pits etc.

Do Not transfer chemical materials to unlabeled containers.

Do Not clean hands or clothing with chemical materials. Chemicals, particularly solvents and fuels will dry the skin and may cause irritation with dermatitis. Some can be absorbed through the skin in toxic or harmful quantities.

Do Not use emptied containers for other materials, except when they have been cleaned under supervised conditions.

Do Not sniff or smell chemical materials. Brief exposure to high concentrations of fumes can be toxic or harmful.

Clutch Fluids

see Brake and Clutch Fluids.

Clutch Linings and Pads

see Brake and Clutch Linings and Pads.

CORROSION PROTECTION MATERIALS

see Solvents, Fire.

Highly flammable, flammable.

These materials are varied and the manufacturers instructions should be followed. They may contain solvents, resins, petroleum products etc. Skin and eye contact should be avoided. They should only be sprayed in conditions of adequate ventilation and not in confined spaces.

Cutting

see Welding.

De-Waxing

see Solvents and Fuels (Kerosene).

DUSTS

Powder, dusts or clouds may be irritant, harmful or toxic. Avoid breathing dusts from powdery chemical materials or those arising from dry abrasion operations. Wear respiratory protection if ventilation is inadequate.

ELECTRIC SHOCK

Electric shocks can result from the use of faulty electrical equipment or from the misuse of equipment even in good condition.

Ensure that electrical equipment is maintained in good condition and frequently tested.

Ensure that flexes, cables, plugs and sockets are not frayed, kinked, cut, cracked or otherwise damaged.

Ensure that electric equipment is protected by the correct rated fuse.

Never misuse electrical equipment and never use equipment which is in any way faulty. The results could be fatal.

Use reduced voltage equipment (**110 volt**) for inspection and working lights where possible.

Ensure that the cables of mobile electrical equipment cannot get trapped and damaged, such as in a vehicle hoist. Use air operated mobile equipment where possible in preference to electrical equipment.

In cases of electrocution:-

- switch off electricity before approaching victim
- if this is not possible, push or drag victim from source of electricity using dry non-conductive material
- commence resuscitation if trained to do so
- SUMMON MEDICAL ASSISTANCE

EXHAUST FUMES

These contain asphyxiating, harmful and toxic chemicals and particles such as carbon oxides, nitrogen oxides, aldehydes, lead and aromatic hydrocarbons. Engines should only be run under conditions of adequate extraction or general ventilation and not in confined spaces.

Gasolene (Petrol) Engine

There may not be adequate warning properties of odour or irritation before immediate and delayed toxic or harmful effects arise.

Diesel Engine

Soot, discomfort and irritation usually give adequate warning of hazardous fume concentrations.

FIBRE INSULATION

see Dusts.

Used in noise and sound insulation.

The fibrous nature of surfaces and cut edges can cause skin irritation. This is usually a physical and not a chemical effect.

Precautions should be taken to avoid excessive skin contact through careful organisation of work practices and the use of gloves.

FIRE

see Welding, Foams, Legal Aspects.

Many of the materials found on or associated with the repair of vehicles are highly flammable. Some give off toxic or harmful fumes if burnt.

Observe strict fire safety when storing and handling flammable materials or solvents, particularly near electrical equipment or welding processes.

Ensure before using electrical or welding equipment but that there is no fire hazard present.

Have a suitable fire extinguisher available when using welding or heating equipment.

FIRST AID

Apart from meeting any legal requirements it is desirable for someone in the workshop to be trained in first aid procedures.

Splashes in the eye should be flushed with clean water for at least ten minutes.

Soiled skin should be washed with soap and water.

Inhalation affected individuals should be removed to fresh air immediately.

If swallowed or if effects persist consult a doctor with information (label) on material used.

Do not induce vomiting (unless indicated by manufacturer).

FOAMS - Polyurethane

see Fire.

Used in sound and noise insulation. Cured foams used in seat and trim cushioning.

Follow manufacturers instructions.

Unreacted components are irritating and may be harmful to the skin and eyes. Wear gloves and goggles.

Individuals with chronic respiratory diseases, asthma, bronchial medical problems or histories of allergic diseases should not work with or near uncured materials.

The components, vapours, spray mists can cause direct irritation, sensitivity reactions and may be toxic or harmful. Vapours and spray mists must not be breathed. These materials must be applied with adequate ventilation and respiratory protection. Do not remove respirator immediately after spraying, wait until vapour/ mists have cleared.

Burning of the uncured components and the cured foams can generate toxic and harmful fumes.

Smoking, open flames or the use of electrical equipment during foaming operations and until vapours/mists have cleared should not be allowed.

Any heat cutting of cured foams or partially cured foams should be conducted with extraction ventilation (see Body Section 44 Legal and Safety Aspects).

FUELS

see Fire, Legal Aspects, Chemicals - General, Solvents.

Used as fuels and cleaning agents.

Gasolene (Petrol).

Highly flammable.

Swallowing can result in mouth and throat irritation and absorption from the stomach can result in drowsiness and unconsciousness. Small amounts can be fatal to children. Aspiration of liquid into the lungs, e.g. through vomiting, is a very serious hazard.

Gasolene dries the skin and can cause irritation and dermatitis on prolonged or repeated contact. Liquid in the eye causes severe smarting.

Motor gasolene may contain appreciable quantities of benzene, which is toxic upon inhalation and the concentrations of gasolene vapours must be kept very low. High concentrations will cause eye, nose and throat irritation, nausea, headache, depression and symptoms of drunkenness. Very high concentrations will result in rapid loss of consciousness.

Ensure there is adequate ventilation when handling and using gasolene. Great care must be taken to avoid the serious consequences of inhalation in the event of vapour build up arising from spillages in confined spaces.

Special precautions apply to cleaning and maintenance operations on gasolene storage tanks.

Gasolene should not be used as a cleaning agent. It must not be siphoned by mouth.

Kerosene (Paraffin)

Used also as heating fuel, solvent and cleaning agent.

Flammable.

Irritation of the mouth and throat may result from swallowing. The main hazard from swallowing arises if liquid aspiration into the lungs occurs. Liquid contact dries the skin and can cause irritation or dermatitis. Splashes in the eye may be slightly irritating.

In normal circumstances the low volatility does not give rise to harmful vapours. Exposure to mists and vapours from kerosene at elevated temperatures should be avoided (mists may arise in de-waxing).

Avoid skin and eye contact and ensure there is adequate ventilation.

Gas-Oil (Diesel Fuel)

see Fuels (Kerosene).

Combustible.

Gross or prolonged skin contact with high boiling gas oils may also cause serious skin disorders including skin cancer.

GAS CYLINDERS

see Fire.

Gases such as oxygen, acetylene, carbon dioxide, argon and propane are normally stored in cylinders at pressures of up to **140 bar (2000 lb/in²)** and great care should be taken in handling these cylinders to avoid mechanical damage to them or to the valve gear attached. The contents of each cylinder should be clearly identified by appropriate markings.

Cylinders should be stored in well ventilated enclosures, and protected from ice and snow, or direct sunlight. Fuel gases (e.g. acetylene and propane) should not be stored in close proximity to oxygen cylinders.

Care should be exercised to prevent leaks from gas cylinders and lines, and to avoid sources of ignition.

Only trained personnel should undertake work involving gas cylinders.

Gases

see Gas Cylinders.

Gas Shielded Welding

see Welding.

Gas Welding

see Welding.

GENERAL WORKSHOP TOOLS AND EQUIPMENT

It is essential that all tools and equipment are maintained in good condition and the correct safety equipment used where required.

Never use tools or equipment for any purpose other than that for which they were designed.

Never overload equipment such as hoists, jacks, axle and chassis stands or lifting slings. Damage caused by overloading is not always immediately apparent and may result in a fatal failure the next time that the equipment is used. Do not use damaged or defective tools or equipment, particularly high speed equipment such as grinding wheels. A damaged grinding wheel can disintegrate without warning and cause serious injury.

Wear suitable eye protection when using grinding, chiselling or sand blasting equipment.

Wear a suitable breathing mask when using sand blasting equipment, working with asbestos based materials or using spraying equipment.

Glues

see Adhesives and Sealers.

High Pressure Air, Lubrication and Oil Test Equipment accordance with local regulations

see Lubricants and Greases.

Always keep high pressure equipment in good condition and regularly maintained, particularly at joints and unions. Never direct a high pressure nozzle at the skin as the fluid may penetrate to the underlying tissue etc. and cause serious injury.

LEGAL ASPECTS

Many laws and regulations make requirements relating to health and safety in the use of materials and equipment in workshops. Always conform to the laws and regulations applicable to the country in which you are working.

Workshops should be familiar, in detail, with the associated laws and regulations. Consult the local factory inspectorate or appropriate authority if in any doubt.

LUBRICANTS AND GREASES

Avoid all prolonged and repeated contact with mineral oils, especially used oils. Used oils contaminated during service (e.g. routine service change sump oils) are more irritating and more likely to cause serious effects including skin cancer in the event of gross and prolonged skin contact.

Wash skin thoroughly after work involving oil. Proprietary hand cleaners may be of value provided they can be removed from the skin with water. Do not use petrol, paraffin or other solvents to remove oil from the skin.

Lubricants and greases may be slightly irritating to the eyes.

Repeated or prolonged skin contact should be avoided by wearing protective clothing if necessary. Particular care should be taken with used oils and greases containing lead. Do not allow work clothing to be contaminated with oil. Dry clean or launder such clothing at regular intervals. Discard oil soaked shoes.

Do not employ used engine oils as lubricants or for any application where appreciable skin contact is likely to occur. Used oils may only be disposed of in accordance with local regulations.

Noise Insulation Materials

see Foams, Fibre Insulation.

PAINTS

see Solvents and Chemical Materials - General.

Highly Flammable, Flammable.

One Pack. Can contain harmful or toxic pigments, driers and other components as well as solvents. Spraying should only be carried out with adequate ventilation.

Two Pack. Can also contain harmful and toxic unreacted resins and resin hardening agents. The manufacturers instructions should be followed and the section of page 5 on resin based adhesives, isocyanate containing Adhesives and Foams should be consulted.

Spraying should preferably be carried out in exhausted ventilated booths removing vapour and spray mists from the breathing zone. Individuals working in booths should wear respiratory protection. Those doing small scale repair work in the open shop should wear supplied air respirators.

Paint Thinners

see Solvents.

Petrol

see Fuels (Gasolene).

Pressurised Equipment

see High Pressure Air, Lubrication and Oil Test Equipment.

Resistance Welding

see Welding.

Sealers

see Adhesives and Sealers.

SOLDER

see Welding.

Solders are mixtures of metals such that the melting point of the mixture is below that of the constituent metals (normally lead and tin). Solder application does not normally give rise to toxic lead fumes, provided a gas/air flame is used. Oxy-acetylene flames should not be used, as they are much hotter and will cause lead fumes to be evolved. Some fumes may be produced by the application of any flame to surfaces coated with grease etc. and inhalation of these should be avoided.

Removal of excess solder should be undertaken with care, to ensure that fine lead dust is not produced, which can give toxic effects if inhaled. Respiratory protection may be necessary.

Solder spillage and filing should be collected and removed promptly to prevent general air contamination by lead.

High standards of personal hygiene are necessary in order to avoid indigestion of lead or inhalation of solder dust from clothing.

SOLVENTS

see Chemical Materials - General Fuels (Kerosene), Fire.

e.g. Acetone, white spirit, toluene, xylene, trichlorethane.

Used in cleaning materials, de-waxing, paints, plastics, resins, thinners etc.

Highly Inflammable, Flammable.

Skin contact will degrease the skin and may result in irritation and dermatitis following repeated or prolonged contact.

Some can be absorbed through the skin in toxic or harmful quantities.

Splashes in the eye may cause severe irritation and could lead to loss of vision.

Brief exposure to high concentrations of vapours or mists will cause eye and throat irritation, drowsiness, dizziness, headaches and in the worst circumstances, unconsciousness.

Repeated or prolonged exposures to excessive but lower concentrations of vapours or mists, for which there might not be adequate warning indications, can cause more serious toxic or harmful effects.

Aspiration into the lungs (e.g. through vomiting) is the most serious consequence of swallowing.

Avoid splashes to the skin, eyes and clothing. Wear protective gloves, goggles and clothing if necessary. Ensure good ventilation when in use, avoid breathing fumes, vapours and spray mists and keep containers tightly sealed. Do not use in confined spaces. When the spraying material contains solvents, e.g. paints, adhesives, coatings, use extraction ventilation or personal respiratory protection in the absence of adequate general ventilation. Do not apply heat or flame except under specific and detailed manufacturers instructions.

Sound Insulation

see Fibre Insulation, Foams.

Spot Welding

see Welding.

SUSPENDED LOADS

There is always a danger when loads are lifted or suspended. Never work under an unsupported suspended or raised load, e.g. jacked up vehicle, suspended engine, etc. Always ensure that lifting equipment such as jacks, hoists, axle stands, slings, etc. are adequate and suitable for the job, in good condition and regularly maintained. Never improvise lifting tackle.

Underseal

see Corrosion Protection.

WELDING

see Fire, Electric Shock, Gas Cylinders. Welding processes include Resistance Welding (Spot Welding), Arc Welding and Gas Welding.

Resistance Welding

This process may cause particles of molten metal to be emitted at high velocity and the eyes and skin must be protected.

Arc Welding

This process emits a high level of ultraviolet radiation which may cause eye and skin burns to the welder and to other persons nearby. Gas-shielded welding processes are particularly hazardous in this respect. Personal protection must be worn, and screens used to shield other people.

Metal spatter will also occur and appropriate eye and skin protection is necessary.

The heat of the welding arc will produce fumes and gases from the metals being welded and from any applied coatings or contamination on the surfaces being worked on. These gases and fumes may be toxic and inhalation should always be avoided. The use of extraction ventilation to remove the fumes from the working area may be necessary, particularly in cases where the general ventilation is poor, or where considerable welding work is anticipated. In extreme cases where adequate ventilation cannot be provided, supplied air respirators may be necessary.

Gas Welding

Oxy-acetylene torches may be used for welding and cutting and special care must be taken to prevent leakage of these gases, with consequent risk of fire and explosion.

The process will produce metal spatter and eye and skin protection is necessary.

The flame is bright and eye protection should be used, but the ultra-violet emission is much less than that from arc welding, and lighter filters may be used.

The process itself produces few toxic fumes, but such fumes and gases may be produced from coatings on the work, particularly during cutting away of damaged body parts and inhalation of the fumes should be avoided.

In brazing, toxic fumes may be evolved from the metals in the brazing rod, and a severe hazard may arise if brazing rods containing cadmium are used. In this event particular care must be taken to avoid inhalation of fumes and expert advice may be required.

SPECIAL PRECAUTIONS MUST BE TAKEN BEFORE ANY WELDING OR CUTTING TAKES PLACE ON VESSELS WHICH HAVE CONTAINED COMBUSTIBLE MATERIALS, E.G. BOILING OR STEAMING OUT OF FUEL TANKS.

White Spirit

see Solvents.

ECOLOGY AND THE ENVIRONMENT

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

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, anti freeze, 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.

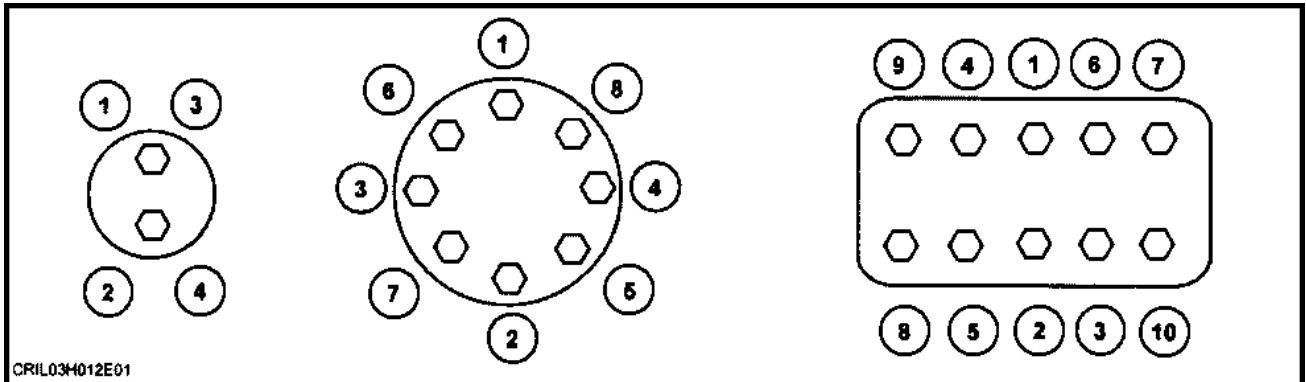
HELPFUL HINTS

1. Avoid filling tanks using unsuitable containers or inappropriate pressurised fuel delivery systems which may cause considerable spillage.
2. In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which can be harmful to your health.
3. Modern oils contain additives. Do not burn contaminated fuels and/or waste oils in ordinary heating systems.
4. 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.
5. 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 safely.
6. Do not open the air-conditioning system yourself. It contains gases which should not be released into the atmosphere. Your dealer or air conditioning specialist has a special extractor for this purpose and will have to recharge the system anyway.
7. Repair any leaks or defects in the engine cooling or hydraulic system immediately.
8. Do not increase the pressure in a pressurised circuit as this may lead to the components exploding.
9. Protect hoses during welding as penetrating weld splatter may burn a hole or weaken them, causing the loss of oils, coolant, etc.

Torque [9696959]

Minimum hardware tightening torques for normal assembly applications unless otherwise stated

NOTICE: Shown below is the suggested initial torque tightening sequences for general applications, tighten in sequence from item 1 through to the last item of the hardware.



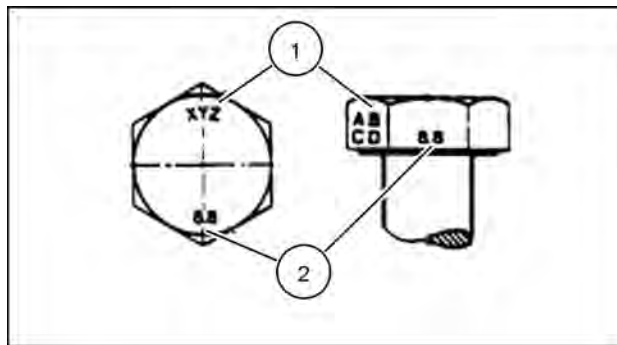
df5019-1 1

Imperial hardware

Nominal Size	SAE GRADE 2 Unplated or Silver plated	SAE GRADE 2 plated w/ZnCr GOLD	SAE GRADE 5 Unplated or Silver plated	SAE GRADE 5 plated w/ZnCr GOLD	SAE GRADE 8 Unplated or Silver plated	SAE GRADE 8 plated w/ZnCr GOLD	LOCK-NUTS GR.B w/GR5 BOLT	LOCK-NUTS GR.B w/GR8 BOLT
1/4	6.2 Nm 55 lb in	8.1 Nm 72 lb in	9.7 Nm 86 lb in	13 Nm 112 lb in	14 Nm 121 lb in	18 Nm 157 lb in	6.9 Nm 61 lb in	9.8 Nm 86 lb in
5/16	13 Nm 115 lb in	17 Nm 149 lb in	20 Nm 178 lb in	26 Nm 229 lb in	28 Nm 250 lb in	37 Nm 324 lb in	14 Nm 125 lb in	20 Nm 176 lb in
3/8	23 Nm 17 lb ft	30 Nm 22 lb ft	35 Nm 26 lb ft	46 Nm 34 lb ft	50 Nm 37 lb ft	65 Nm 48 lb ft	26 Nm 19 lb ft	35 Nm 26 lb ft
7/16	37 Nm 27 lb ft	47 Nm 35 lb ft	57 Nm 42 lb ft	73 Nm 54 lb ft	80 Nm 59 lb ft	104 Nm 77 lb ft	41 Nm 30 lb ft	57 Nm 42 lb ft
1/2	27 Nm 42 lb ft	73 Nm 54 lb ft	87 Nm 64 lb ft	113 Nm 83 lb ft	123 Nm 91 lb ft	159 Nm 117 lb ft	61 Nm 45 lb ft	88 Nm 64 lb ft
9/16	81 Nm 60 lb ft	104 Nm 77 lb ft	125 Nm 92 lb ft	163 Nm 120 lb ft	176 Nm 130 lb ft	229 Nm 169 lb ft	88 Nm 65 lb ft	125 Nm 92 lb ft
5/8	112 Nm 83 lb ft	145 Nm 107 lb ft	174 Nm 128 lb ft	224 Nm 165 lb ft	244 Nm 180 lb ft	316 Nm 233 lb ft	122 Nm 90 lb ft	172 Nm 127 lb ft
3/4	198 Nm 146 lb ft	256 Nm 189 lb ft	306 Nm 226 lb ft	397 Nm 293 lb ft	432 Nm 319 lb ft	560 Nm 413 lb ft	217 Nm 160 lb ft	305 Nm 226 lb ft
7/8	193 Nm 142 lb ft	248 Nm 183 lb ft	495 Nm 365 lb ft	641 Nm 473 lb ft	698 Nm 515 lb ft	904 Nm 667 lb ft	350 Nm 258 lb ft	494 Nm 364 lb ft
1.0	289 Nm 213 lb ft	373 Nm 275 lb ft	742 Nm 547 lb ft	960 Nm 708 lb ft	1048 Nm 773 lb ft	1356 Nm 1000 lb ft	523 Nm 386 lb ft	739 Nm 545 lb ft

Metric hardware

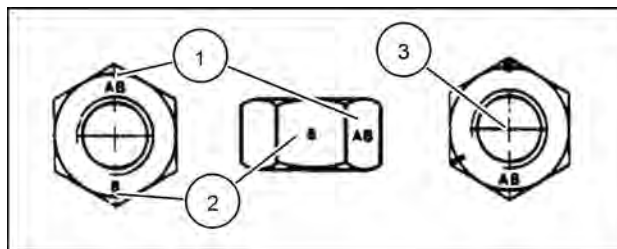
Nominal Size	CLASS 5.8 UNPLATED	CLASS 5.8 UNPLATED	CLASS 8.8 UNPLATED	CLASS 8.8 UNPLATED	CLASS 10.9 UNPLATED	CLASS 10.9 UNPLATED	LOCKNUT CL.8 w/CL8.8 BOLT
M4	1.7 Nm 15 lb in	2.2 Nm 19 lb in	2.6 Nm 23 lb in	3.4 Nm 30 lb in	3.7 Nm 33 lb in	4.8 Nm 42 lb in	1.8 Nm 16 lb in
M6	5.8 Nm 51 lb in	7.6 Nm 67 lb in	8.9 Nm 79 lb in	12 Nm 102 lb in	13 Nm 115 lb in	17 Nm 150 lb in	6.3 Nm 56 lb in
M8	14 Nm 124 lb in	18 Nm 159 lb in	22 Nm 195 lb in	28 Nm 248 lb in	31 Nm 274 lb in	40 Nm 354 lb in	15 Nm 133 lb in
M10	28 Nm 21 lb ft	36 Nm 27 lb ft	43 Nm 32 lb ft	56 Nm 41 lb ft	61 Nm 45 lb ft	79 Nm 58 lb ft	30 Nm 22 lb ft
M12	49 Nm 36 lb ft	63 Nm 46 lb ft	75 Nm 55 lb ft	97 Nm 72 lb ft	107 Nm 79 lb ft	138 Nm 102 lb ft	53 Nm 39 lb ft
M16	121 Nm 89 lb ft	158 Nm 117 lb ft	186 Nm 137 lb ft	240 Nm 177 lb ft	266 Nm 196 lb ft	344 Nm 254 lb ft	131 Nm 97 lb ft
M20	237 Nm 175 lb ft	307 Nm 107 lb ft	375 Nm 277 lb ft	485 Nm 358 lb ft	519 Nm 383 lb ft	671 Nm 495 lb ft	265 Nm 195 lb ft
M24	411 Nm 303 lb ft	531 Nm 392 lb ft	648 Nm 478 lb ft	839 Nm 619 lb ft	897 Nm 662 lb ft	1160 Nm 855 lb ft	458 Nm 338 lb ft



20083680 2

Identification - Hexagon cap screw and carriage bolts classes 5.6 and onwards

- 1. Manufacturers identification
- 2. Property class

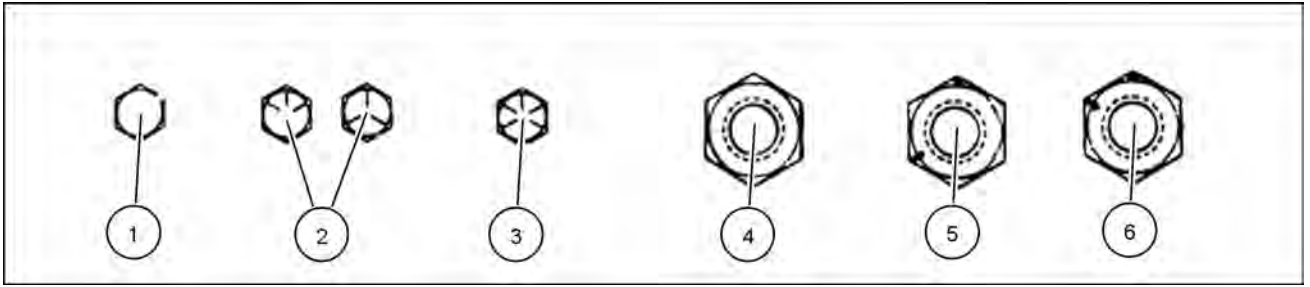


20083681 3

Identification - Hexagonal nuts and locknuts classes 05 onwards

- 1. Manufacturers identification
- 2. Property class
- 3. Clock marking

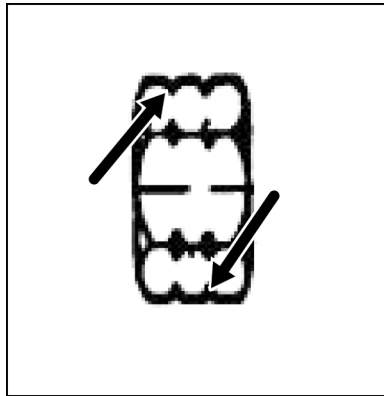
INTRODUCTION



20083682 4

Identification - Cap screws and carriage bolts

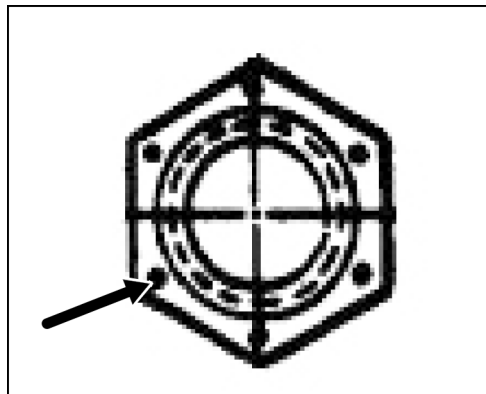
- | | |
|-------------------------|-------------------------|
| 1. SAE grade 2 | 2. SAE grade 5 |
| 3. SAE grade 8 | 4. Regular nuts |
| 5. SAE grade 5 hex nuts | 6. SAE grade 8 hex nuts |



20083683 5

Locknuts - grade identification

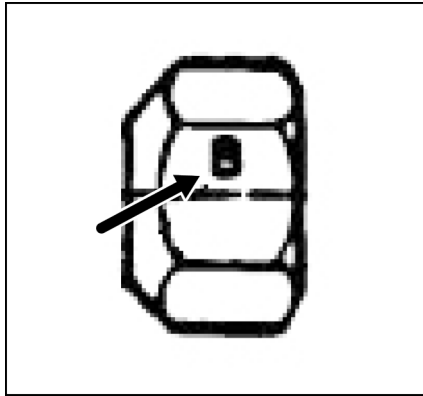
- | | |
|---------------------------------------|-------------------------------------|
| Grade A : no notches | Grade B : one circumferential notch |
| Grade C : two circumferential notches | |



20083684 6

Locknuts - grade identification

- | | |
|---------------------|-----------------------|
| Grade A : no marks | Grade B : three marks |
| Grade C : six marks | |



20083685 7

Locknuts - grade identification

Grade A : no marks

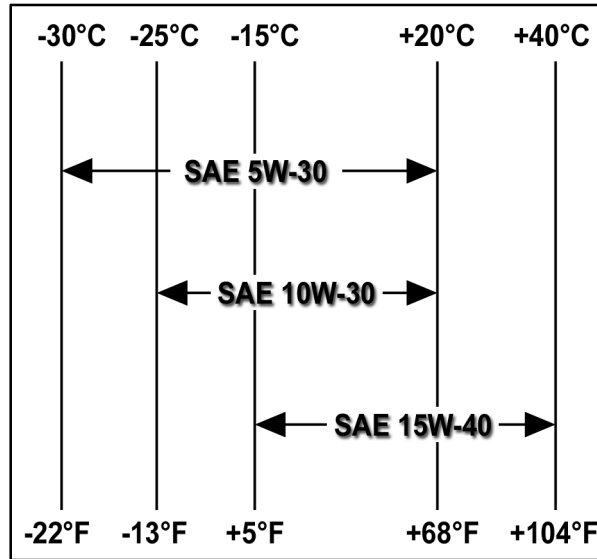
Grade C : letter C

Grade B : letter B

Consumables Lubrications and Coolants [11922313]

Lubrications

The correct engine oil viscosity grade is dependent upon ambient temperature. Refer to the chart when selecting oil for your tractor engine.



SS09J076 1

NOTE: In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable; such as the use of SAE 5W-30 in extreme low temperatures or SAE 50 in extreme high temperatures.

Biodegradable Transmission and Hydraulic Oil

A biodegradable oil has been approved for use in the transmission, 4WD front axle and hubs, and the hydraulic system of your tractor. Although the oil is 90% biodegradable, it is important to follow safe handling and disposal practices.

Biodegradable oil should not be used in conjunction with other oils. Use the following procedure to replace standard oil with biodegradable lubricant.

1. Operate the tractor until the oil that is being changed reaches a temperature greater than **60 °C (140 °F)**.
2. Stop the engine and immediately drain the oil.
3. Replace all transmission and hydraulic filters.
4. Add the biodegradable oil to the correct level and run the tractor to circulate the oil.
5. Check for oil leaks and recheck the oil level.

Sulphur in Fuel

The engine oil and filter change period are shown in the Lubrication and Maintenance in the operators manual. However, locally available fuel may have a high sulphur content, in which case the engine oil and filter change period should be adjusted as follows:

Sulphur Content %	Oil Change Period
Below 0.5	Normal
From 0.5 - 1.0	Half the normal
Above 1.0	One quarter normal

NOTE: The use of fuel with a sulphur content above 1.3% is not recommended.

Coolants

To reduce the amount of deposits and corrosion, the water used in the cooling system must comply with the following values.

Total Hardness	Chloride	Sulphate
300 parts per million	100 parts per million	100 parts per million

Using Plain water

If you reside in a country where antifreeze is not available, use clean water premixed with 5% chemical inhibitor.



Inhibitor solution is irritating to eyes and skin . It contains buffered potassium hydroxide.

B084

- Avoid contact with eyes or prolonged or repeated skin contact.
- Wear protective eyewear when using.
- In case of contact with eyes, flush with water for 15 minutes and obtain medical attention.
- Wash skin with soap and water after use.
- Keep out of reach of children.

Lubrications and Coolant Specifications

RECOMMENDED FLUIDS AND APPLICATIONS	CIH SPECIFICATION	INTERNATIONAL SPECIFICATION
ENGINE OIL AKCELA NO. 1 ENGINE OIL 15W-40 AKCELA NO. 1 ENGINE OIL 10W-30	MS 1121	API CI-4, ACEA E7
TRANSMISSION, REAR AXLE AND HYDRAULIC SYSTEM OIL AKCELA NEXPLORE	MAT 3525	API GL4, ISO VG32/46, M2C 134D
FRONT AXLE (Axle and Hubs) AKCELA NEXPLORE		
FRONT P.T.O GEARBOX OIL AKCELA NEXPLORE		
ENGINE RADIATOR COOLANT AKCELA PREMIUM ANTI-FREEZE (mixed with 50% of water)	MS 1710	Ethylene Glycol
BRAKE OIL AKCELA LHM FLUID	n/a	ISO 7308
AIR CONDITIONING COMPRESSOR OIL Low Viscosity Oil SP10	n/a	PAG-E13, ISO100 Viscosity
GREASE FITTINGS AND BEARINGS AKCELA MULTI-PURPOSE GREASE 251H EP	251H EP	NLGI2, Li-Ca

Regarding filling quantity - see **Capacities ()**

Capacities [16227161]

MAXXUM / MAXXUM Multicontroller							
UNIT	100	110	120	130	115	125	140
FUEL TANK	176 l (46.5 US gal)			250 l (66 US gal)			
COOLING SYSTEM (with cab) *) only for North America MAXXUM 100, 110 and 115	25 l (6.6 US gal) *23 l (6.1 US gal)						
COOLING SYSTEM (less cab)	21 l (5.5 US gal)	n/a		21 l (5.5 US gal)	23 l (6.1 US gal)	n/a	
ENGINE (including filter)	10 l (2.64 US gal)			15 l (3.96 US gal)			
TRANSMISSION / REAR AXLE							
(with 12x12, Light Duty axle)	58 l (15.3 US gal)	n/a		58 l (15.3 US gal)	n/a		
(with 12x12, Heavy Duty axle)	65 l (17.2 US gal)	n/a		65 l (17.2 US gal)	n/a		
(with 24x24, Light Duty axle)	58.5 l (15.5 US gal)	n/a		58.5 l (15.5 US gal)	n/a		
(with 24x24, Heavy Duty axle)	65.5 l (17.3 US gal)	n/a		65.5 l (17.3 US gal)			
(with 16x16, Light Duty axle)	55.5 l (14.7 US gal)	n/a		55.5 l (14.7 US gal)	n/a		
(with 16x16, Heavy Duty axle)	62 l (16.4 US gal)						
4WD FRONT AXLE - DIFFERENTIAL	9 l (2.38 US gal)						
4WD FRONT HUBS (Class 3 Axle - less breaks)	1.25 l 0.33 US gal)						
4WD FRONT HUBS (Class 3 Axle - with breaks)	3 l (0.79 US gal)						
4WD FRONT HUBS (Class 4 Axle - less breaks)	3.6 l (0.95 US gal)						
4WD FRONT HUBS (Class 4 Axle - with breaks)	4 l (1.06 US gal)						



SERVICE MANUAL

HYDRAULIC, PNEUMATIC, ELECTRICAL, ELECTRONIC SYSTEMS



MAXXUM 100 , MAXXUM 110 Multicontroller , MAXXUM 110 , MAXXUM 115 Multicontroller , MAXXUM 115 , MAXXUM 120 Multicontroller , MAXXUM 120 , MAXXUM 125 Multicontroller , MAXXUM 125 , MAXXUM 130 Multicontroller , MAXXUM 130 , MAXXUM 140 Multicontroller , MAXXUM 140

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PRIMARY HYDRAULIC POWER SYSTEM Open center mechanical remote valve	A.10.D
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MAXXUM 100 , MAXXUM 110 Multicontroller , MAXXUM 110 , MAXXUM 115 Multicontroller , MAXXUM 115 , MAXXUM 120 Multicontroller , MAXXUM 120 , MAXXUM 125 Multicontroller , MAXXUM 125 , MAXXUM 130 Multicontroller , MAXXUM 130 , MAXXUM 140 Multicontroller , MAXXUM 140	
ELECTRICAL POWER SYSTEM	A.30.A
MAXXUM 100 , MAXXUM 110 Multicontroller [Z7BE50001 - Z9BE60000] , MAXXUM 110 , MAXXUM 115 Multicontroller [Z7BE50001 - Z9BE60000] , MAXXUM 115 , MAXXUM 120 Multicontroller [Z7BE50001 - Z9BE60000] , MAXXUM 120 , MAXXUM 125 Multicontroller [Z7BE50001 - Z9BE60000] , MAXXUM 125 , MAXXUM 130 Multicontroller [Z7BE50001 - Z9BE60000] , MAXXUM 130 , MAXXUM 140 Multicontroller [Z7BE50001 - Z9BE60000] , MAXXUM 140	
ELECTRICAL POWER SYSTEM	A.30.A
MAXXUM 110 Multicontroller [Z9BE40001 -] , MAXXUM 110 Multicontroller [Z9BE60001 -] , MAXXUM 115 Multicontroller [Z9BE40001 -] , MAXXUM 115 Multicontroller [Z9BE60001 -] , MAXXUM 120 Multicontroller [Z9BE40001 -] , MAXXUM 120 Multicontroller [Z9BE60001 -] , MAXXUM 125 Multicontroller [Z9BE40001 -] , MAXXUM 125 Multicontroller [Z9BE60001 -] , MAXXUM 130 Multicontroller [Z9BE40001 -] , MAXXUM 130 Multicontroller [Z9BE60001 -] , MAXXUM 140 Multicontroller [Z9BE40001 -] , MAXXUM 140 Multicontroller [Z9BE60001 -]	
ELECTRONIC SYSTEM	A.50.A
MAXXUM 100 , MAXXUM 110 Multicontroller , MAXXUM 110 , MAXXUM 115 Multicontroller , MAXXUM 115 , MAXXUM 120 Multicontroller , MAXXUM 120 , MAXXUM 125 Multicontroller , MAXXUM 125 , MAXXUM 130 Multicontroller , MAXXUM 130 , MAXXUM 140 Multicontroller , MAXXUM 140	

FAULT CODES **A.50.A**
MAXXUM 100 , MAXXUM 110 Multicontroller , MAXXUM 110 , MAXXUM 115 Multicontroller , MAXXUM 115 , MAXXUM 120 Multicontroller
, MAXXUM 120 , MAXXUM 125 Multicontroller , MAXXUM 125 , MAXXUM 130 Multicontroller , MAXXUM 130 , MAXXUM 140
Multicontroller , MAXXUM 140



HYDRAULIC, PNEUMATIC, ELECTRICAL, ELECTRONIC SYSTEMS - A

PRIMARY HYDRAULIC POWER SYSTEM - 10.A

**MAXXUM 100 , MAXXUM 110 Multicontroller , MAXXUM 110 , MAXXUM 115
Multicontroller , MAXXUM 115 , MAXXUM 120 Multicontroller , MAXXUM 120 ,
MAXXUM 125 Multicontroller , MAXXUM 125 , MAXXUM 130 Multicontroller ,
MAXXUM 130 , MAXXUM 140 Multicontroller , MAXXUM 140**

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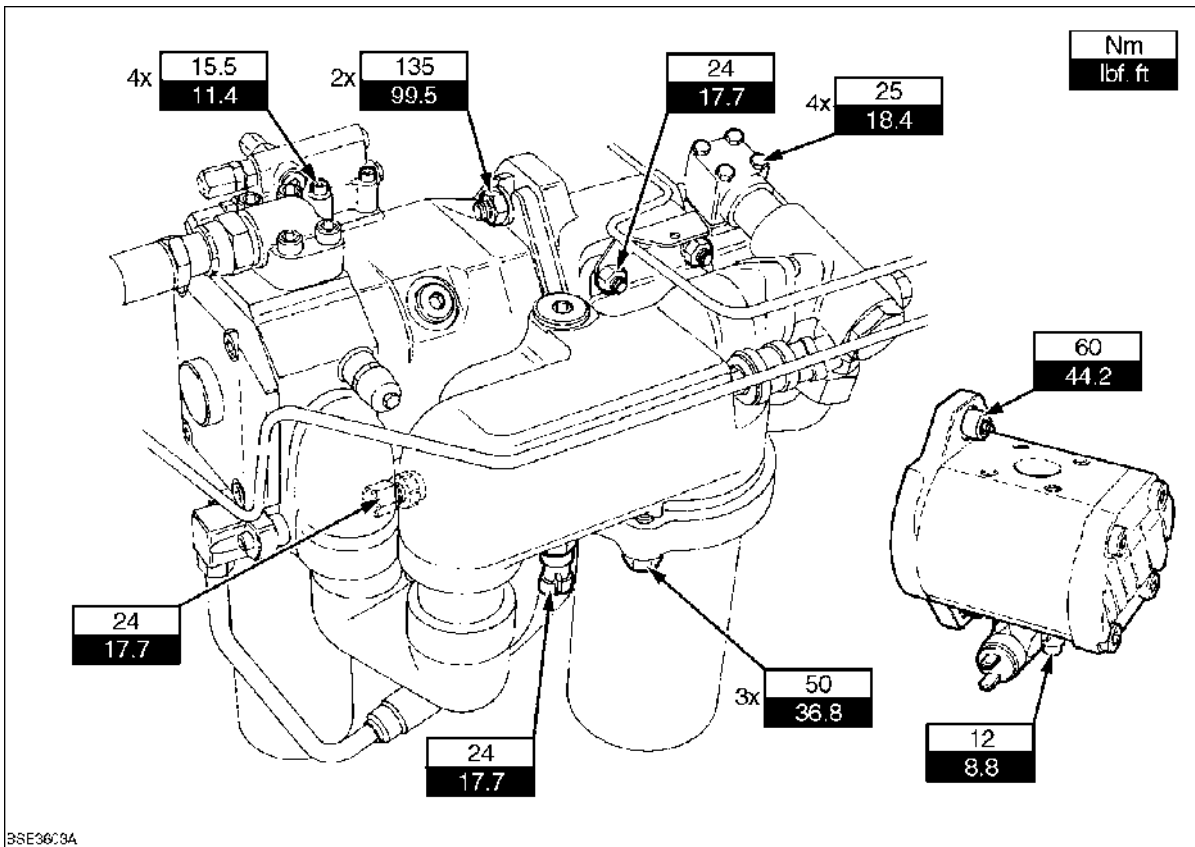
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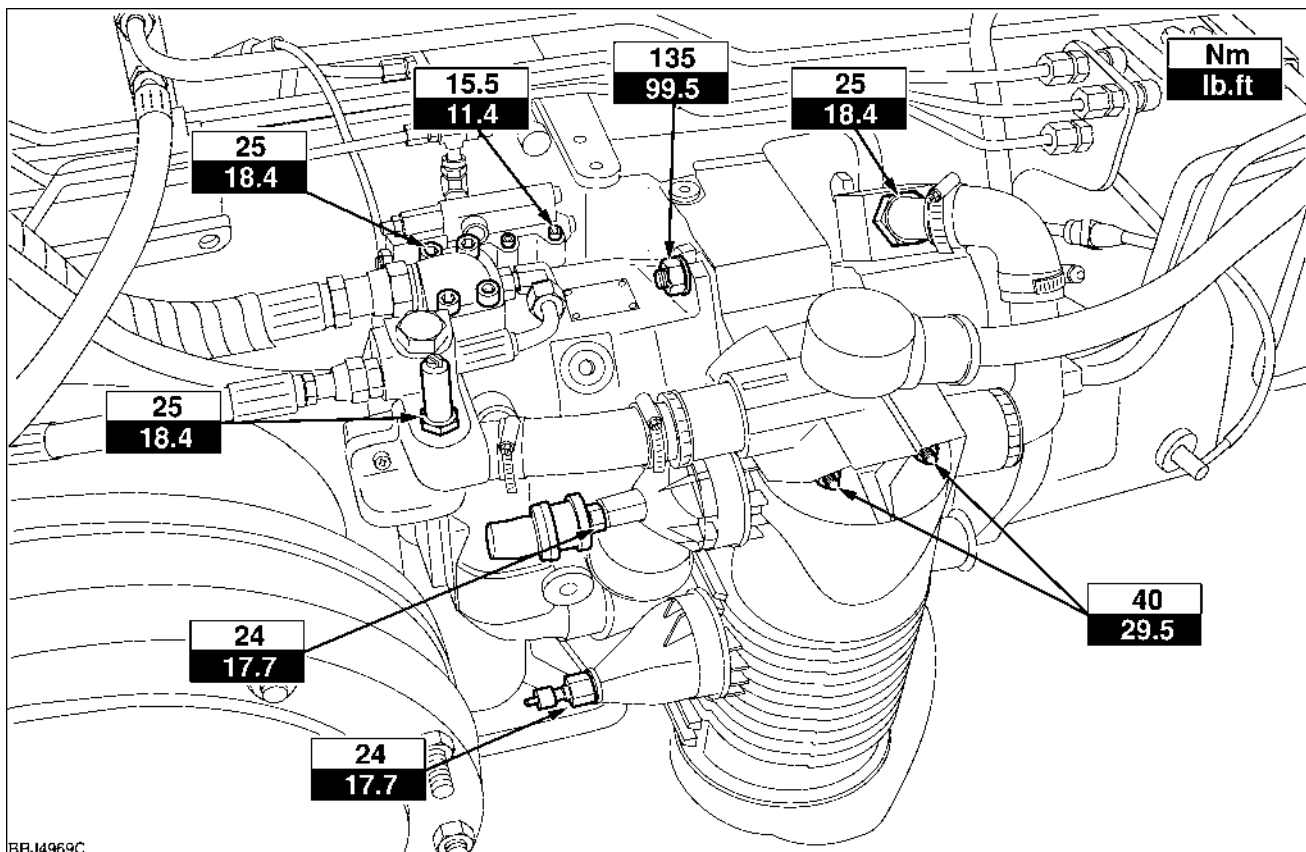
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PRIMARY HYDRAULIC POWER SYSTEM - Torque [6426649]



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BRJ4969C 2

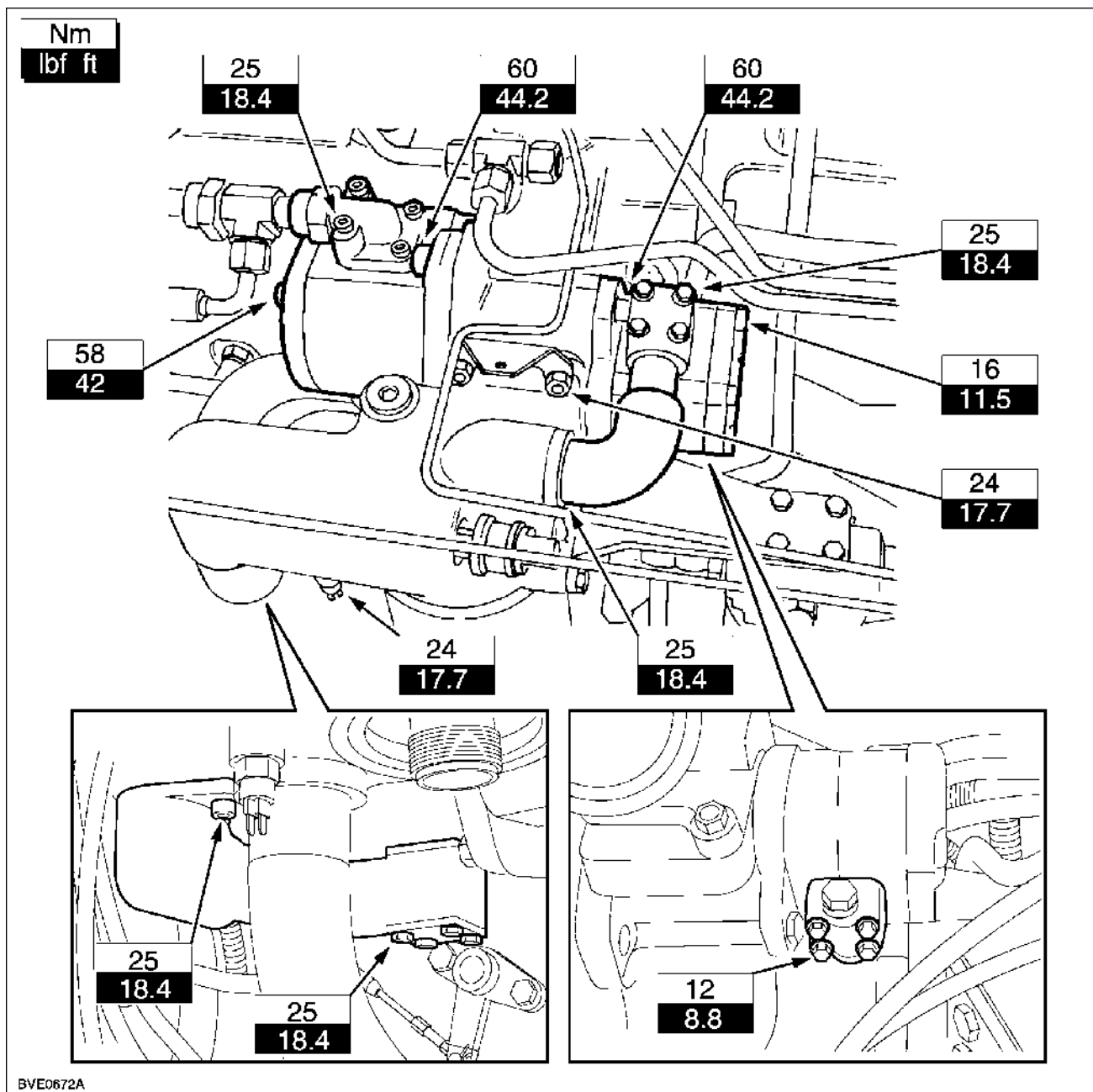
PRIMARY HYDRAULIC POWER SYSTEM - Special tools [6426667]

DESCRIPTION	PART NUMBER
Tee adaptor 11/16 ORFS female x 11/16 ORFS male x 7/16 UNF female	380000570*
Adaptor M10 banjo x 7/16 UNF female	380000572*
Adaptor 7/16 UNF female x M12 x 1.5p male	380000577*
Adaptor 7/16 UNF male	380000999
Adaptor M14 banjo x M14 x 1.5p female	380000579*
Tee adaptor 7/16 UNF female x 1/4 BSP hose tail x 1/2 hose	380000580*
7/16 UNF male Quick release adaptor	380000492
Adaptor M10 x 1.0p x 7/16 UNF female	380000493
Hand pump	380000215
Lift relief valve fitting	380000217
90 quick release fitting with adaptor M8 x 1.0 male	380001146.
Blanking Cap 11/16 ORFS	380000599*
Pressure Gauge 0–10 bar	380000551#
Pressure Gauge 0–27 bar	3800001145
Pressure Gauge 0–40 bar (5 off)	380000552#
Pressure Gauge 0–250 bar	380000553 #
Remote valve coupling	380000554#
Quick release adaptor	380000543
Pressure gauge hose	380000545#
1/8 NPT fitting to attach hose 292246 to gauge	380000544#
T–adaptor 13/16 ORFS female x 13/16 ORFS male x 7/16 UNF female	380000842.
Adaptor M10 x 1.0p x 7/16 JIC male (enables use of gauges with 7/16 JIC hoses if used)	380000494
diagnostic switch	380000488
Bypass connector	380001147.
Bypass connector	380000561
Trailer brake fitting	380000550#
Open Centre Lift Pressure Regulating Valve Adjusting Tool	380000231
Flow Meter 120 l/min)	
* Part of hydraulic adaptor kit	
380000464	
# Part of hydraulic pressure test kit	
380000240	
Remote valve check valve removal tool	380002720
Charge pump pressure test adaptor	380200015
Lift ram pressure test tee piece 13/16 ORFS	380200012
Oil cooler pressure test adaptor	380200006
Hydraulic pump pressure test adaptor	380200090
Lube pressure test adaptor	380200091

Hydraulic pump Fixed displacement pump - General specification [6427344]

Filter Type Location	Full-flow, screw-on cartridge Pump intake, on the R.H. side of the rear axle housing
PUMP Type Location Manufacturer Drive Corresponding rated output l/min (US gallon/min)	Gear type, with oil suction from transmission casing On the R.H. side of the rear axle housing BOSCH Driven by PTO input shaft 80 21.1

Hydraulic pump Fixed displacement pump - Torque [6427391]

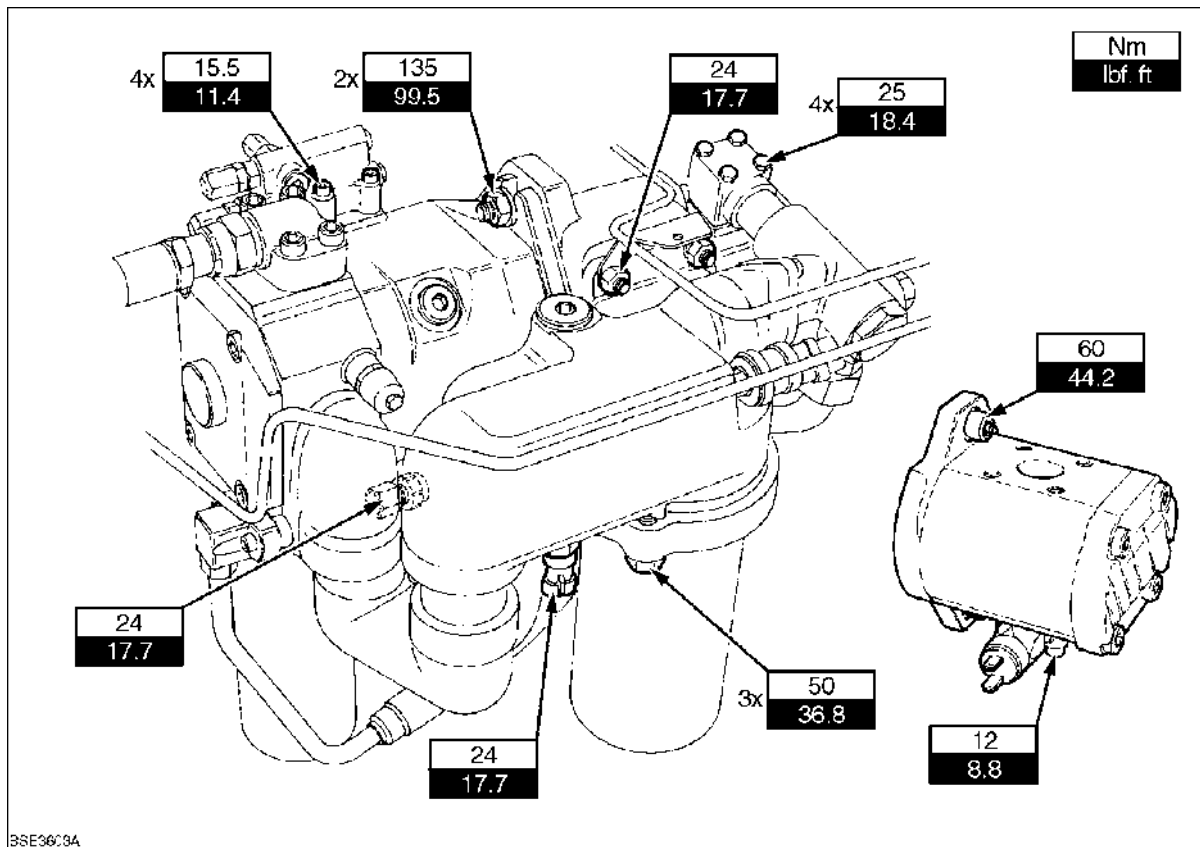


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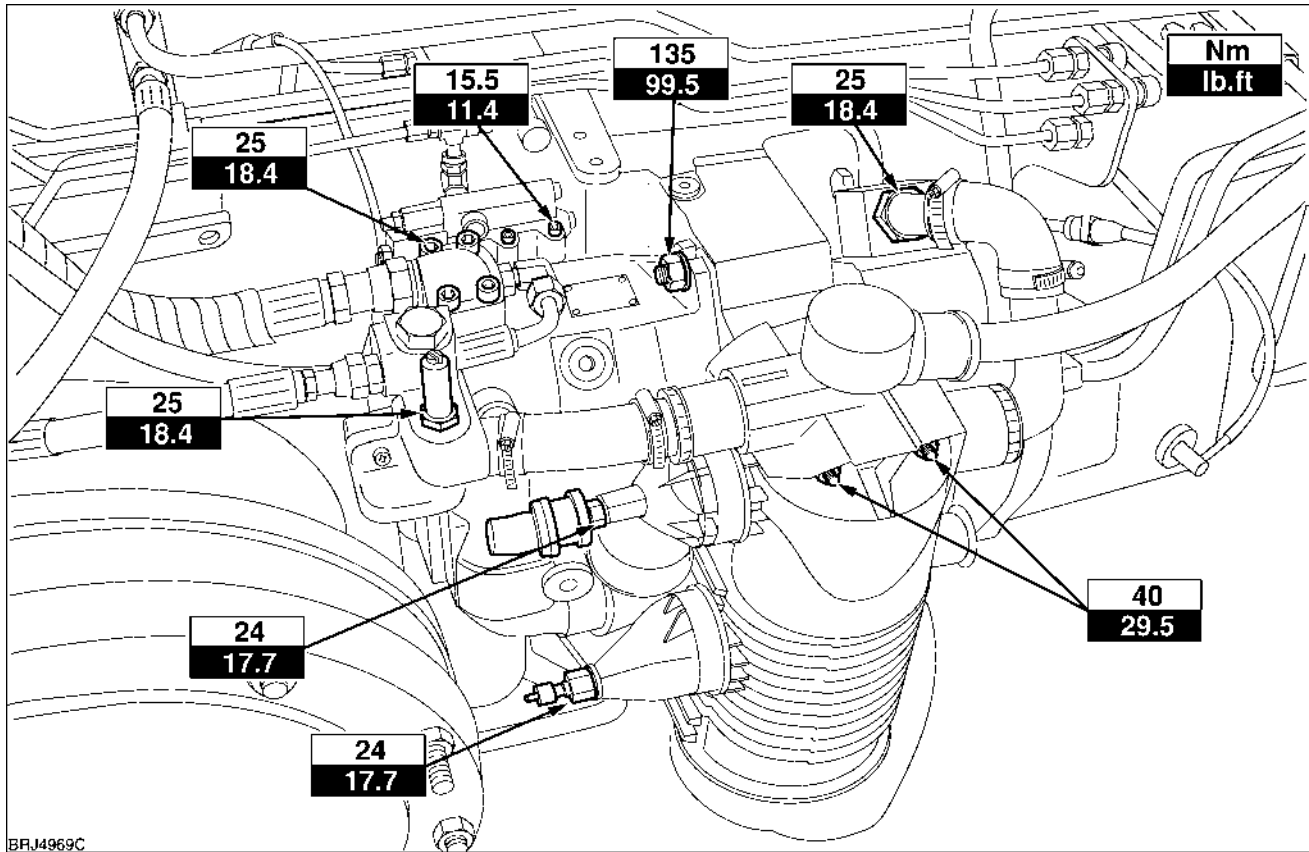
Hydraulic pump Variable displacement pump - General specification [6429501]

Type	Variable Displacement Piston Pump (Swash Plate Controlled)
Rotation	Clockwise
Minimum Pump Speed	800 RPM
Maximum Pump Speed	2662 RPM
Pump Speed @ 2200 RPM (enginespeed)	2514 RPM
Displacement	45 cm³/rev (2.75 in³/rev)
Output (new pump) @ 2200 RPM (enginespeed)	113 l/min (24.9 UK gpm) 29.8 US gpm
Standby Pressure	23 bar +/- 1 (334 psi +/- 14.5)
Maximum System Pressure	210 bar +/- 5 (3045 psi +/- 72.5)
Spike Clipper Relief Valve	245 bar +/- 5 (3553 psi +/- 72.5)
Peak Pressure	315 bar (4568 psi)

Hydraulic pump Variable displacement pump - Torque [6429483]



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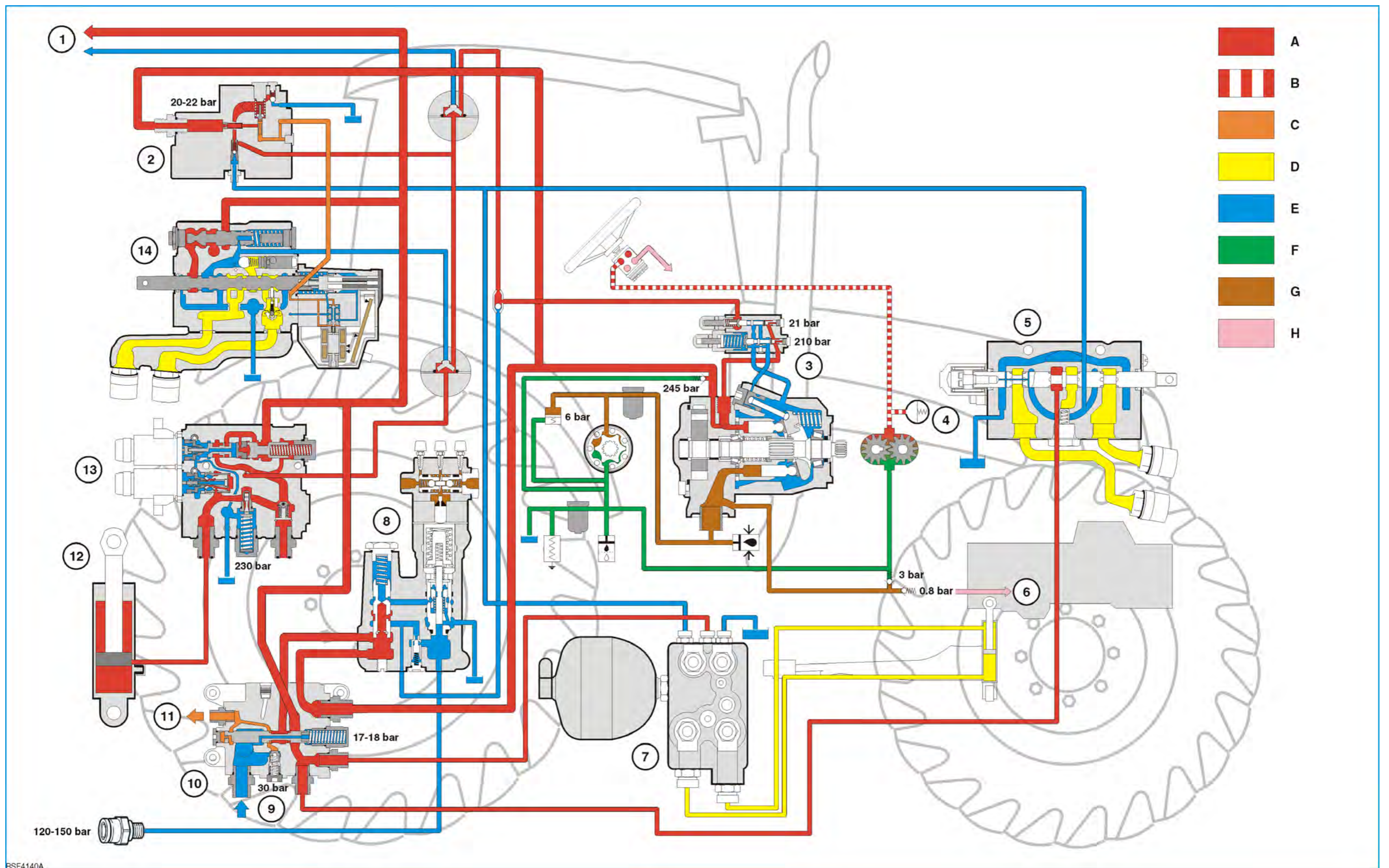
Charge pump - General specification [6429604]

Type	Rotor Pump
Displacement	57 cm³/rev (3.48 in³/rev)
Output (new pump) @ 2200 RPM (enginespeed)	143 l/min (31.5 UK gpm) 37.8 US gpm
Charge Pressure Filter Dump Valve	Open @ 6 bar (87 psi)
Charge Pressure Limiting Valve	Open @ 1.72 bar (24.9 psi)
Charge Pressure Switch (making charge pressure warning light flash)	Close @ 0.55 - 0.82 bar (8 - 11.9 psi)

**PRIMARY HYDRAULIC POWER SYSTEM - Overview - Variable
Displacement Pump High Pressure Hydraulic Circuit 16 x 16
Models. [6433132]**

Variable Displacement Pump High Pressure Hydraulic Circuit 16 x 16 Models

1 To Additional Remote Control Valves	2 End Plate With Pilot Line Pressure Reducing Valve and Load Sensing Shuttle Valve
3 Variable Displacement Hydraulic Pump	4 Low Pressure Switch
5 Mid Mounted Remote Control Valve	6 Boosted Lubrication Oil
7 Front Suspension Control Valve	8 Trailer Brake Valve
9 Power Beyond Ports	10 Subplate with Low Pressure Compensator Valve
11 Feed to Low Pressure circuit	12 Lift Cylinder
13 Electronic Draft Control Valve	14 Electro-Hydraulic Remote Control Valve
A High Pressure Circuit Oil	B Steering Circuit
C Low Pressure Circuit Oil	D Trapped Oil
E Return To Reservoir Oil	F Suction Oil
G Charge Pump Oil	H Lubrication Oil



BSF4140A

BSF4140A 1

PRIMARY HYDRAULIC POWER SYSTEM - Static description [1703160]

The hydraulic systems can be separated into the following circuits:-

High Pressure Circuit

Hydraulic Lift Assembly.

Remote Control Valves.

Trailer Brake (Where Fitted)
Suspended Front Axle.

Front Lift (Where fitted).

Steering Circuit

Steering Motor and Cylinders

Low Pressure Circuit

Independent Power Take Off (PTO).

Differential Lock

Front Wheel Drive engagement

Transmission clutch and synchroniser engagement

Creeper engagement (Where fitted)

Front PTO (Where fitted)

50 kph engagement (Where fitted)

Lubrication Circuit

PTO Clutch Plates

Transmission Clutch Plates.

Transmission Shaft Pressure Lube
Pump Drive Gear Bearing.

Hydraulic Lift Cross Shaft

The high pressure circuit is of the 'Closed Centre Load Sensing' design on all tractor model options fed by either a Variable Displacement Pump or a Fixed Displacement Pump.

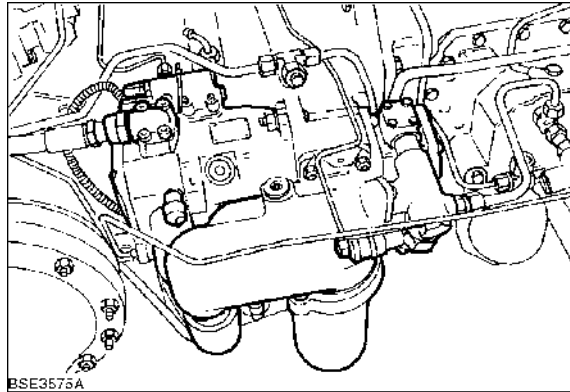
The steering, low pressure and lubrication circuits are fed by a separate fixed displacement pump via a solenoid activated lubrication block..

Hydraulic Pump/ HPL/ Remote Valve Options																							
	Less Hydraulic Trailer Brakes				With Hydraulic Trailer Brakes				Hydraulic Trailer Brake Italy														
	Fixed Disp.		Variable Disp.		Fixed Disp.		Variable Disp.		Fixed Disp.		Variable Disp.												
	MDC	EDC	MDC	EDC	MDC	EDC	MDC	EDC	MDC	EDC	MDC	EDC											
Remotes	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	
12 x 12	Y	Y							Y	Y							Y	Y					

24 x 24	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y			Y	Y		
16 x 16					Y	Y	Y	Y					Y	Y	Y	Y							Y	Y	Y	Y

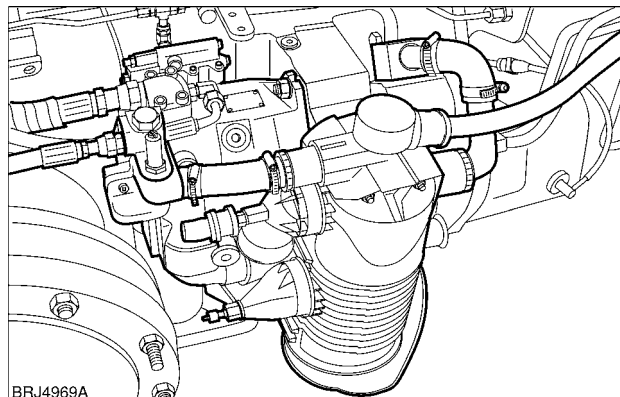
Before commencing work on a tractor it is important to identify if the tractor has a variable displacement pump or fixed displacement pumps and the type of transmission.

Figure 1 shows the variable displacement pump with a 16 x 16 Transmission.



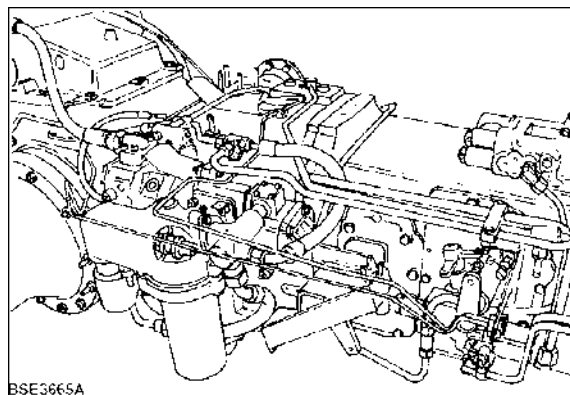
BSE3575A 1

Figure 2 shows the variable displacement pump with a 16 x 16 Transmission and ARGO hydraulic oil filter fitted to later models..



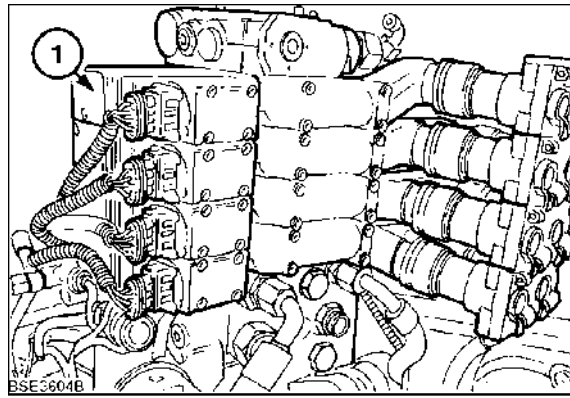
BAIL07APH323ASA 2

Figure 3 shows the fixed displacement pump with a 24 x 24 Transmission.



BSE3665A 3

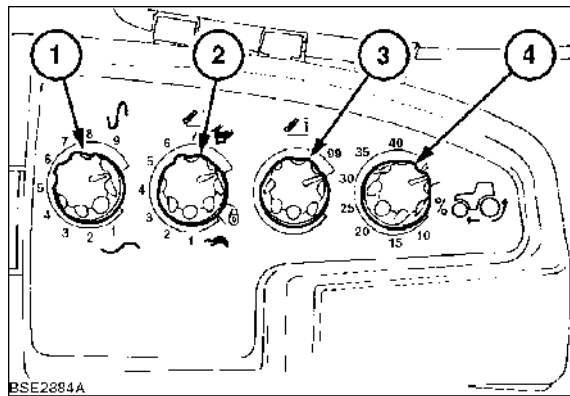
Closed centre remote valves (1) and Electronic draft control .



BSE3604B 4

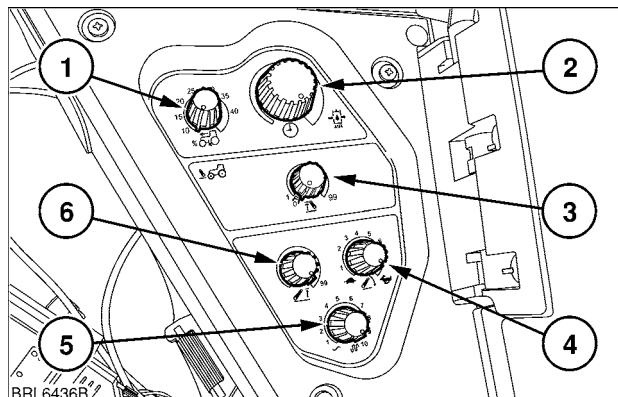
Tractors installed with the electronic draft control hydraulic lift assembly use a unique operator control panel.

- (1). Draft sensitivity control knob
- (2). Drop rate control knob
- (3). Height limit control knob
- (4). Slip limit control knob



BSE2884A 5

Maxxum Models with armrest unit from Serial No. Z9BE40001- and Z9BE60001-

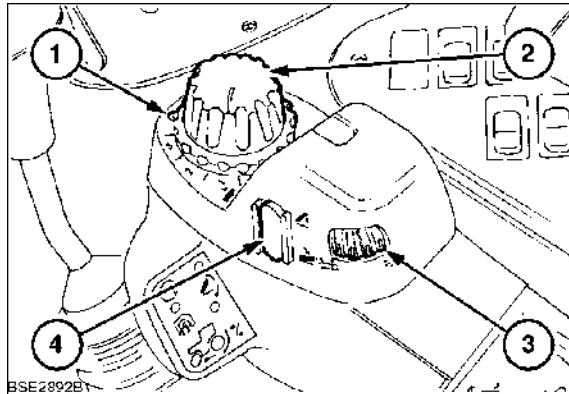


BRL6436B 6

The lift arm position control is unique to tractors with electronic draft control.

- (1). Stop adjuster thumbwheel
- (2). Stop
- (3). Position control lever
- (4). Draft loading wheel

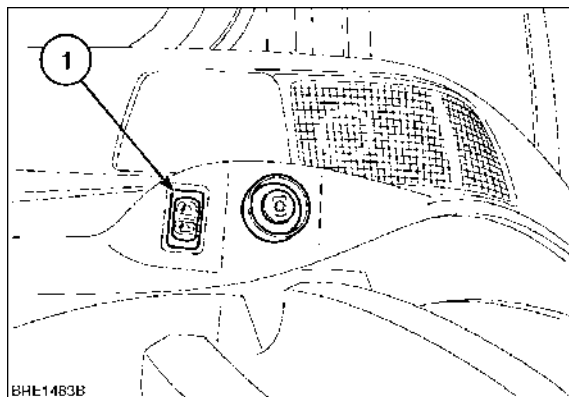
(5). Raise/lower switch



BSE2892B 7

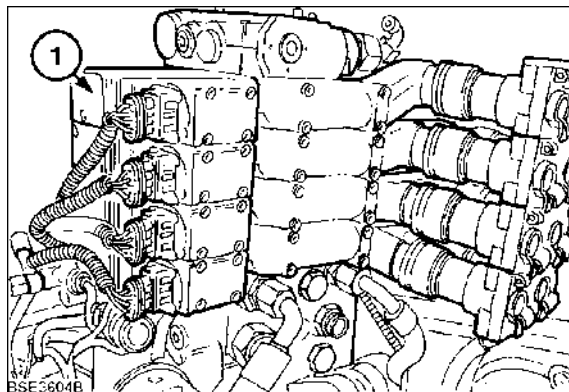
Maxxum Models with armrest unit from Serial No. Z9BE40001 and Z9BE60001

The raise and lowering functions of the electronic draft control lift system can also be operated from the rear fender switch (1).



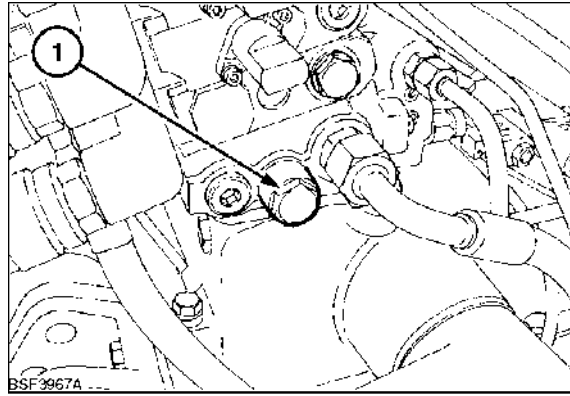
BRE1483B 8

The closed centre model tractors can also have electro-hydraulic remote valves (1).



BSE3604B 9

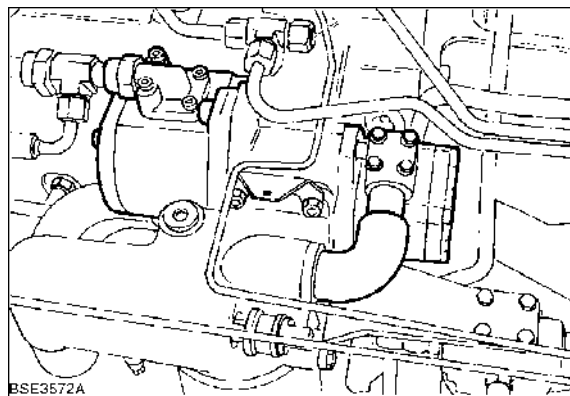
Located below the Electronic Draft Control valve (Where fitted), is the Hydraulic Power Tapping port (Power Beyond) block. This includes a priority valve (1) and also a low pressure regulating valve. This block also has a flange plate which allows the addition of a trailer brake valve.



BSF3967A_430 10

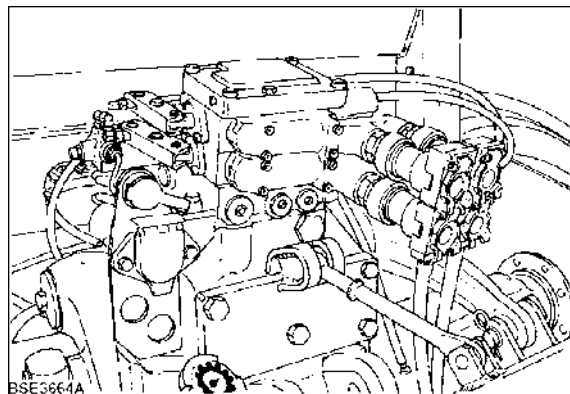
Fixed Displacement high pressure hydraulic systems can be identified from the following:-

Fixed displacement pump.



BSE3572A 11

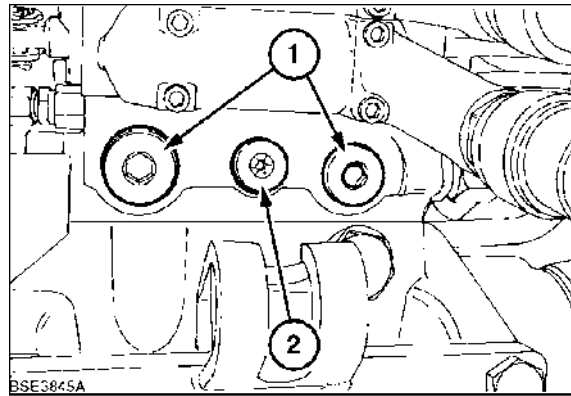
Mechanical remote control valves



BSE3664A 12

Located below the Electronic Draft Control valve (Where fitted), is the Hydraulic Power Tapping port (Power Beyond) block. This includes a priority valve and also a low pressure regulating valve. This block also has a flange plate which allows the addition of a trailer brake valve.

1. Power Beyond Ports
2. Pressure Relief Valve

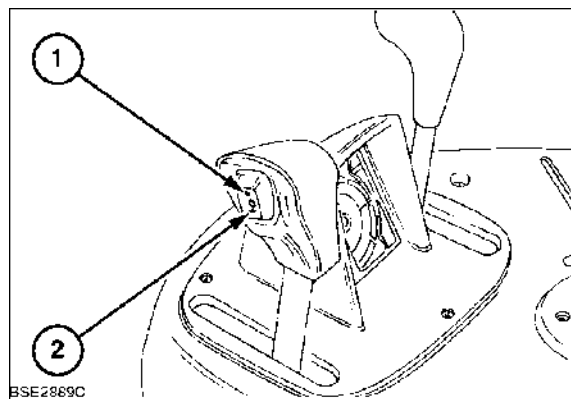


BSE3845A 13

The type of transmission installed can be identified by inspecting the transmission control lever.

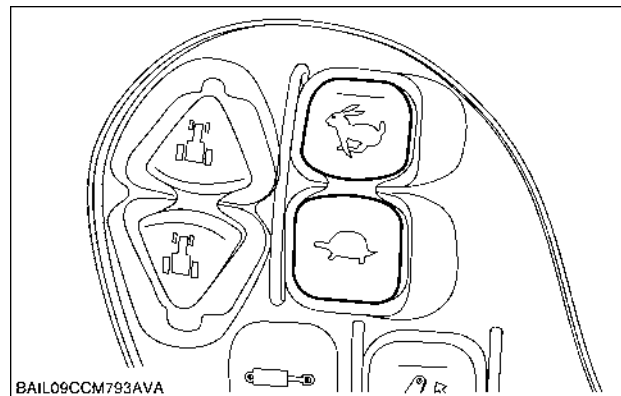
Tractors with 16 x 16 transmission have a single control lever (1) with two shift buttons. Closed centre hydraulic system only.

Figure [Invalid Reference] shows Semi-Powershift control lever..



BSE2889C_437 14

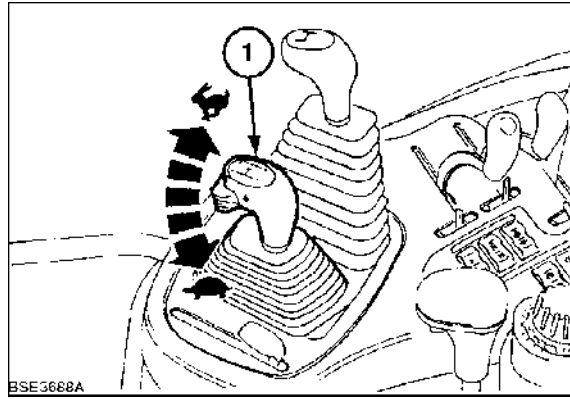
Maxxum Models with armrest unit from Serial No. Z9BE40001- and Z9BE60001-



BAIL09CCM793AVA 15

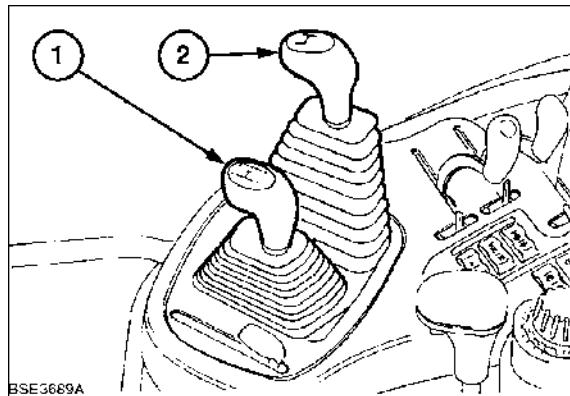
Tractors installed with 24 x 24 transmission uses two control levers. The main transmission lever (1) is provided with push buttons (2) and (3) to actuate the Dual Command function.

These tractors can use either variable displacement pump or a fixed displacement pump.



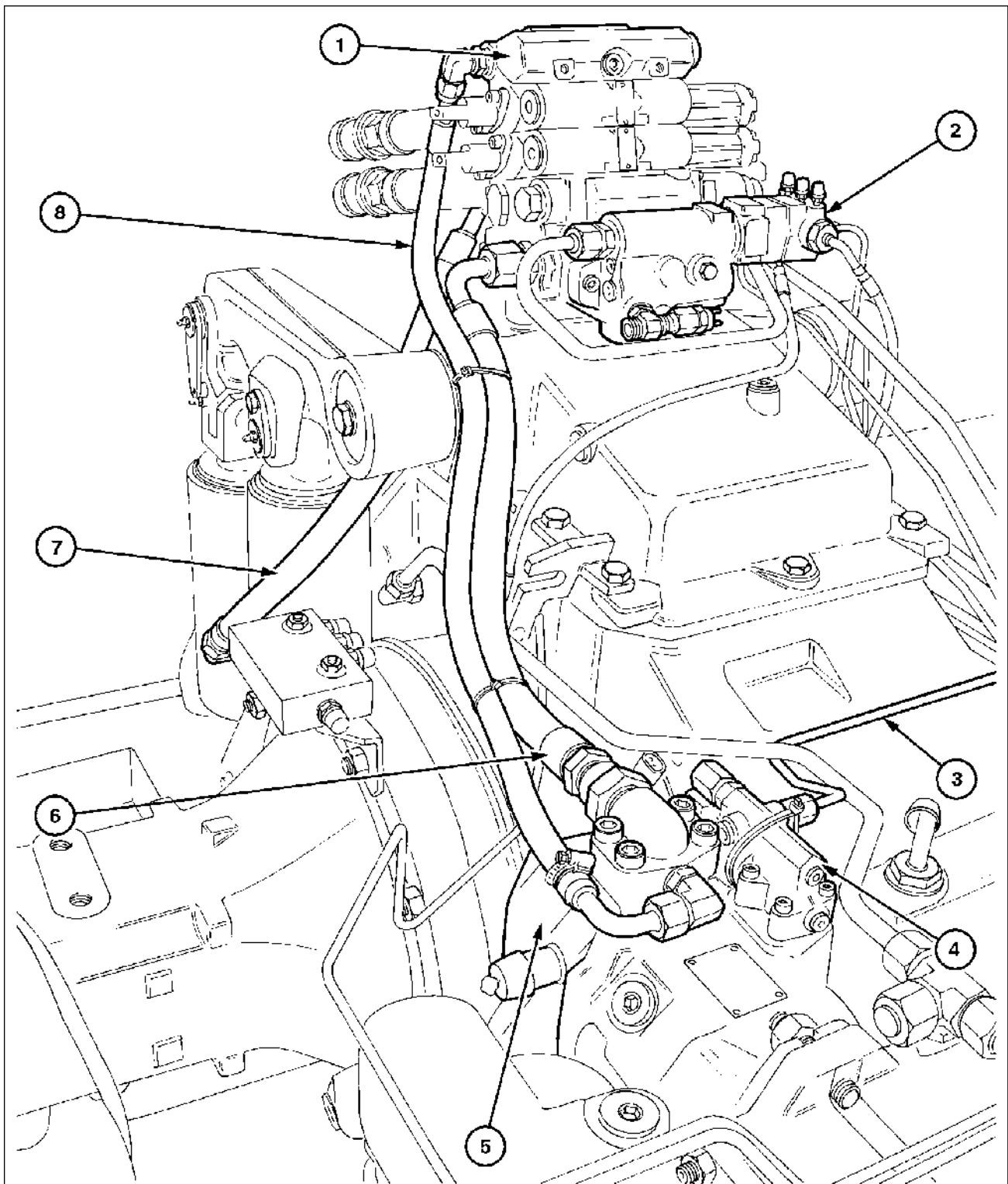
BSE3688A_438 16

Tractors installed with 12 x 12 Command transmission uses two control levers. These are the main shift lever (1) and the range lever (2).



BSE3689A_439 17

CLOSED CENTRE LOAD SENSING HIGH PRESSURE HYDRAULIC CIRCUIT



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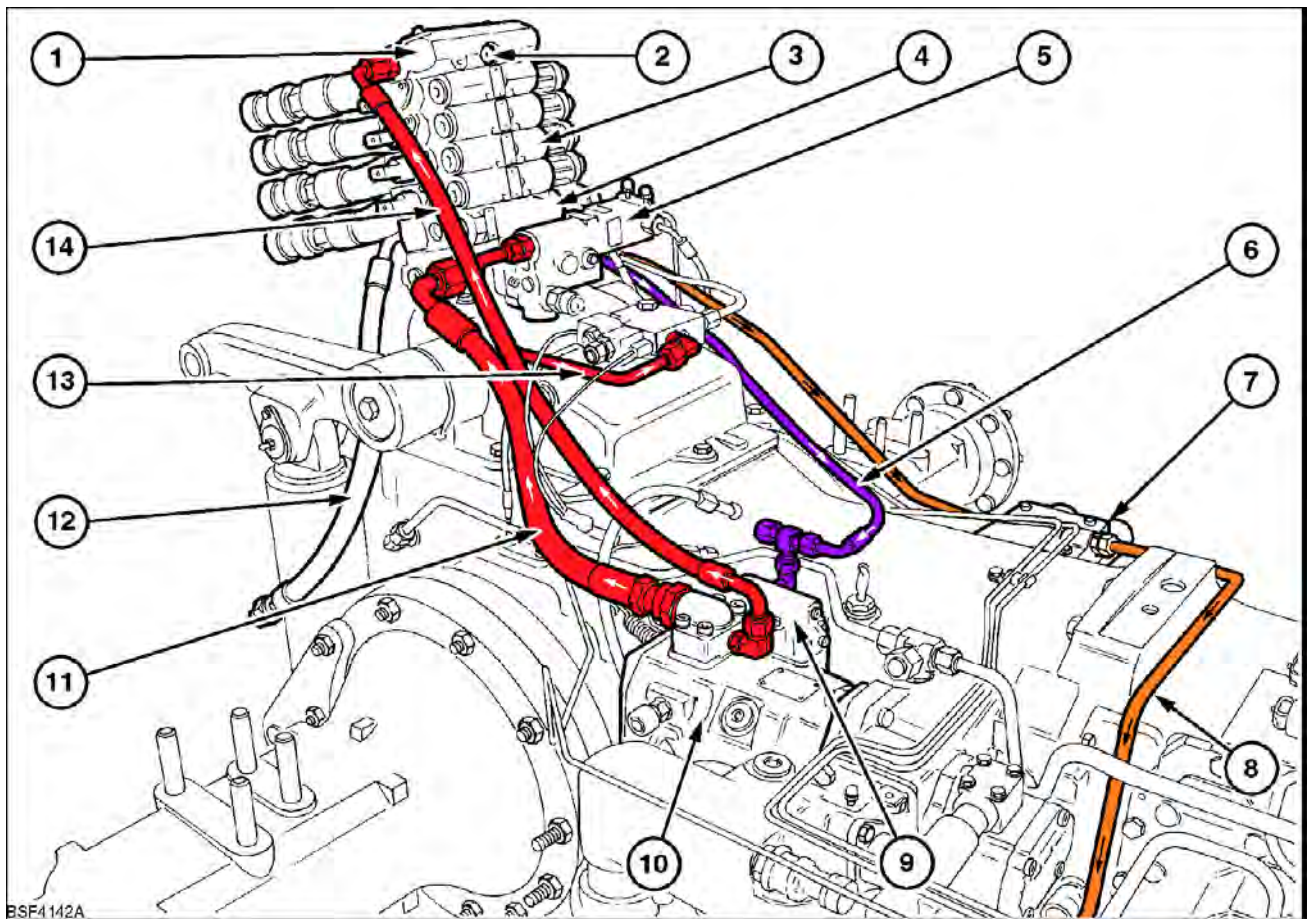
**High Pressure Circuit Components and Pipework
Tractors with Variable Flow Piston Pump**

- 1 Remote and EDC Control Valves
- 3 Load Sense Lines
- 5 Variable Flow Hydraulic Pump
- 7 To Hydraulic Lift Ram

- 2 Trailer Brake Valve
- 4 Flow and Pressure Compensator Valve
- 6 Feed to Remote Valves
- 8 Feed to Electro-Hydraulic Valve Pilot Line

The principal of operation of the closed centre load sensing high pressure hydraulic circuit with variable flow piston pump is to supply oil flow on demand. It also enables simultaneous operation of the trailer brakes, hydraulic lift, remote control valve assemblies and front axle suspension where fitted. The load sensing variable flow piston pump offers significant benefits in reducing the engine power loss that occurs in open centre systems where a high volume of oil, often far in excess of demand, is continuously pumped round the hydraulic circuit even when they are not being operated.

A fixed displacement pump (Charge Pump) serves as an initial displacement pump for the variable displacement pump. The variable displacement pump first of all supplies oil to the trailer brake valve (where fitted), the remote valves and electronic draft control valve and a pilot oil supply with lower priority. The highest load pressure is indicated to the flow and compensating valve on the pump via the load sensing line. The flow and compensator valve controls the pump pressure in such a way that it always exceeds the highest load pressure by a pre-set difference. A priority valve for low pressure circuit demand is located in the bottom subplate of the remote valve stack. Tractors fitted with Electro-hydraulic remote valves also have high pressure oil supplied from the variable displacement pump to the top plate of the remote valve stack. The oil passes through the top plate via a small filter and a pressure limiting valve (20 - 22 Bar). The oil is then directed to the pilot oil supply of the electro-hydraulic control valve.



BSF4142A 19
**High Pressure Circuit Components and Pipework
 Tractors with Variable Flow Piston Pump**

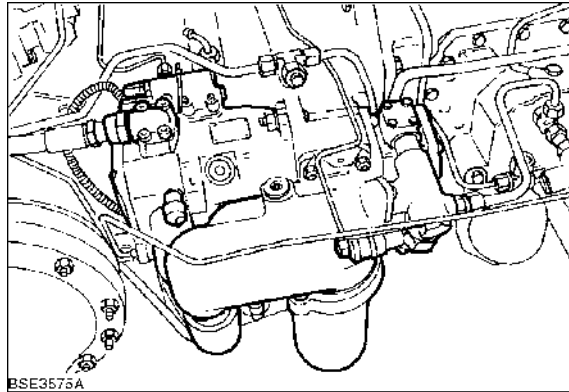
- | | |
|--|---|
| 1 End Plate | 2 Load Sensing port for Mid Mount Valve |
| 3 Electro-Hydraulic Remote Valves | 4 Electronic Draft Control Valve |
| 5 Trailer Brake Valve (Where Fitted) | 6 Load Sensing Line |
| 7 Low Pressure Circuit Distribution Manifold | 8 Low Pressure Feed |
| 9 Flow and Pressure Compensator Valve | 10 Variable Displacement Pump |
| 11 High Pressure Feed to Electro-Hydraulic Remote Valves | 12 Feed To Hydraulic Lift Cylinder |
| 13 Feed to Italian type trailer brake solenoids | 14 High Pressure Feed to Electro-Hydraulic Valve Pilot Line |

The high pressure circuit is illustrated in **PRIMARY HYDRAULIC POWER SYSTEM - Overview (A.10.A)**.

Hydraulic pump assembly.

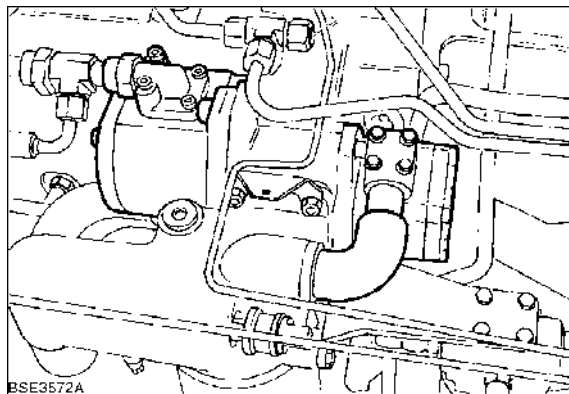
Figure 20 shows the variable displacement pump assembly.

Integral with the high pressure variable displacement pump is the load sensing valve, containing the pressure and flow compensating valves, the steering pump, the charge pressure and main system filters and various electrical switches.



BSE3575A 20

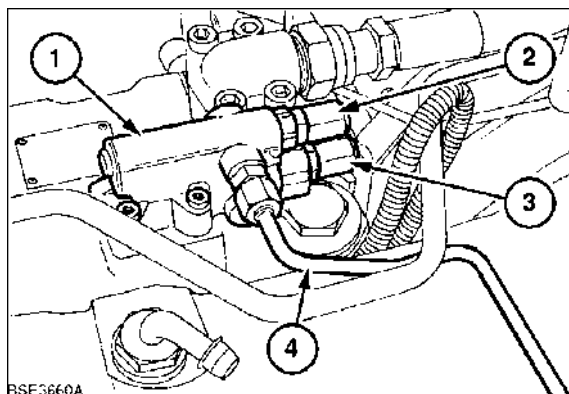
Figure 21 shows the fixed displacement pump assembly.



BSE3572A_434 21

Load sensing valve assembly (1), consists of a flow compensating valve (2) and a high pressure control valve (3). The load sensing valve receives hydraulic signals from operated components through the load sense line (4) and relays this to the pump which will adjust to satisfy the system demands.

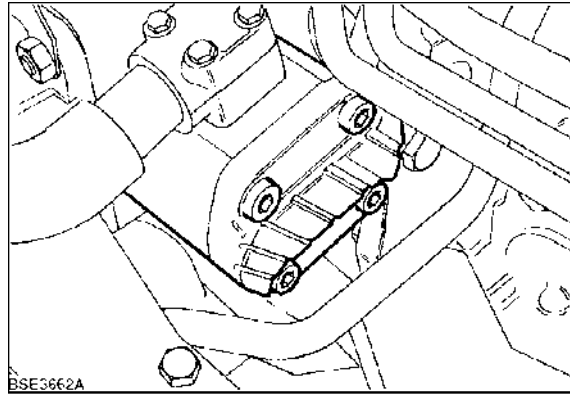
Figure 22 shows the load sense valve assembly.



BSE3660A 22

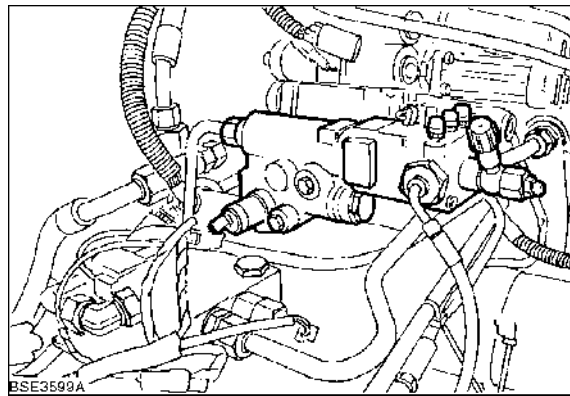
Steering pump,

The steering pump is a separate unit but still driven from the same drive gear as the main pump.



BSE3662A 23

Trailer brake valve which is located beneath the cab just in front of the hydraulic lift assembly. The valve diverts oil pressure to the trailer brakes whenever both tractor brake pedals are depressed.

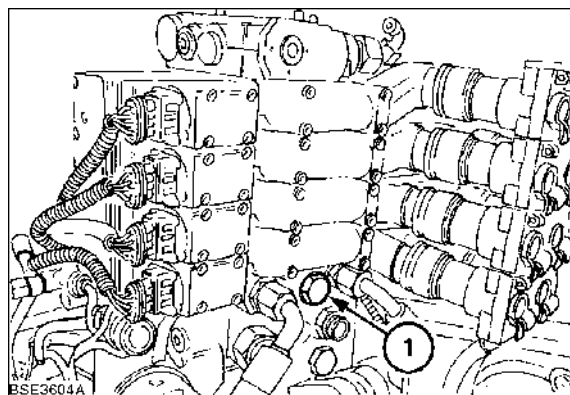


BSE3599A 24

The hydraulic lift Electronic Draft Control Valve is a stack type design mounted together with the Remote Control Valves (1) at the rear below the cab, and incorporates the safety valve for the lift cylinders

The lift cylinder safety valve protects the lift cylinder from shock loadings and limits the pressure in the cylinder to **210 - 215 bar**

The hydraulic lift control valve is a proportional solenoid operated valve, controlled by a microprocessor, to raise and lower the hydraulic lift.

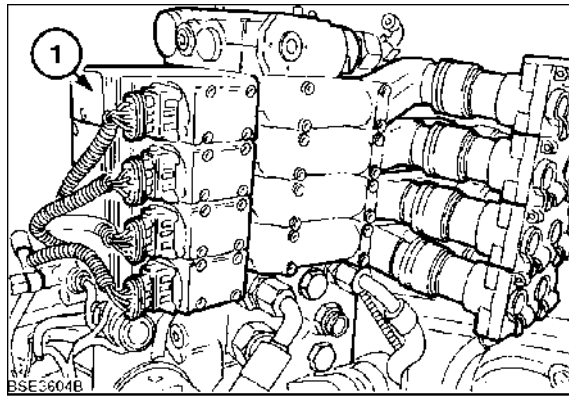


BSE3604A 25

Closed centre load sensing remote control valves

There are two types of remote valves available for the closed centre system. Standard fitment are the mechanical remote valves operated via a cable from within the cab and optional on all 16 x 16 models are electro hydraulically operated valves, (1), Figure 26, which are operated by electrical switches and have their own in-built processor to control oil flow via a solenoid valve.

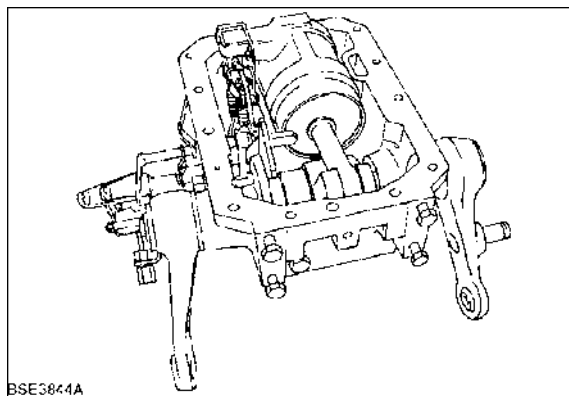
Up to four mechanical type valves can be installed.



BSE3604B 26

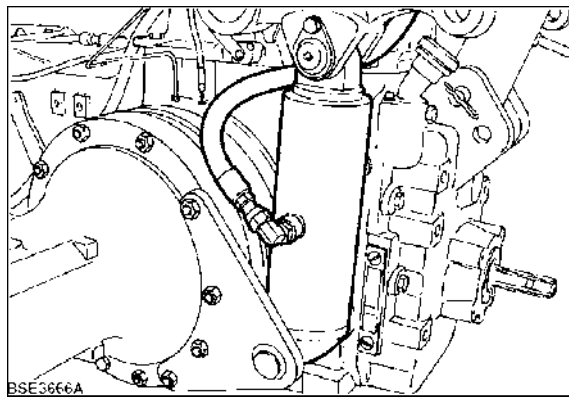
Hydraulic Lift Cylinders.

Models with mechanical draft control utilize a main lift cylinder which is located internally within the rear axle top cover and also one or two **50 mm** external cylinders depending on specification , Figure 27.



BSE3844A 27

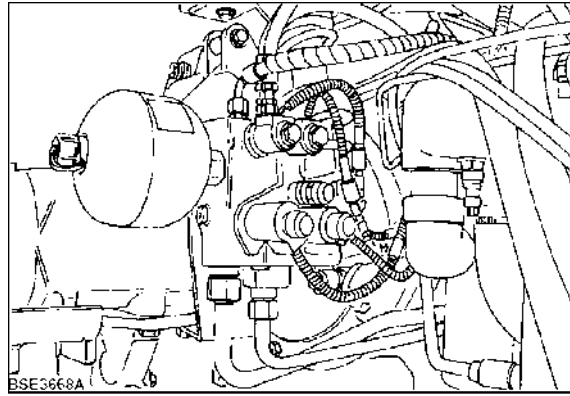
Models with electronic draft control utilize two external cylinders, one per lift arm, anchored to the rear axle with a bracket, Figure 28.



BSE3666A 28

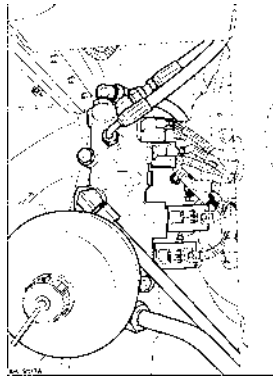
Suspended front axle control valve.

Located on the right hand side of the tractor and attached to the rear axle centre housing. Receives high pressure oil, via the trailer brake valve, if fitted, and with the use of processor controlled PWM valves controls oil to a cylinder, attached between the front axle and front support, to provide a hydraulically controlled suspended front axle.



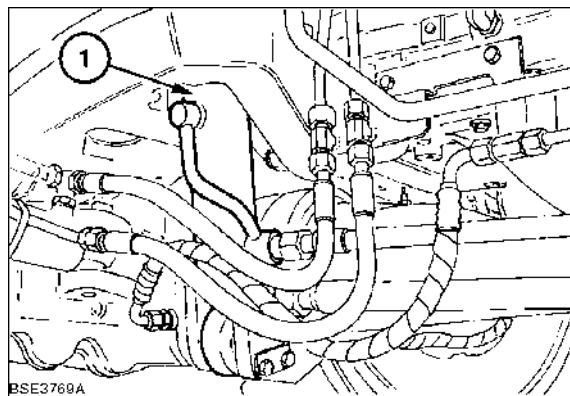
BSE3668A 29

Maxxum Models with armrest unit from Serial No. Z9BE40001 and Z9BE60001



BAIL07APH357HSA 30

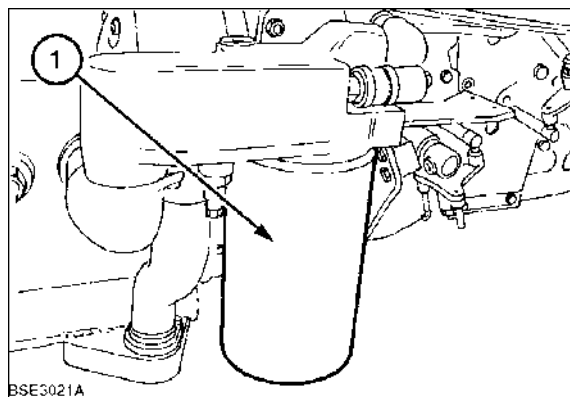
Front axle to front support hydraulic control cylinder (1).



BSE3769A 31

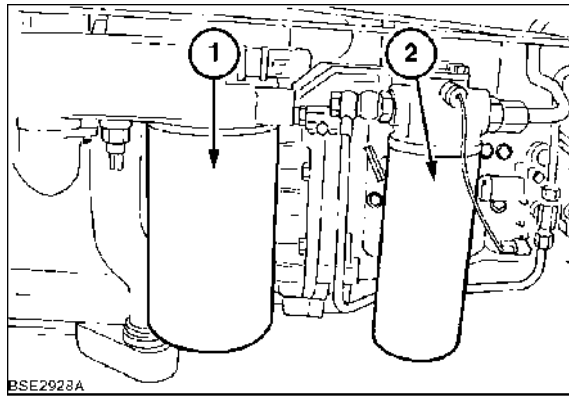
Hydraulic system filters.

Figure 32 shows the main hydraulic filter (1) for tractors fitted with 12 x 12 Transmission with mechanical draft control.



BSE3021A 32

Figure 33 shows the main hydraulic filters for tractors with fixed displacement hydraulic pump. this type of pump is only fitted to tractors with 24 x 24 with mechanical draft control.

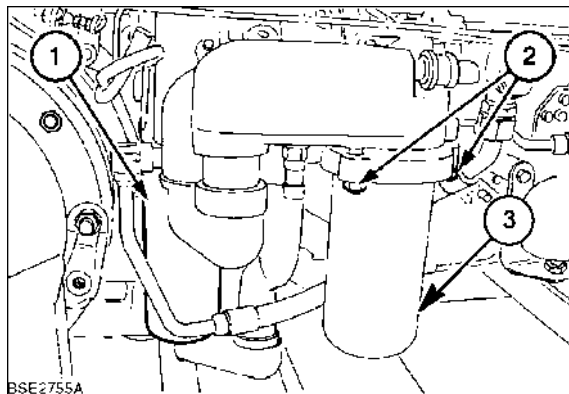


BSE2928A 33

1. Intake Filter

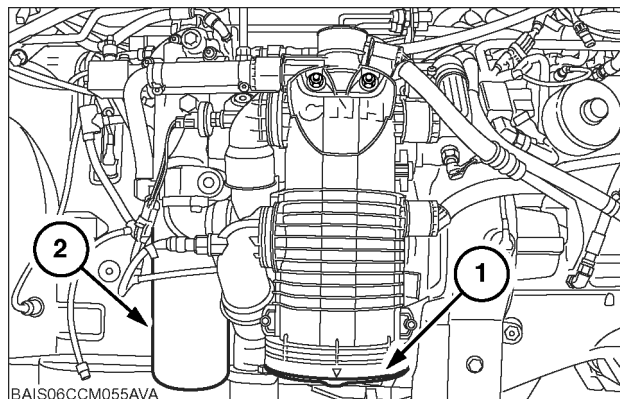
2. Transmission Feed Pressure Filter

The main filter (3) and the charge filter (1) Figure 34 are only installed on tractors with variable displacement pump (CCLS system).



BSE2755A 34

The main filter (1) and the charge filter (2) Figure 27 are installed on tractors with variable displacement pump (CCLS system).



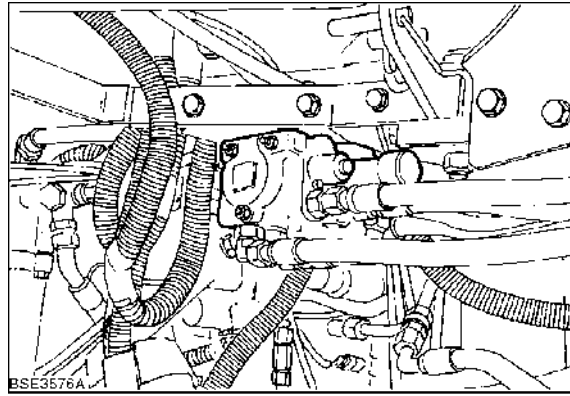
BAIS06CCM055AVA 35

1. Main Intake (Suction) Filter

2. Charge Filter

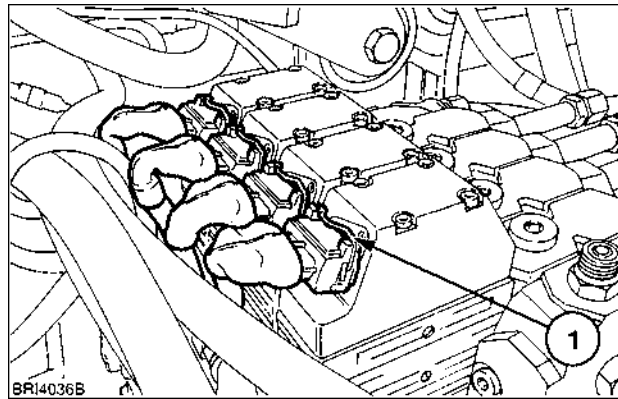
Mid-Mount Remote Valves.

Optional additional remote valves are mounted under the cab. Connected into the high pressure oil line supplied from the hydraulic pump after the trailer brake valve and operated via a joystick control in the cab.



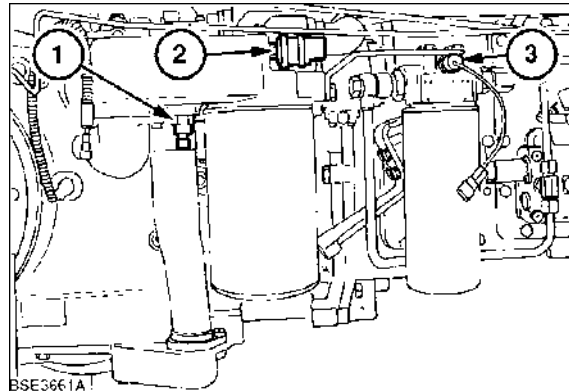
BSE3576A_435 36

Maxxum Models with armrest unit from Serial No. Z9BE40001 and Z9BE60001



BAIL06CCM063ASA 37

High Pressure Hydraulic System, Fixed Displacement Pump - Electrical Switches

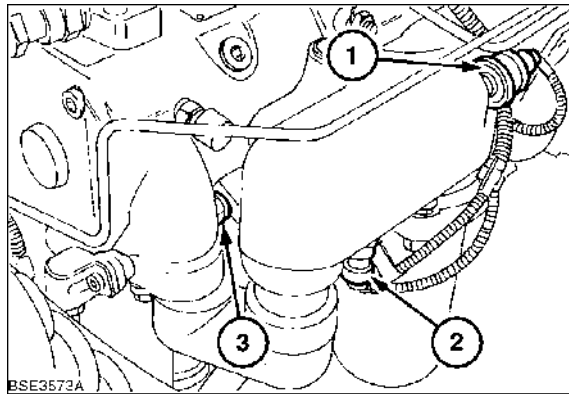


BSE3661A 38

- 1. Oil Temperature Switch
- 3. Steering Pressure Switch

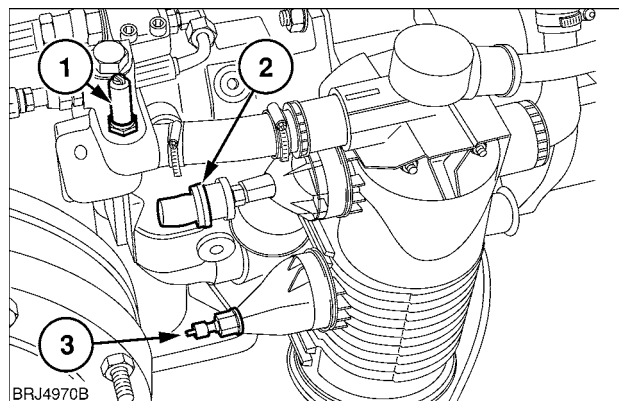
- 2. Intake Filter restriction (vacuum) Switch

High Pressure Hydraulic System, Variable Displacement Pump(CCLS) - Electrical Switches



BSE3573A 39

1. Intake Filter restriction (vacuum) Switch
2. Low Oil Temperature Switch
3. Low Charge Pressure Warning Switch

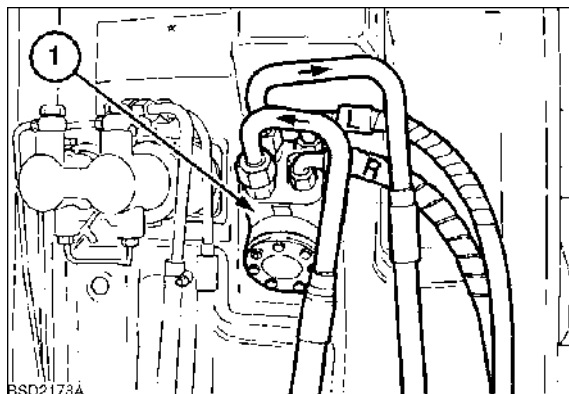


BAIL07APH325ASA 40

1. Low Charge Pressure Warning Switch
2. Intake Filter restriction (vacuum) Switch
3. Low Oil Temperature Switch

Steering Motor

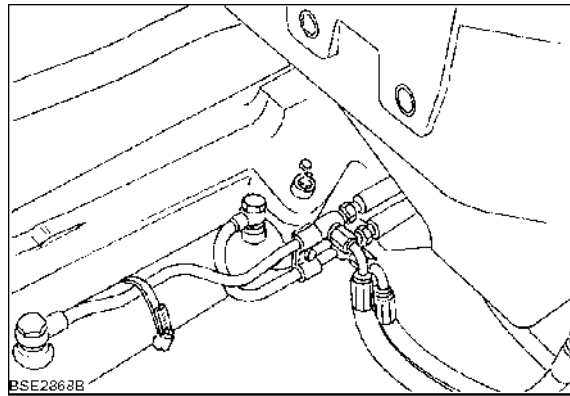
All models use a fixed displacement motor.



BSD2178A 41

Steering Cylinders.

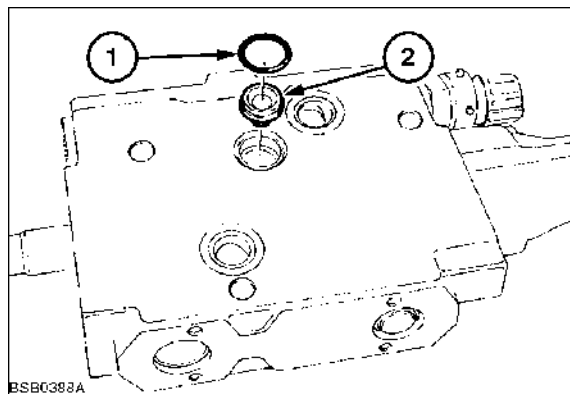
Receives high pressure oil directly from the steering motor.



BSE2868B 42

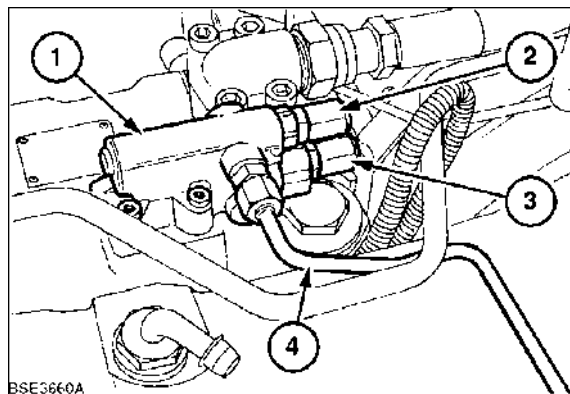
Load Sensing Shuttle Valve.

Located in each remote valve slice, the Electronic Draft Control valve and between the trailer brake valve, front suspension valve and mid-mounted valves, where fitted, is the load sensing shuttle valve (2). This allows the function with the highest pressure demand to send sensing pressure to the load sensing valve, Figure 44, on the variable displacement pump.



BSB0388A_436 43

1. Valve Body
2. Flow Compensating Valve
3. Pressure Compensator Valve
4. Load Sensing Line



BSE3660A 44

With Reference to **PRIMARY HYDRAULIC POWER SYSTEM - Overview (A.10.A)**.

Operation of the closed centre high pressure hydraulic circuit is as follows:-
 The components in the high pressure hydraulic circuit are connected by their load sensing lines to the hydraulic load sensing valve which controls the output of the hydraulic pump.

When the trailer brakes, remote control valves, hydraulic lift or front axle suspension (where fitted) are operating, the load sensing valve on variable flow piston pump, compares the pressure in the component load sense line with the output pressure of the hydraulic pump.

If pump output pressure is less than the combined pressure of the load sense line and spring force of the flow control valve, then pump output continues to increase. When circuit demand is satisfied pump pressure overcomes the combined pressure of the load sense line and flow compensating valve spring. This moves the spool in the flow compensating valve to the right, allowing control pressure oil to be directed to the variable flow swash plate servo piston, which de-strokes the pump to adjust output to circuit demand.

For a detailed explanation on the load sensing operating principle of the variable flow piston pump refer to **Hydraulic pump Fixed displacement pump - Static description (A.10.A)**.

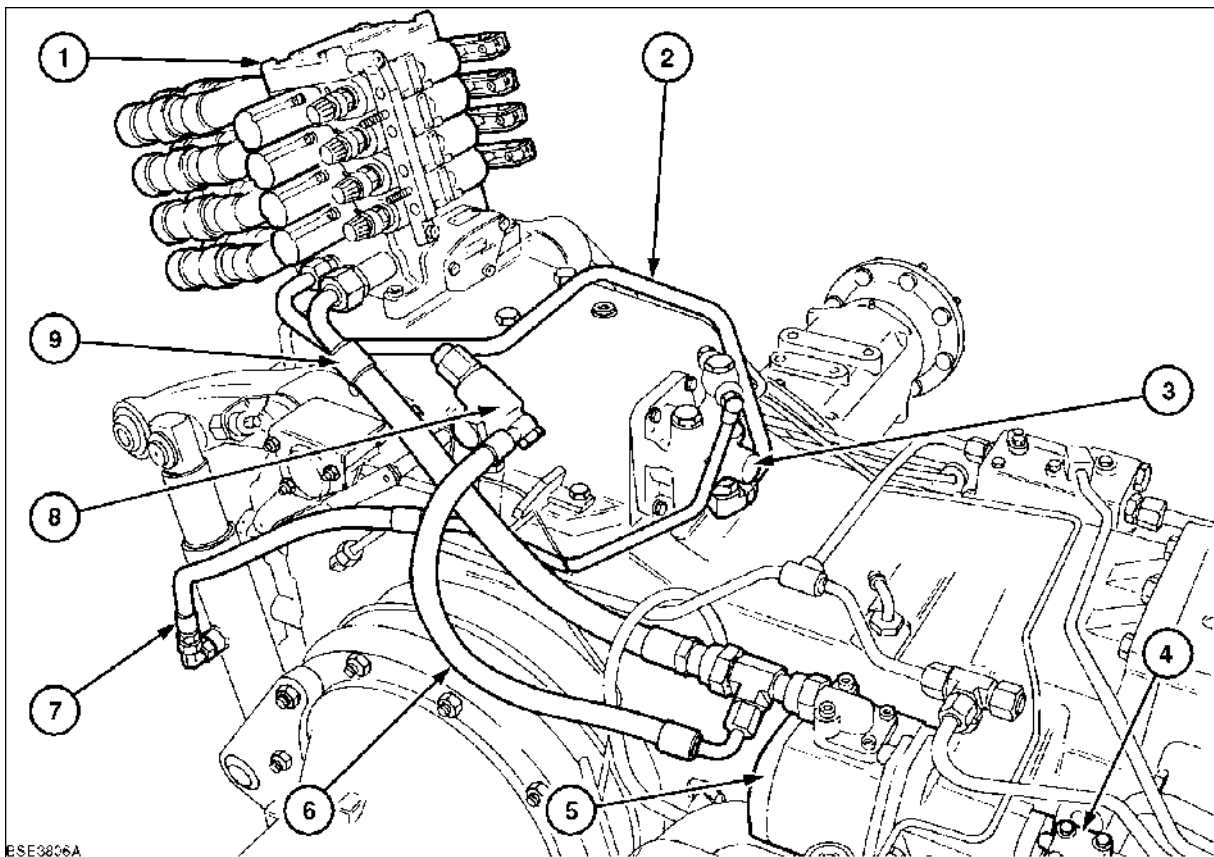
High Pressure oil is fed to a subplate at the bottom of the remote valve stack where it is directed to the Trailer Brake valve which has priority for safety reasons. The oil is then redirected to the Electronic Draft Control Valve and the Electro-Hydraulic Remote Valves. Within the subplate is a pressure compensating valve which diverts the oil to the low pressure system at a pressure of **17 - 18 bar**.

High Pressure oil is also fed to the top of the Remote Valve stack through an end plate which incorporates a pressure limiting valve and this supplies oil at **20 - 22 bar** to the pilot line galleries in the Electro-Hydraulic Remote Valves.

Surplus oil from the charge pump to the variable displacement pump is fed past the **0.8 bar** valve and boosts the pressure in the lubrication circuit.

Refer to **PRIMARY HYDRAULIC POWER SYSTEM - Overview (A.10.A)**.

FIXED DISPLACEMENT HIGH PRESSURE HYDRAULIC CIRCUIT



BSE3806A 45

**High Pressure Circuit Components and Pipework
Tractors with Mechanical Hydraulic Lift and Fixed Displacement Hydraulic Pump**

- | | |
|-----------------------------------|--|
| 1 Remote Control Valves | 2 Feed To Mechanical Draft Control Valve |
| 3 Mechanical Draft Control Valve | 4 Steering Pump (Steering Circuit) |
| 5 High Pressure Circuit Gear Pump | 6 Hose To Pressure Relief Valve |

7 Feed To Lift Cylinder

8 Pressure Relief Valve(**195 - 205 Bar**)

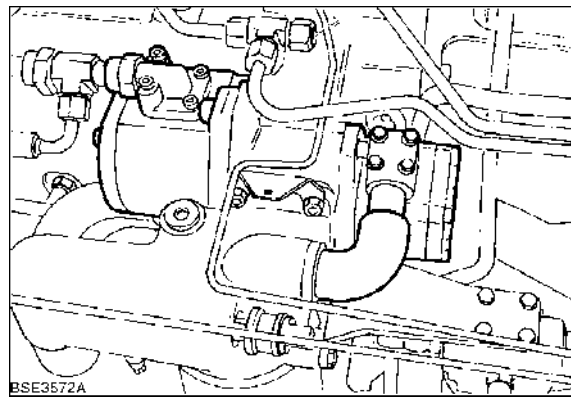
9 High Pressure Feed To Remote Valve Stack

On high pressure hydraulic systems with fixed displacement pump, all components are connected in series and pump flow is continually circulating through the hydraulic system even when the circuits are not being operated.

The priority of operation is given to the order of components in the circuits, that is trailer brakes, remote valves and hydraulic lift.

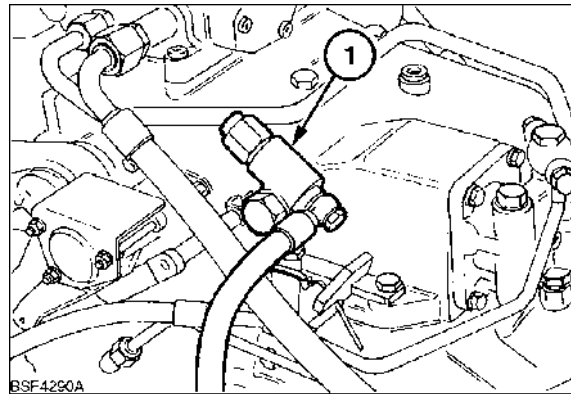
The high pressure hydraulic circuits for tractors installed with mechanically controlled hydraulic lift are shown in Figures **52** and include the components shown on the following pages.

Fixed displacement hydraulic pump assembly comprising of the high pressure gear pump and steering/low pressure gear pump .



BSE3572A_440 46

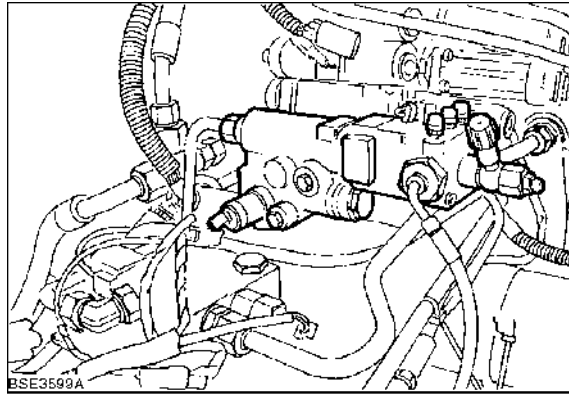
High pressure circuit relief valve **(1)** located on the right hand side of the top cover diverts pump flow to sump if the system pressure reaches **190 bar (2755 lbf/in²)**.



BSF4290A 47

The trailer brake valve is located beneath the cab on top of the hydraulic lift cover. The valve diverts oil pressure to the trailer brakes whenever the right hand tractor brake pedals is depressed. This is unlike the valve installed on the closed centre system where both pedals have to be depressed in order for the valve to operate.

The trailer brake has absolute priority over other services in the circuit.



BSE3599A_441 48

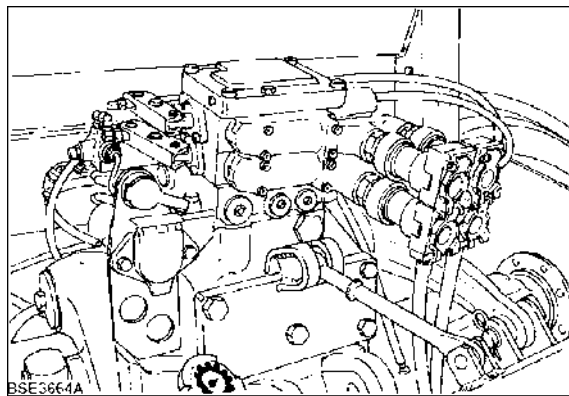
The remote valves are available as two, three or four valves per tractor.

The valves can be double-acting with float and kick out.

Double acting convertible to single-acting with float.

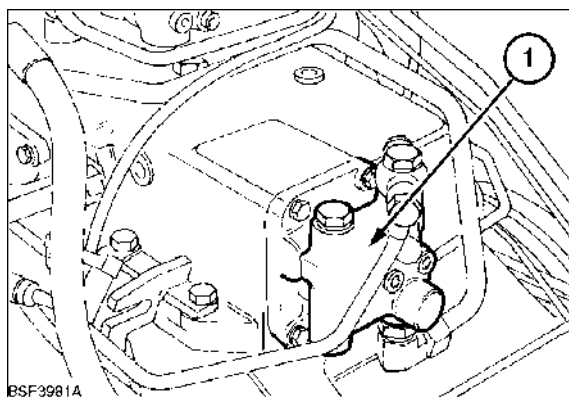
Double acting convertible to single-acting.

When four remote valves are installed the optional flow divider valve (1) is available enabling simultaneous operation of remote valve No 1 with another remote valve or hydraulic lift.



BSE3664A_442 49

On tractors which are fitted with mechanical hydraulic lift, the lift cylinder control valve (1) assembly is located at the front of the hydraulic lift assembly. The lift cylinder safety valve is mounted on the rear face of the control valve which must be removed to obtain access. This safety valve will operate at between **210 - 215 Bar**.



BSF3981A 50

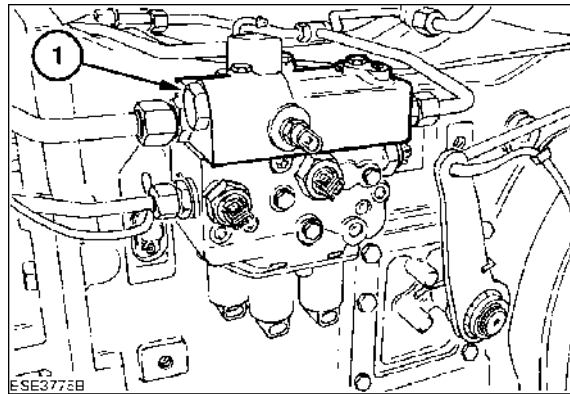
The low pressure regulating valve is located in the top manifold situated on the lubrication services distribution block on the left hand side of the rear axle centre housing. This valve regulates the pressure in the low pressure circuit to **17 - 18 bar (246 - 261 lbf/in²)**.

Also located in this manifold are the oil cooler by-pass valve and the lubrication relief valve (**7.3 - 8.3 bar**).

When the oil is cold and pressure differential across the oil cooler is higher than **6 bar (87 lbf/in²)** the cooler by-pass valve (1) located on the right hand side of the transmission will operate to ensure that adequate flow to the lubrication

circuit is maintained. This feature of diverting oil from the cooler assists in aiding a rapid warm up of oil in cold weather conditions.

The steering pump / steering return oil is directed through the oil cooler at the front of the tractor and is limited to a maximum pressure of **7 bar (101 lbf/in²)** by the lubrication relief valve located in the lubrication services distribution block on the left hand side of the rear axle centre housing.



BSE3775B 51

High Pressure Circuit for Tractors with Fixed Displacement Pump and Mechanical Hydraulic Lift

With Reference to Figure **52**.

Both the high and low pressure pumps are driven by a 'live' drive gear train directly connected to the PTO clutch input drive shaft and driven by the engine flywheel.

Oil is drawn through the common intake port and filter to both the high and steering/low pressure pump assemblies.

The high pressure pump supplies constant oil flow according to engine speed, through the trailer brake and remote valves via a subplate at the bottom of the remote valve stack. The subplate incorporates a flow control valve which limits the maximum operating pressure.

Oil, after passing through the remote valves, enters the hydraulic lift control valve located at the front of the lift assembly, which controls the raising and lowering of the lift.

All excess oil flow produced by the hydraulic pump is returned direct to the rear axle through the control valve spool located in the hydraulic lift control valve assembly.

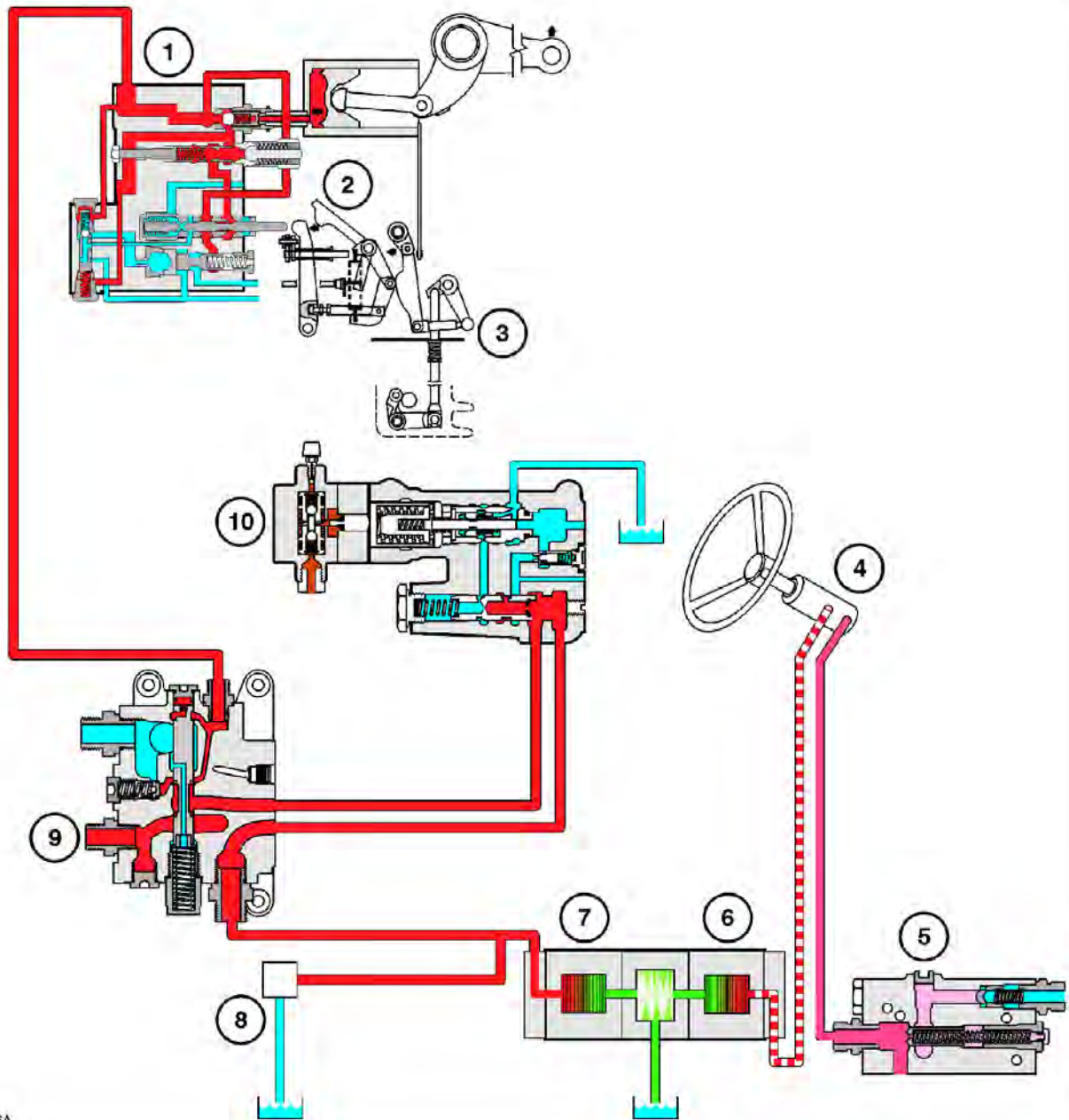
Also located within the assembly is the lift cylinder safety valve, which protects the lift cylinder and seals from excessive peaks of pressure during operation.

For further details on operation of the mechanical hydraulic lift assembly, trailer brake valve and mechanical remote refer to the appropriate Chapters in this Section of the Repair Manual :

HITCH Electronic draft control - Static description (H.10.D) (MECH LIFT),

Trailer brake valve - Static description (D.34.C) (TBV),








PRIMARY HYDRAULIC POWER SYSTEM Closed center mechanical remote valve - Static description (A.10.B) (MECH REMOTES).



BSF4116A

BSF4116A 52

**Fixed Displacement Pump High Pressure Hydraulic Circuit Operation
Tractors With Mechanical Hydraulic Lift
Hydraulic Lift Operating**

	Steering System Oil		System Pressure Oil		Trapped Oil
	Low Pressure Circuit Oil 17 - 18 bar (246 - 261 lbf/in ²)		Return to Reservoir Oil		Lubrication Oil
	Suction Oil				

- | | |
|---|--|
| 1. Lift Control Valve | 2. Lift Cylinder Safety Valve |
| 3. Mechanical Hydraulic Lift Assembly | 4. Steering Motor |
| 5. Low Pressure Circuit Pressure Regulating Valve | 6. Steering and Low Pressure Circuit Gear Pump |
| 7. Fixed Displacement Pump | 8. Pressure Relief Valve (195 - 205 Bar) |
| 9. Subplate with Pressure Compensator | 10. Trailer Brake Valve |

PRIMARY HYDRAULIC POWER SYSTEM - Overview - Variable Displacement Pump High Pressure Hydraulic Circuit 24 x 24 Models. [6438849]

Variable Displacement Pump Closed Centre Load Sensing Hydraulic Circuit 24 x 24 Models

- | | |
|--|---|
| 1 To Additional Remote Control Valves | 2 End Plate With Load Sensing Shuttle Valve |
| 3 Variable Displacement Hydraulic Pump | 4 Mid Mounted Remote Control Valve |
| 5 Low Pressure Switch | 6 Boosted Lubrication Oil |
| 7 Front Suspension Control Valve | 8 Trailer Brake Valve |
| 9 Power Beyond Ports | 10 Subplate with Low Pressure Compensator Valve |
| 11 Feed to Low Pressure circuit | 12 Lift Cylinder |
| 13 Electronic Draft Control Valve | 14 Remote Control Valve |
| A High Pressure Circuit Oil | B Steering Circuit |
| C Low Pressure Circuit Oil | D Trapped Oil |
| E Return To Reservoir Oil | F Suction Oil |
| G Charge Pump Oil | H Lubrication Oil |

Hydraulic pump Fixed displacement pump - Static description [1703079]

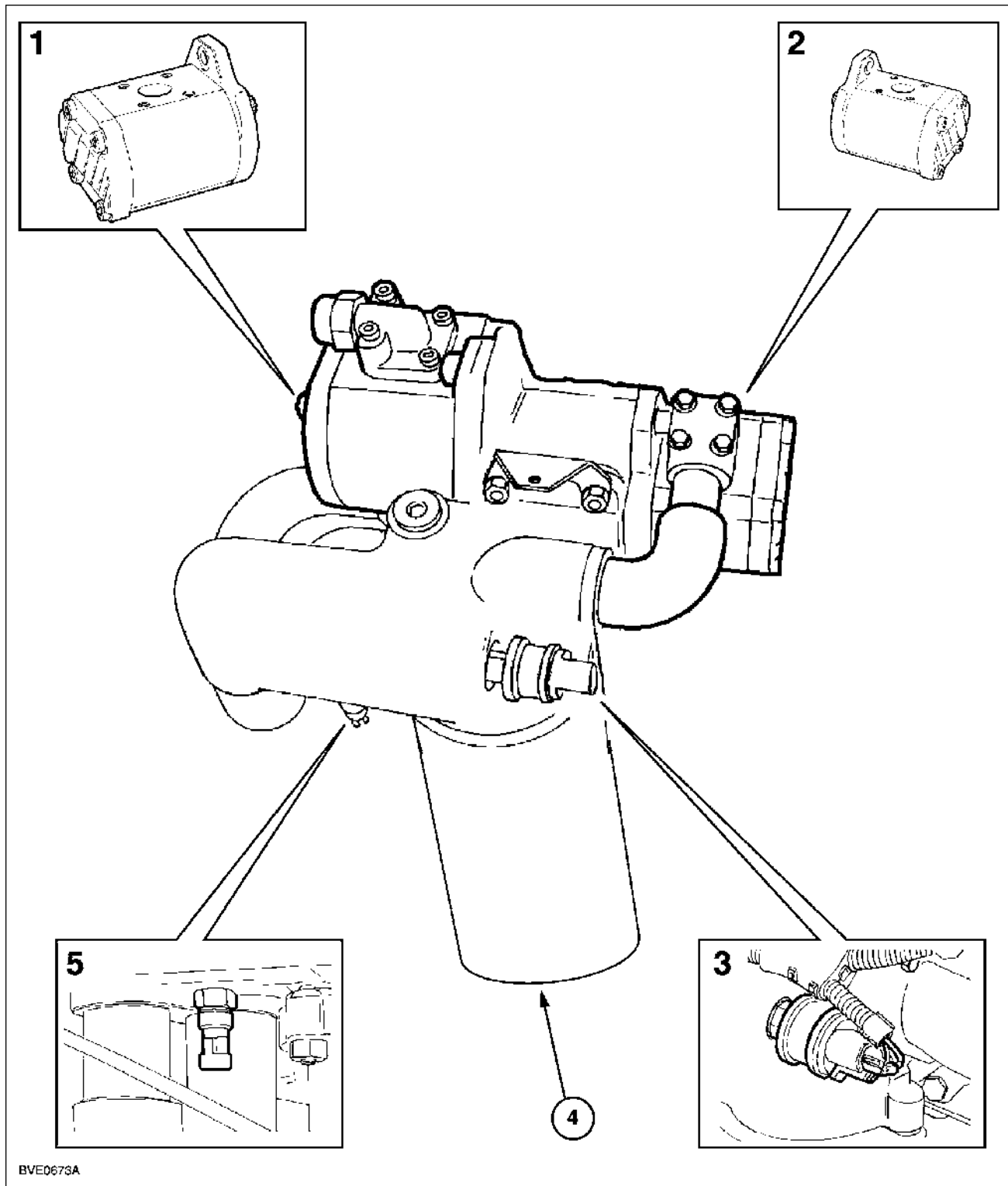
The hydraulic pumps are a gear type and fixed displacement according to ERPm.

The hydraulic pumps are mounted on the right hand side of the rear axle housing and are driven from gears splined directly to the PTO drive shaft. Oil is supplied to the hydraulic pumps from the rear axle housing, via a common intake filter.

The front hydraulic pump controls hydrostatic steering, front and rear differential locks, PTO and PTO brake, and four wheel drive engagement.

The rear hydraulic pump supplies oil for the hydraulic lift, trailer brake valve, and remote control valves.

Hydraulic pump Fixed displacement pump - Overview [1701595]



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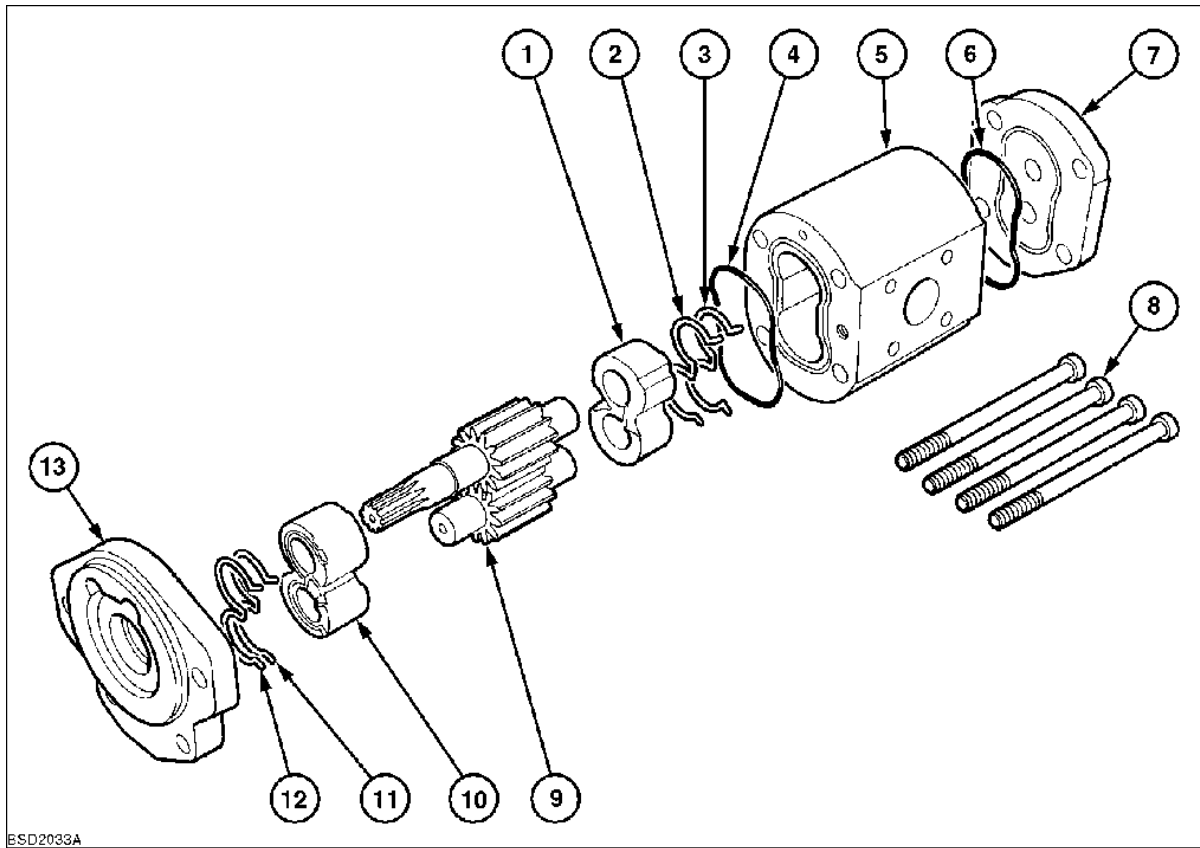
BVE0673A 1

Hydraulic Pump Assembly With Fixed Displacement Closed Centre System

- 1 Hydraulic lift system oil pump
- 3 Main intake filter restriction (vacuum) switch
- 5 Low oil temperature switch

- 2 Steering / low pressure oil pump
- 4 Main intake filter

Hydraulic pump Fixed displacement pump - Exploded view [1701819]



BSD2033A

BSD2033A 1

Hydraulic Lift System Oil Pump Exploded View

- 1 Bearing Block
- 3 Plastic Back-up Seal
- 5 Pump Housing
- 7 End Plate
- 9 Drive Gears
- 11 Oil Seal
- 13 End Plate

- 2 Oil Seal
- 4 O-ring Seal
- 6 O-ring Seal
- 8 Retaining Bolts
- 10 Bearing Block
- 12 Plastic Back-up Seal

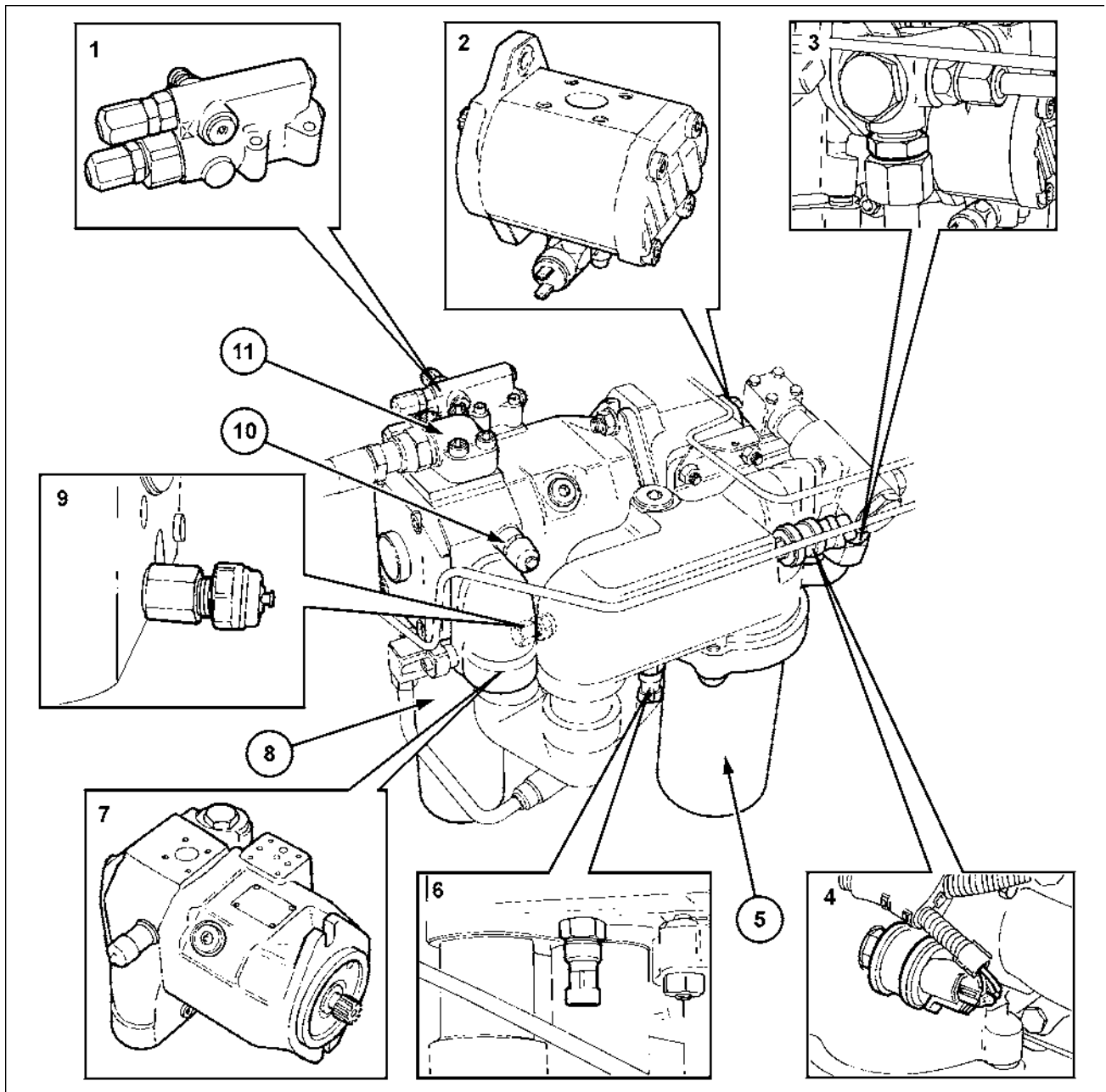
Hydraulic pump Variable displacement pump - Static description [6440386]

The variable flow closed centre load sensing hydraulic pump assembly is mounted on the right hand side of the rear axle centre housing and contains within its body two hydraulic pumps.

- A charge pump of the gear type to supply oil at a charge pressure of **3 bar (44 psi)** to a variable flow closed centre load sensing hydraulic piston pump.
- A variable flow closed centre load sensing piston type hydraulic pump supplying oil to the high pressure circuits for operation of:

- Trailer Brake
- Hydraulic Lift Assembly
- Remote Control Valves
- Front Axle Suspension
- Front Lift
- Mid Mount remote valves

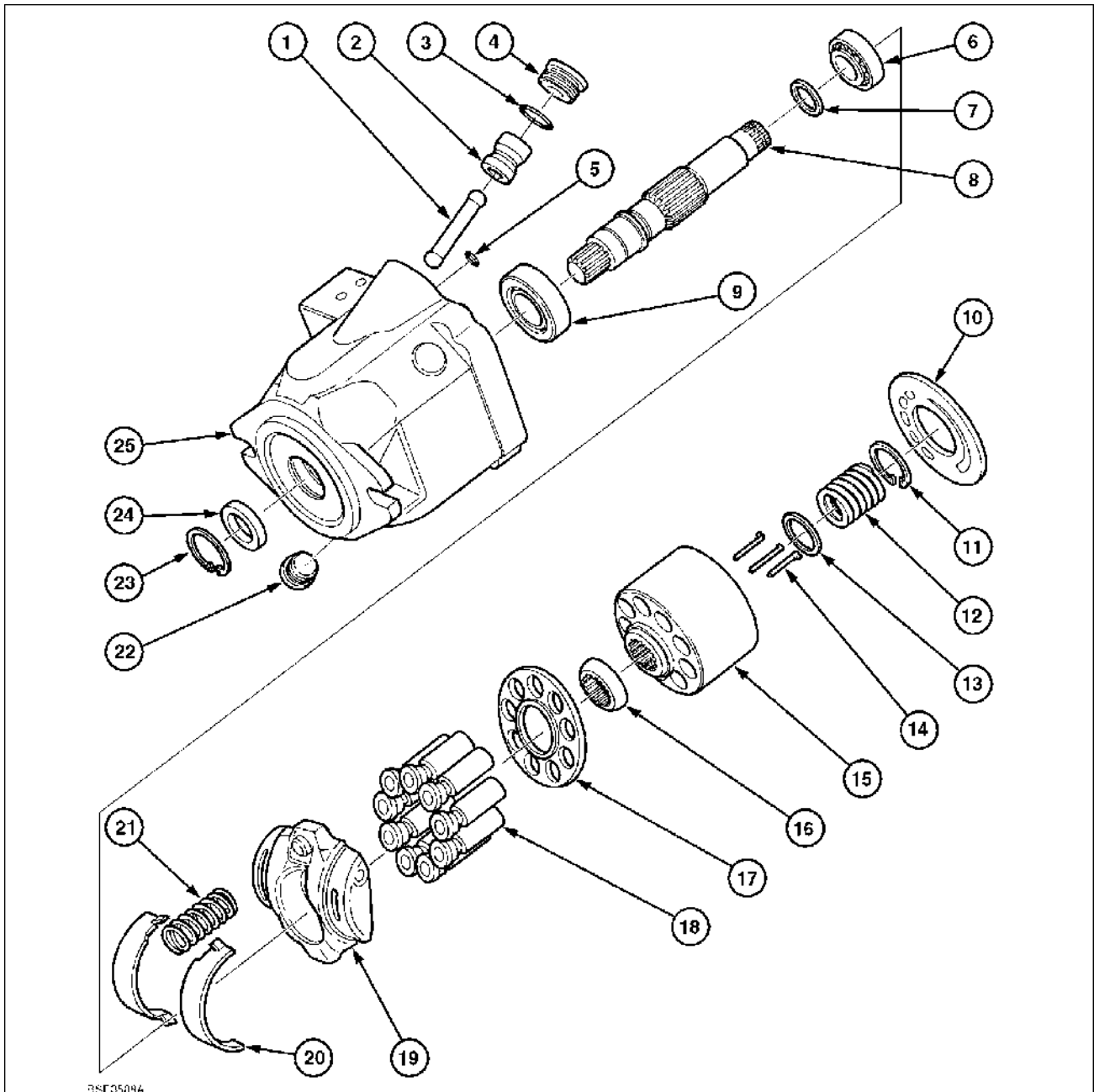
Hydraulic pump Variable displacement pump - Overview [13064140]



BSE3602A 1

- | | | | |
|----|--|----|--|
| 1 | Load Sensing Valve assembly | 2 | Steering Pump |
| 3 | Supplementary Lube valve and By-pass Valve | 4 | Main Intake Filter restriction (vacuum) Switch |
| 5 | Main Filter | 6 | Low Oil Temperature Switch |
| 7 | Variable Displacement Pump and Charge Pump | 8 | Charge Pump Filter |
| 9 | Low Charge Pressure Warning Switch | 10 | Main System Relief Valve 245 bar (3553 psi) |
| 11 | Pressure Feed to Remote Valve Block | | |

Hydraulic pump Variable displacement pump - Exploded view [1701793]



BSE35094

BSE3588A 1

Variable Flow Piston Pump Components

- | | |
|-------------------|-------------------|
| 1 Rod | 2 Piston |
| 3 'O' Ring | 4 Plug |
| 5 Seal | 6 Bearing |
| 7 Shim | 8 Shaft |
| 9 Bearing | 10 Valve Plate |
| 11 Snap Ring | 12 Spring |
| 13 Seal | 14 Pins |
| 15 Rotor Cylinder | 16 Cone |
| 17 Plate | 18 Pistons |
| 19 Swash Plate | 20 Thrust Bearing |
| 21 Spring | |

Hydraulic pump Variable displacement pump - Dynamic description [13064219]

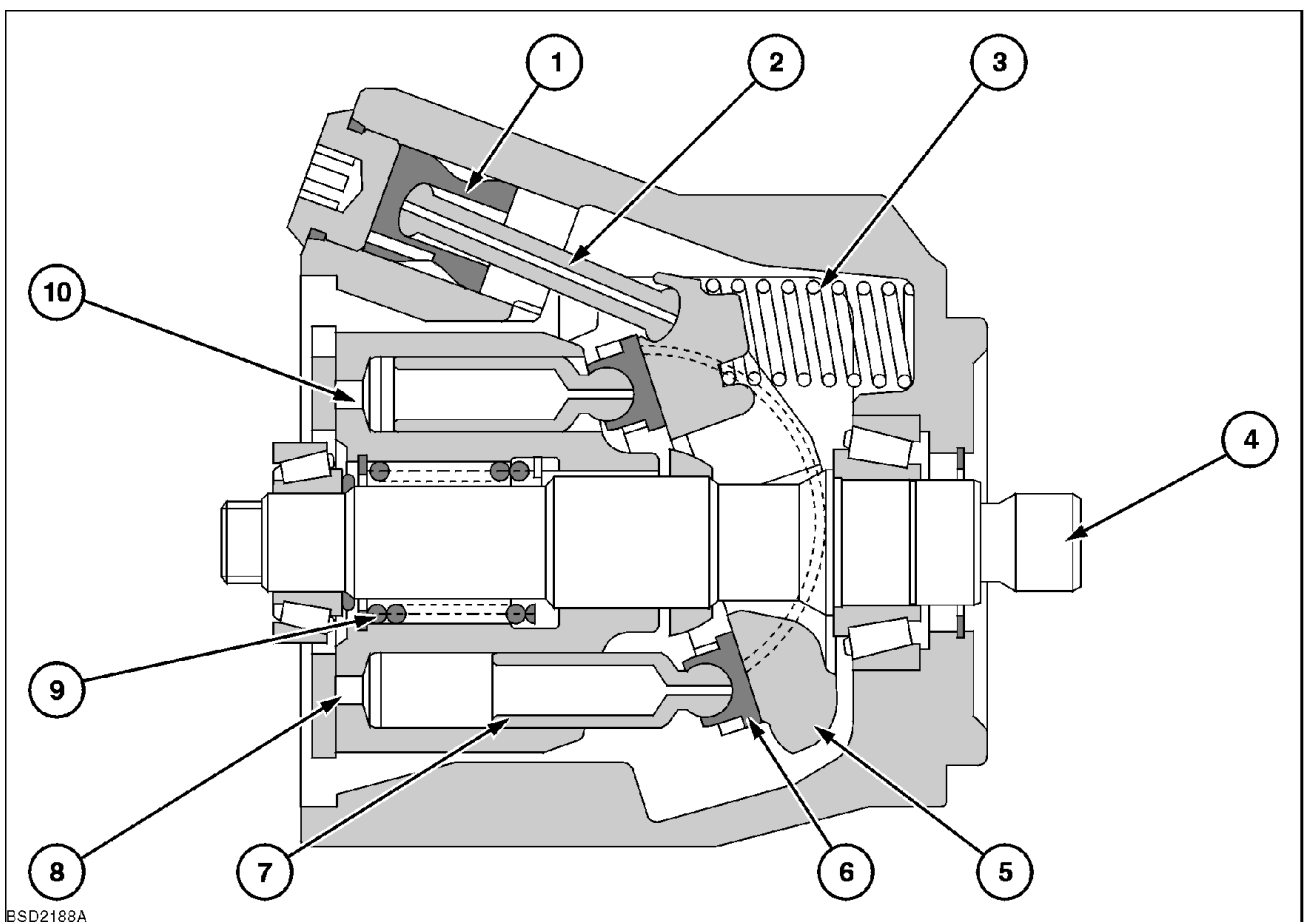
Principal of Operation

Both pumping elements are driven by a 'live' drive gear train directly connected to the PTO clutch input drive shaft and driven by the engine flywheel.

The operating principal of the fixed displacement gear pump is to provide a constant oil flow directly related to the rotation speed of the pump

The operating principal of a variable flow piston pump is to provide oil flow on demand and minimises the engine power absorbed in driving the hydraulic pump when the hydraulic circuits do not require maximum pump flow.

The variable flow piston pump in hydraulic systems therefore has distinct power loss advantages over fixed displacement gear type pumps, which continually provide oil flow and absorb engine power even when the hydraulic circuits do not require the total pump output.



BSD2188A 1

Variable Displacement Piston Pump - Sectional Drawing

1	Stroke control piston	2	Rod
3	Swash plate return spring	4	Driveshaft
5	Swash plate	6	Slipper (9 off)
7	Piston and barrel (9 off)	8	Inlet port
9	Shaft pre-load spring	10	Outlet port

The major components of the variable flow piston pump with closed centre load sensing are:

- A nine element pumping head.
- A plate mechanism (swash plate) to adjust piston stroke and corresponding pump output.
- A load sensing valve which monitors the requirements of the hydraulic circuits and signals the pump to increase or decrease hydraulic oil flow accordingly.

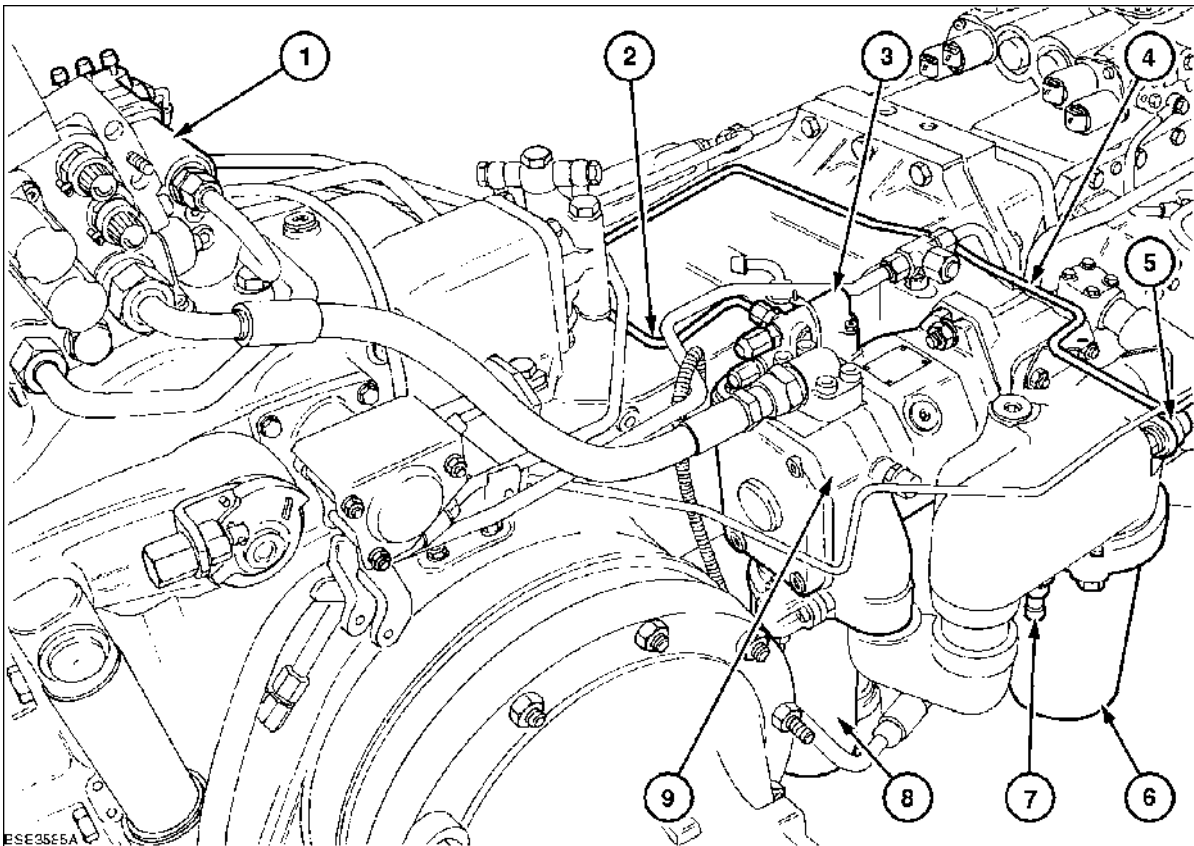
The nine element pumping head is cylindrical in shape and has nine barrels, into each of which, is installed a piston. On the end of each piston is pressed a slipper which always remains in contact with the face of the swash plate located at the front of the pumping head.

The drive shaft, which is driven by the pump drive gear, rotates the pumping head. As the pumping head rotates, the pistons move in and out of their barrels, following the contour of the swash plate. For every revolution of the drive shaft each piston completes one pumping cycle.

The swash plate, which does not rotate but pivots about the front of the pumping head, is the control mechanism that limits the stroke of each piston and works in conjunction with the pressure and flow compensating valves in the load sensing line.

As the pumping head rotates each barrel passes over the inlet and then the outlet ports of the pump. During the inlet cycle for each piston and barrel, oil is pumped into the barrel pushing the piston forward so that it always remains in contact with the swash plate. The stroke of each piston and volume of oil charged into its barrel is therefore dependent on the angle of the swash plate.

After a piston and barrel has completed the inlet stroke, further rotation of the head aligns the barrel with the outlet port. Oil within the barrel is then forcibly ejected by the piston through the exhaust port to the hydraulic circuits.



ESE3585A 2

Variable Displacement Hydraulic Pump Installation

- | | | | |
|---|----------------------------------|---|------------------------|
| 1 | Trailer Brake Valve Assembly | 2 | Load Sensing Line |
| 3 | Flow and Compensator Valve | 4 | Steering Pump |
| 5 | Filter Restriction Vacuum Switch | 6 | Main Intake Filter |
| 7 | Low Oil Temperature Switch | 8 | Charge Pressure Filter |
| 9 | Variable Displacement Pump | | |

The location of the principal components in the hydraulic pump assembly are identified above. These items are shown on the hydraulic circuit diagrams which describe the operating modes of the pump. The principal function of the valves and switches is as follows:

Intake Filter and Restriction Switch

Oil for both the charge and steering pump is drawn from the rear axle centre housing via the intake filter. The filter incorporates a by-pass valve, which is an integral part of the replaceable filter and it is therefore essential that the correct filter is installed at every filter change.

When the filter is blocked the oil filter restriction vacuum switch is activated and illuminates the oil filter restriction warning light on the instrument panel.

Because oil is more viscous (thicker) when cold and can falsely indicate that the filter requires servicing a low temperature oil switch is also used in the filter restriction circuit. This switch ensures that the warning light will not operate if the oil temperature is less than **40 °C (104 °F)**.

Low Charge Pressure Switch

The low charge pressure switch will cause a light to 'Flash' on the instrument cluster whenever the charge pressure is less than **0.75 bar (10.9 psi)**.

Charge Pressure Filter Dump Valve

The charge pressure filter dump valve is a safety relief valve for relieving excess pressure on the charge pump should the filter be restricted. This valve will start to operate if the charge pressure exceeds **6 bar (87 psi)**.

Charge Pressure Valve

The charge pressure valve diverts excess oil supplied by the charge pump and not required by the variable flow piston pump to the inlet port of the steering and lubrication circuit pump.

This valve starts to operate at a pressure of **1 bar (14.5 psi)** and when fully open limits the charge pressure circuit oil to **3 bar (43.5 psi)**.

Flow and Pressure Compensating Valves

Output from the variable flow piston pump is determined by adjusting the angle of the swash plate in the pump. The flow compensating valve senses the circuit operating pressure and adjusts the swash plate angle to control pump output.

If pump output and circuit pressure rises to **205 bar (2973 psi)** the pressure compensating valve overrides the flow compensating valve and adjusts the swash plate angle to limit maximum system pressure.

Hydraulic pump Variable displacement pump - Dynamic description (System description CCLS) [13064269]

The charge pressure pump draws oil through the charge pump inlet filter.

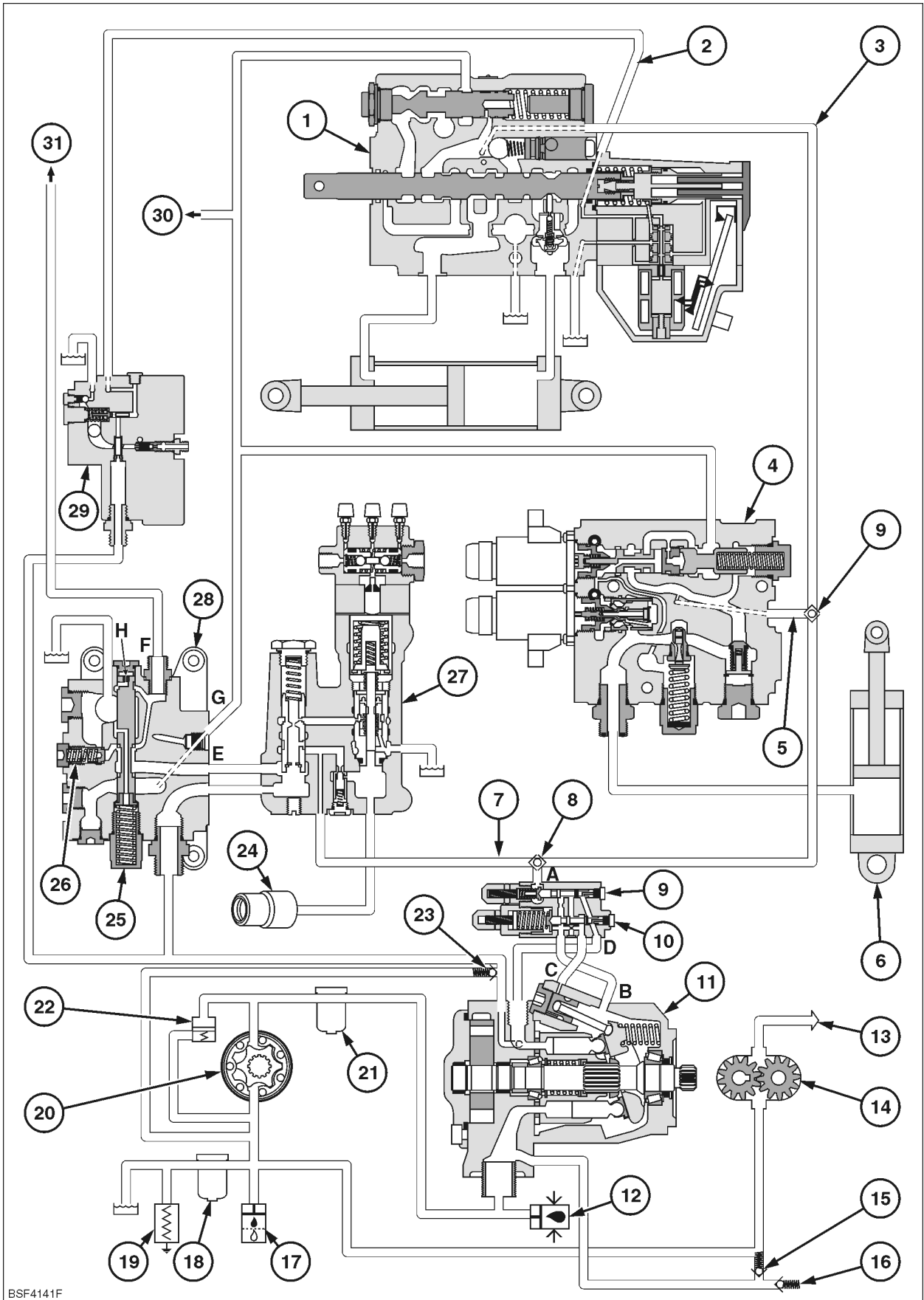
Oil drawn by the charge pump flows through the charge pressure filter to the variable flow piston pump and also through the charge pressure valve to the inlet port of the steering pump.

Because output from the charge pump can exceed the combined demand of the steering and variable displacement pumps an open gallery between the inlet side of the charge and steering pumps allows excess flow to the inlet side of the steering.

The variable flow closed centre load sensing hydraulic pump operates progressively in 5 modes:

- Generating Low Pressure Standby pressure
- Low Pressure Standby
- High Pressure Circuit Maximum Demand
- High Pressure Circuit Low Demand
- Maximum System Pressure (High Pressure Standby)

1	Electro Hydraulic Remote (EHR) Valve	2	Low Pressure Pilot Line for EHR Control Spool
3	Load Sensing Line from EHR Valve	4	Electronic Draft Control (EDC) Valve
5	Load Sensing Line from EDC Valve	6	Lift Ram
7	Load Sensing Line from Trailer Brake Valve	8	Load Sensing Shuttle Valves
9	Flow Compensating Valve 22 bar (319 psi)	10	Pressure Compensating Valve 205 bar (2973 psi)
11	Variable Displacement Pump Assembly	12	Low Charge Pressure Warning Switch
13	Steering System Supply oil	14	Steering Pump
15	Charge Pressure Bypass Valve 3 bar (44 psi)	16	Supplementary lube valve 0.8 bar (12 psi)
17	Main Intake Filter Vacuum Switch	18	Main Intake Filter
19	Low Temperature Switch 40 °C (104 °F)	20	Charge Pump
21	Charge Pressure Filter	22	Charge Pressure Filter Dump Valve 6 bar (87 psi)
23	Main System Relief Valve 245 bar (3553 psi)	24	Trailer Brake Valve Outlet
25	Low Pressure Regulating Valve	26	Low Pressure Relief Valve 30 bar (435 psi)
27	Trailer Brake Valve	28	Low Pressure Regulating Valve Assembly
29	End Plate with Pressure Regulator Valve for Supply to EHR Pilot Line 20 - 22 bar (290 - 319 psi)	30	High Pressure Supply to Front Suspension or Mid Mount Remotes, where fitted
31	Low pressure Supply to Transmission clutches, Four Wheel Drive, Differential Locks, PTO clutch and PTO Brake		
A	Load Sensing Line from High pressure circuit components	B	Return to Reservoir from flow and pressure compensating valves.
C	Gallery to Swash Plate servo piston from flow and compensating valves	D	System Pressure sensing gallery to flow and pressure compensating valves
E	System pressure supply to low pressure regulating valve	F	Regulated Low pressure oil supply
G	System pressure outlet from low pressure regulating valve	H	Low pressure regulating valve spool sensing gallery



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Generating Low Pressure Standby

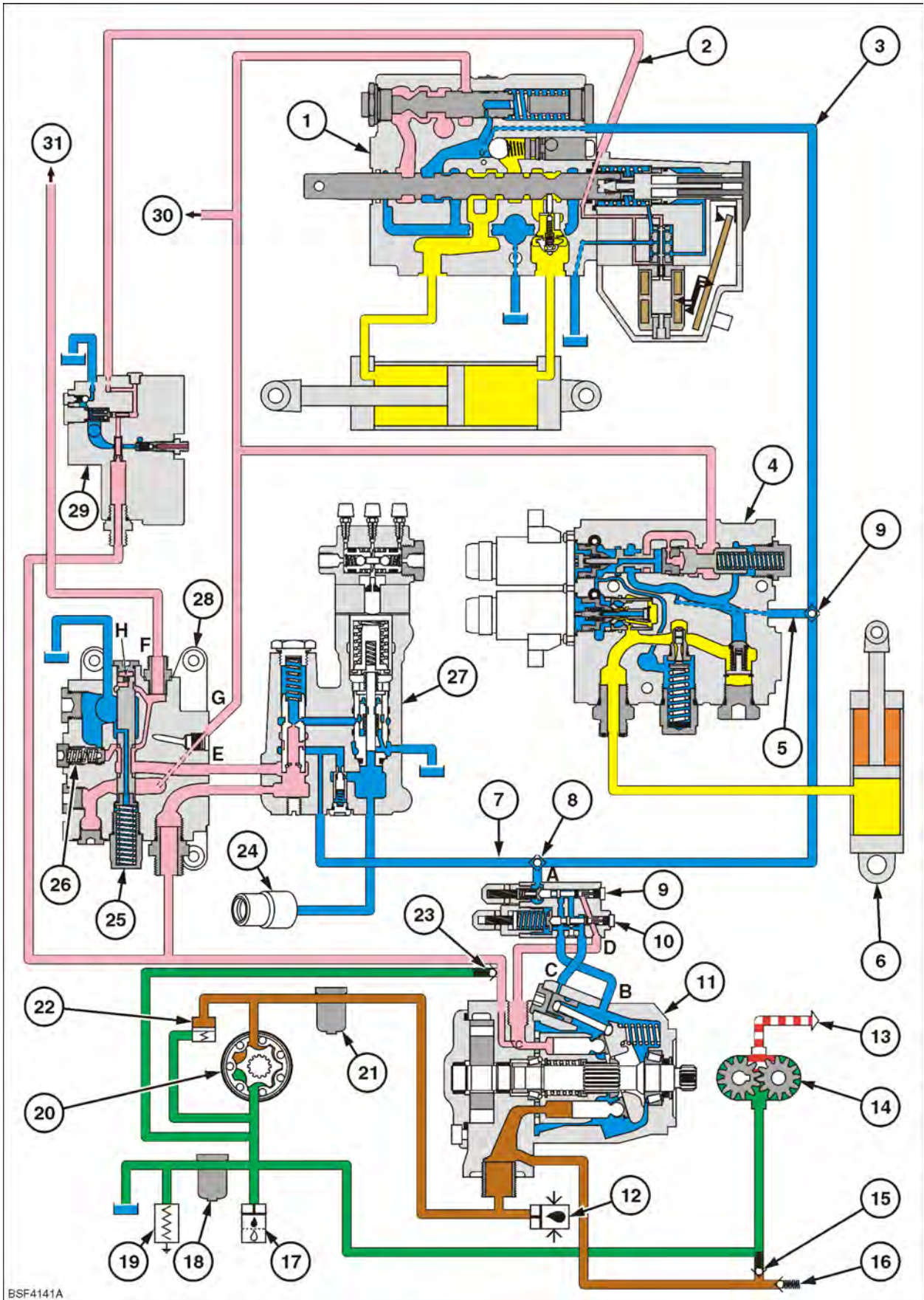
Low pressure standby is the system pressure **21 bar (305 psi)**, maintained by the hydraulic pump when high pressure hydraulic circuits are not being operated.

Control of the swash plate, which regulates the output of the variable displacement piston pump, is achieved by the flow and pressure compensating valves located on the top of the pump.

When the engine is first started, the swash plate return spring positions the swash plate for maximum output of the pump. During engine start up, Low Standby Pressure has not yet been generated by the pump and the flow compensating valve spool is held to the right by spring pressure. The position of the spool prevents oil pressure generated by the pump, being applied through gallery D to the swash plate servo piston through gallery "C". The swash plate consequently remains in the maximum flow position until the piston pump has developed standby pressure.

1	Electro Hydraulic Remote (EHR) Valve	2	Low Pressure Pilot Line for EHR Control Spool
3	Load Sensing Line from EHR Valve	4	Electronic Draft Control (EDC) Valve
5	Load Sensing Line from EDC Valve	6	Lift Ram
7	Load Sensing Line from Trailer Brake Valve	8	Load Sensing Shuttle Valves
9	Flow Compensating Valve 22 bar (319 psi)	10	Pressure Compensating Valve 205 bar (2973 psi)
11	Variable Displacement Pump Assembly	12	Low Charge Pressure Warning Switch
13	Steering System Supply oil	14	Steering Pump
15	Charge Pressure Bypass Valve 3 bar (44 psi)	16	Supplementary lube valve 0.8 bar (12 psi)
17	Main Intake Filter Vacuum Switch	18	Main Intake Filter
19	Low Temperature Switch 40 °C (104 °F)	20	Charge Pump
21	Charge Pressure Filter	22	Charge Pressure Filter Dump Valve 6 bar (87 psi)
23	Main System Relief Valve 245 bar (3553 psi)	24	Trailer Brake Valve Outlet
25	Low Pressure Regulating Valve	26	Low Pressure Relief Valve 30 bar (435 psi)
27	Trailer Brake Valve	28	Low Pressure Regulating Valve Assembly
29	End Plate with Pressure Regulator Valve for Supply to EHR Pilot Line 20 - 22 bar (290 - 319 psi)	30	High Pressure Supply to Front Suspension or Mid Mount Remotes, where fitted
31	Low pressure Supply to Transmission clutches, Four Wheel Drive, Differential Locks, PTO clutch and PTO Brake		

	System Pressure 205 bar (2973 psi)		Return To Reservoir
	Standby Pressure 22 bar (319 psi)		Steering Circuit
	Control Pressure		Low Pressure 17 bar (247 psi)
	Charge Pressure 3 bar (44 psi)		Trapped Oil
	Suction		Lubrication Oil



Regulating Low Pressure Standby

When the pressure in the system is below **17 bar (247 psi)** the Low-Pressure Priority valve is held by the spring to give flow priority to the low-pressure systems.

As the pressure in the system increases to **17 bar (247 psi)** the Low-Pressure Priority valve is moved against the spring, by the pressure sensed through the orifice, to allow increased flow to the high pressure systems and regulates the pressure in the low pressure system.









As system pressure continues increases to **22 bar (319 psi)**, known as Low Standby Pressure, the increase in pressure is sensed in gallery D and applied to the end of the flow compensator spool. The spool gradually moves against the spring allowing oil flow from gallery D to gallery C, Figure 3.

The controlled pressure rise in gallery C operates the swash plate servo piston, changing the angle of the swash plate in relation to the pumping head. The change in angle reduces the operating stroke of the pistons and output of the pump.

As pump output decreases and the pressure in gallery D reduces to less than **22 bar (319 psi)**, the spring in the flow compensating valve gradually moves the spool to the left opening gallery C to sump through gallery B, via the spring cavity of the pressure compensating valve. This reduces the pressure applied to the servo piston, allowing the servo piston to retract at a controlled rate under pressure from the swash plate return spring, which re-adjusts the angle of the swash plate to increase pump output.

This process where the flow compensating valve spool moves back and forth to control the pressure applied to the servo piston, continues until there is a demand by the hydraulic system to increase output to operate the hydraulic lift, remote control valves, front axle suspension (where fitted) or trailer brakes (where fitted).

1	Electro Hydraulic Remote (EHR) Valve	2	Low Pressure Pilot Line for EHR Control Spool
3	Load Sensing Line from EHR Valve	4	Electronic Draft Control (EDC) Valve
5	Load Sensing Line from EDC Valve	6	Lift Ram
7	Load Sensing Line from Trailer Brake Valve	8	Load Sensing Shuttle Valves
9	Flow Compensating Valve 22 bar (319 psi)	10	Pressure Compensating Valve 205 bar (2973 psi)
11	Variable Displacement Pump Assembly	12	Low Charge Pressure Warning Switch
13	Steering System Supply oil	14	Steering Pump
15	Charge Pressure Bypass Valve 3 bar (44 psi)	16	Supplementary lube valve 0.8 bar (12 psi)
17	Main Intake Filter Vacuum Switch	18	Main Intake Filter
19	Low Temperature Switch 40 °C (104 °F)	20	Charge Pump
21	Charge Pressure Filter	22	Charge Pressure Filter Dump Valve 6 bar (87 psi)
23	Main System Relief Valve 245 bar (3553 psi)	24	Trailer Brake Valve Outlet
25	Low Pressure Regulating Valve	26	Low Pressure Relief Valve 30 bar (435 psi)
27	Trailer Brake Valve	28	Low Pressure Regulating Valve Assembly
29	End Plate with Pressure Regulator Valve for Supply to EHR Pilot Line 20 - 22 bar (290 - 319 psi)	30	High Pressure Supply to Front Suspension or Mid Mount Remotes, where fitted
31	Low pressure Supply to Transmission clutches, Four Wheel Drive, Differential Locks, PTO clutch and PTO Brake		

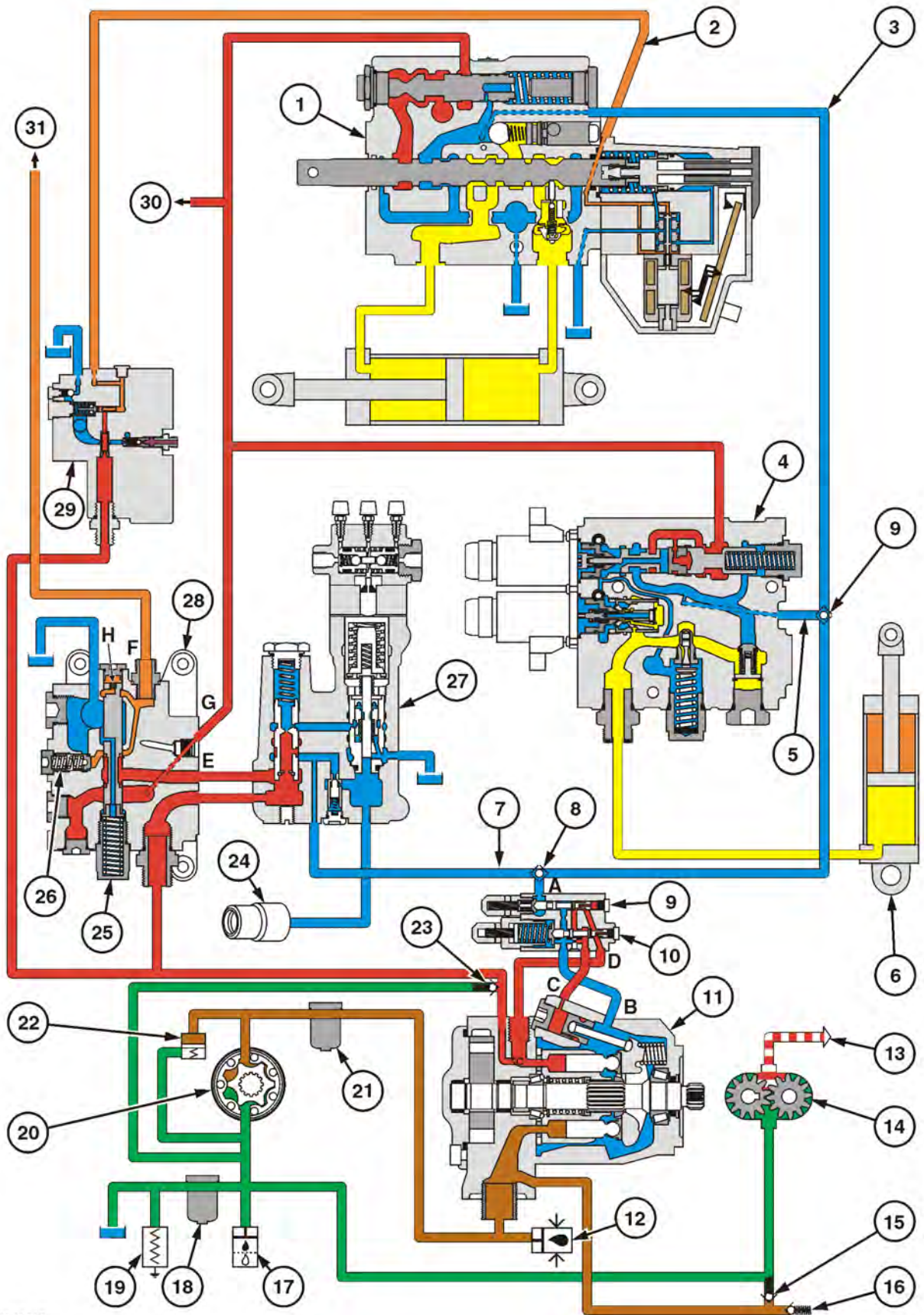
	System Pressure 205 bar (2973 psi)		Return To Reservoir
	Standby Pressure 22 bar (319 psi)		Steering Circuit
	Control Pressure		Low Pressure 17 bar (247 psi)
	Charge Pressure 3 bar (44 psi)		Trapped Oil



Suction



Lubrication Oil



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High Pressure circuit High Demand

After the pump has reached standby pressure and one of the high pressure services is operated, the pressure rise in the hydraulic circuit being operated is sensed by the load sensing line A.











The pressure in the sensing line is now applied to the spring loaded end of the flow compensator valve.

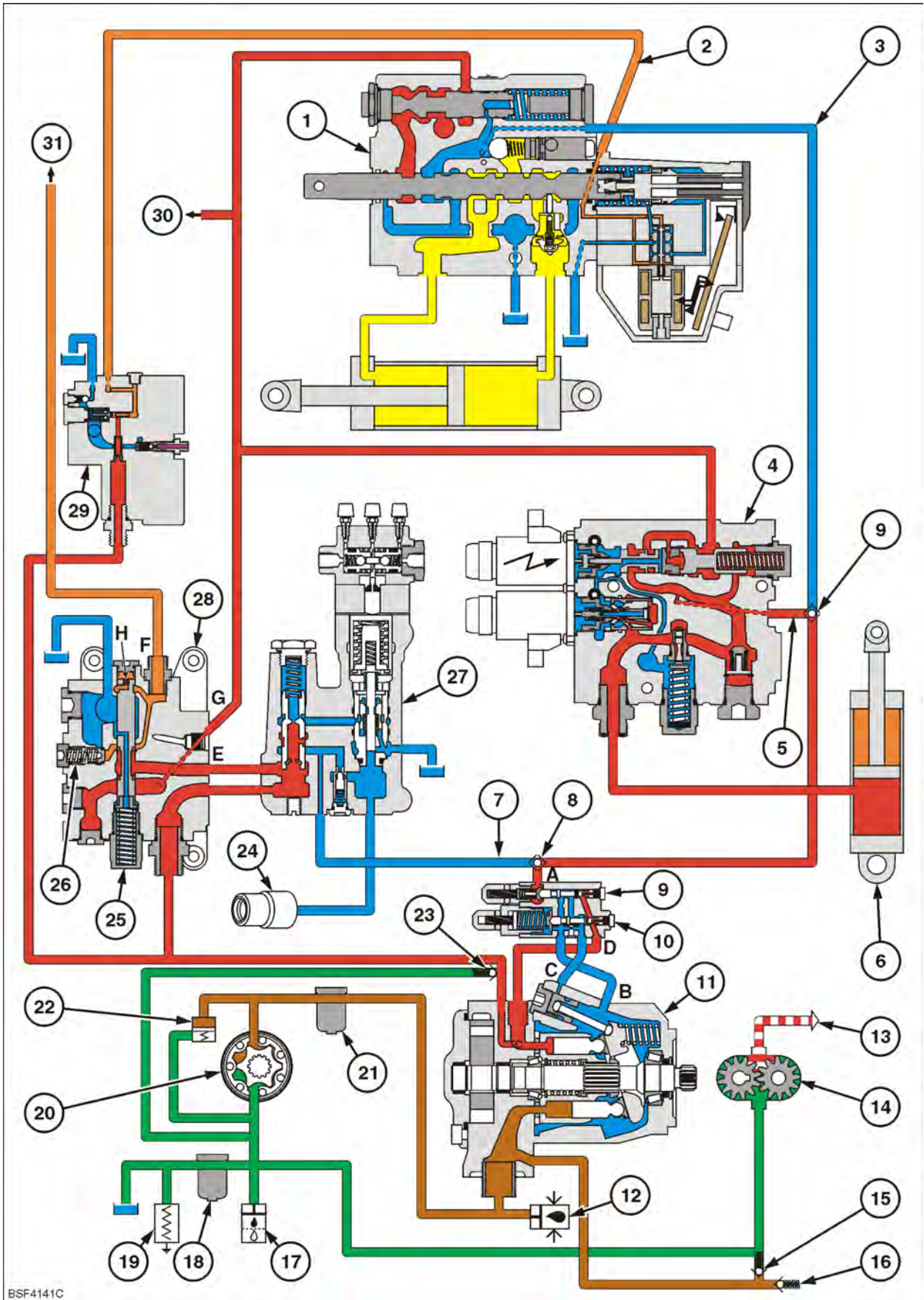
The combined pressure from the pilot line and flow compensating valve return spring causes the flow compensating spool to move against the standby pressure in gallery D, preventing the flow of oil to the swash plate servo piston through gallery C.

The movement of the spool opens gallery C to the return to sump gallery B, allowing the servo piston to retract under pressure from the swash plate return spring, which re-adjusts the angle of the swash plate to increase pump output.

As the pressure in the system increases the Low Pressure Priority Valve works against the spring to regulate the low pressure system to **17 bar (247 psi)**.

1	Electro Hydraulic Remote (EHR) Valve	2	Low Pressure Pilot Line for EHR Control Spool
3	Load Sensing Line from EHR Valve	4	Electronic Draft Control (EDC) Valve
5	Load Sensing Line from EDC Valve	6	Lift Ram
7	Load Sensing Line from Trailer Brake Valve	8	Load Sensing Shuttle Valves
9	Flow Compensating Valve 22 bar (319 psi)	10	Pressure Compensating Valve 205 bar (2973 psi)
11	Variable Displacement Pump Assembly	12	Low Charge Pressure Warning Switch
13	Steering System Supply oil	14	Steering Pump
15	Charge Pressure Bypass Valve 3 bar (44 psi)	16	Supplementary lube valve 0.8 bar (12 psi)
17	Main Intake Filter Vacuum Switch	18	Main Intake Filter
19	Low Temperature Switch 40 °C (104 °F)	20	Charge Pump
21	Charge Pressure Filter	22	Charge Pressure Filter Dump Valve 6 bar (87 psi)
23	Main System Relief Valve 245 bar (3553 psi)	24	Trailer Brake Valve Outlet
25	Low Pressure Regulating Valve	26	Low Pressure Relief Valve 30 bar (435 psi)
27	Trailer Brake Valve	28	Low Pressure Regulating Valve Assembly
29	End Plate with Pressure Regulator Valve for Supply to EHR Pilot Line 20 - 22 bar (290 - 319 psi)	30	High Pressure Supply to Front Suspension or Mid Mount Remotes, where fitted
31	Low pressure Supply to Transmission clutches, Four Wheel Drive, Differential Locks, PTO clutch and PTO Brake		

	System Pressure 205 bar (2973 psi)		Return To Reservoir
	Standby Pressure 22 bar (319 psi)		Steering Circuit
	Control Pressure		Low Pressure 17 bar (247 psi)
	Charge Pressure 3 bar (44 psi)		Trapped Oil
	Suction		Lubrication Oil



High Pressure circuit Low Demand











As pump output increases so does the system pressure generated and applied to the end of the flow compensating spool through gallery D.

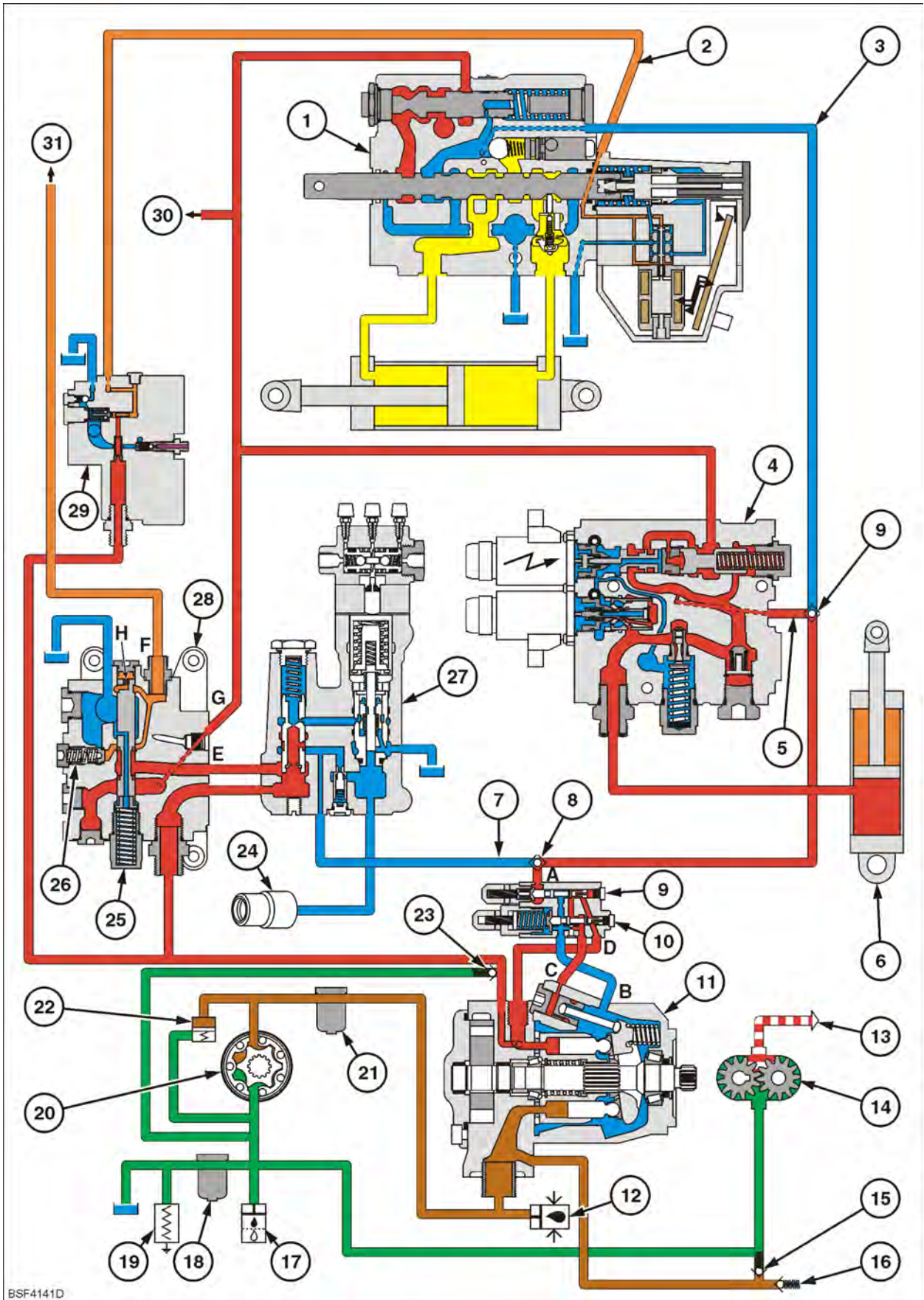
When the hydraulic operating cycle nears completion, eg. the hydraulic lift is raised out of the ground and the main spool in the electronic draft control valve gradually returns to the neutral position, the pressure in the load sensing line similarly begins to decrease. When the pressure generated in gallery D is **22 bar (319 psi)** greater than that in the load sensing gallery A the flow compensator spool moves back against the spring to open gallery D to gallery C. The controlled pressure rise in gallery C now operates the swash plate servo piston and changes the swash plate angle to reduce pump output and the speed of lift.

It can now be seen that the basic principle of pump control, when operating the hydraulic high pressure circuits, is similar to that for operation of the pump at standby pressure when there is no high pressure hydraulic demand. The only difference is that because the pressure in the hydraulic system circuit being operated is sensed through the load sensing line A, the pressure required to operate the flow compensating valve is higher than that for standby pressure operation.

The Low-Pressure Priority Valve will continue to sense the changes in system pressure to regulate the low-pressure system to **17 bar (247 psi)**.

1	Electro Hydraulic Remote (EHR) Valve	2	Low Pressure Pilot Line for EHR Control Spool
3	Load Sensing Line from EHR Valve	4	Electronic Draft Control (EDC) Valve
5	Load Sensing Line from EDC Valve	6	Lift Ram
7	Load Sensing Line from Trailer Brake Valve	8	Load Sensing Shuttle Valves
9	Flow Compensating Valve 22 bar (319 psi)	10	Pressure Compensating Valve 205 bar (2973 psi)
11	Variable Displacement Pump Assembly	12	Low Charge Pressure Warning Switch
13	Steering System Supply oil	14	Steering Pump
15	Charge Pressure Bypass Valve 3 bar (44 psi)	16	Supplementary lube valve 0.8 bar (12 psi)
17	Main Intake Filter Vacuum Switch	18	Main Intake Filter
19	Low Temperature Switch 40 °C (104 °F)	20	Charge Pump
21	Charge Pressure Filter	22	Charge Pressure Filter Dump Valve 6 bar (87 psi)
23	Main System Relief Valve 245 bar (3553 psi)	24	Trailer Brake Valve Outlet
25	Low Pressure Regulating Valve	26	Low Pressure Relief Valve 30 bar (435 psi)
27	Trailer Brake Valve	28	Low Pressure Regulating Valve Assembly
29	End Plate with Pressure Regulator Valve for Supply to EHR Pilot Line 20 - 22 bar (290 - 319 psi)	30	High Pressure Supply to Front Suspension or Mid Mount Remotes, where fitted
31	Low pressure Supply to Transmission clutches, Four Wheel Drive, Differential Locks, PTO clutch and PTO Brake		

	System Pressure 205 bar (2973 psi)		Return To Reservoir
	Standby Pressure 22 bar (319 psi)		Steering Circuit
	Control Pressure		Low Pressure 17 bar (247 psi)
	Charge Pressure 3 bar (44 psi)		Trapped Oil
	Suction		Lubrication Oil



Limiting Maximum System Pressure











To limit the maximum output pressure of the piston pump under normal operating conditions, a pressure compensating valve, located adjacent to the flow compensator valve, is incorporated in the swash plate control circuit. This valve limits the pressure to **190 bar (2755 psi)** and operates as follows:

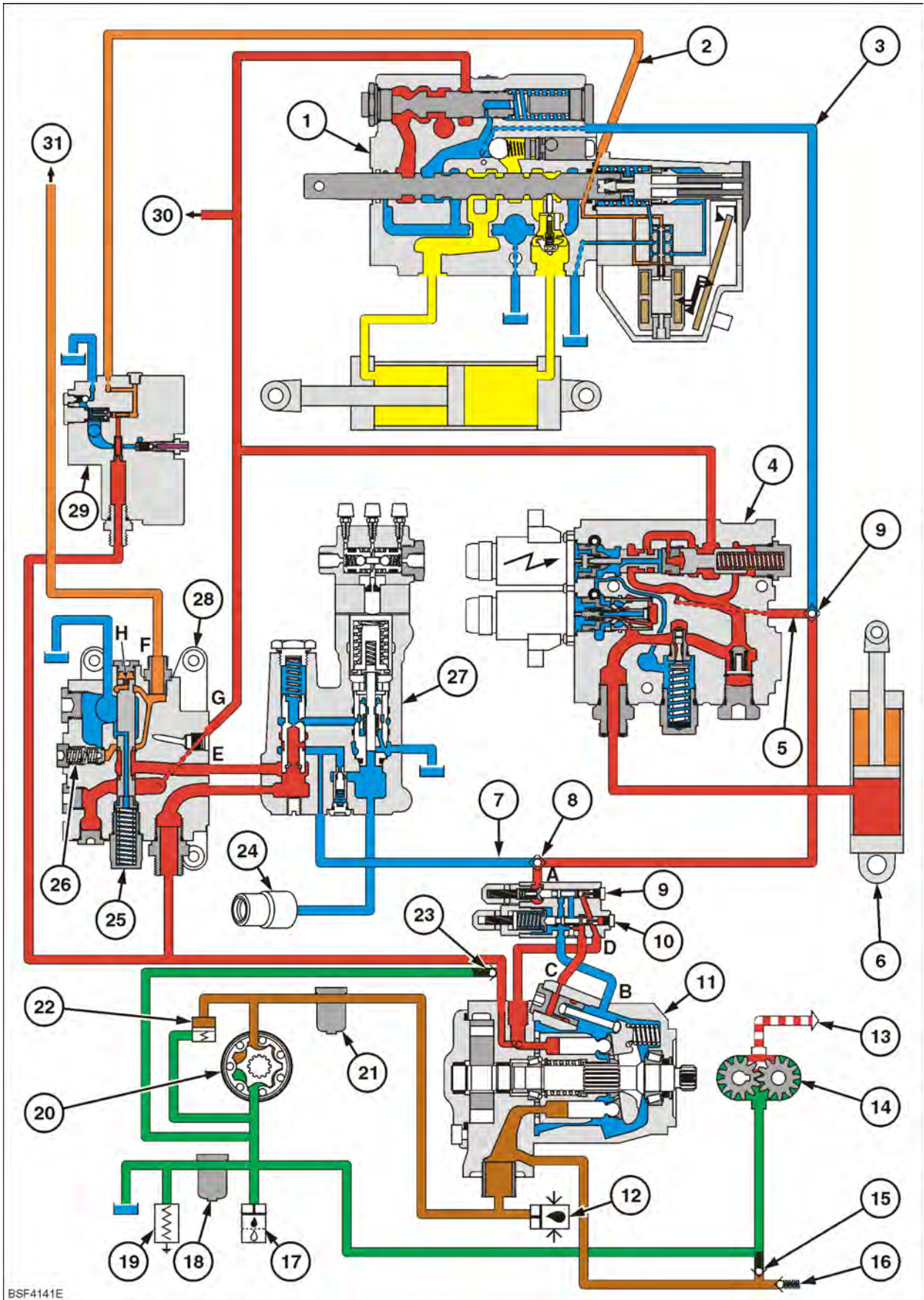
As the pressure in gallery D increases to **205 bar (2973 psi)** the pressure compensator valve spool moves against the valve return spring and opens gallery D to gallery C. The pressure in gallery D is now applied to the servo piston which changes the swash plate angle to reduce pump output to minimum flow. This operating mode is referred to as high pressure standby.

If the pressure in gallery D for some reason exceeds the setting of the pressure compensating valve there is a system safety valve set to **245 bar (3553 psi)** to prevent consequential damage that may occur due to excessive pressures.

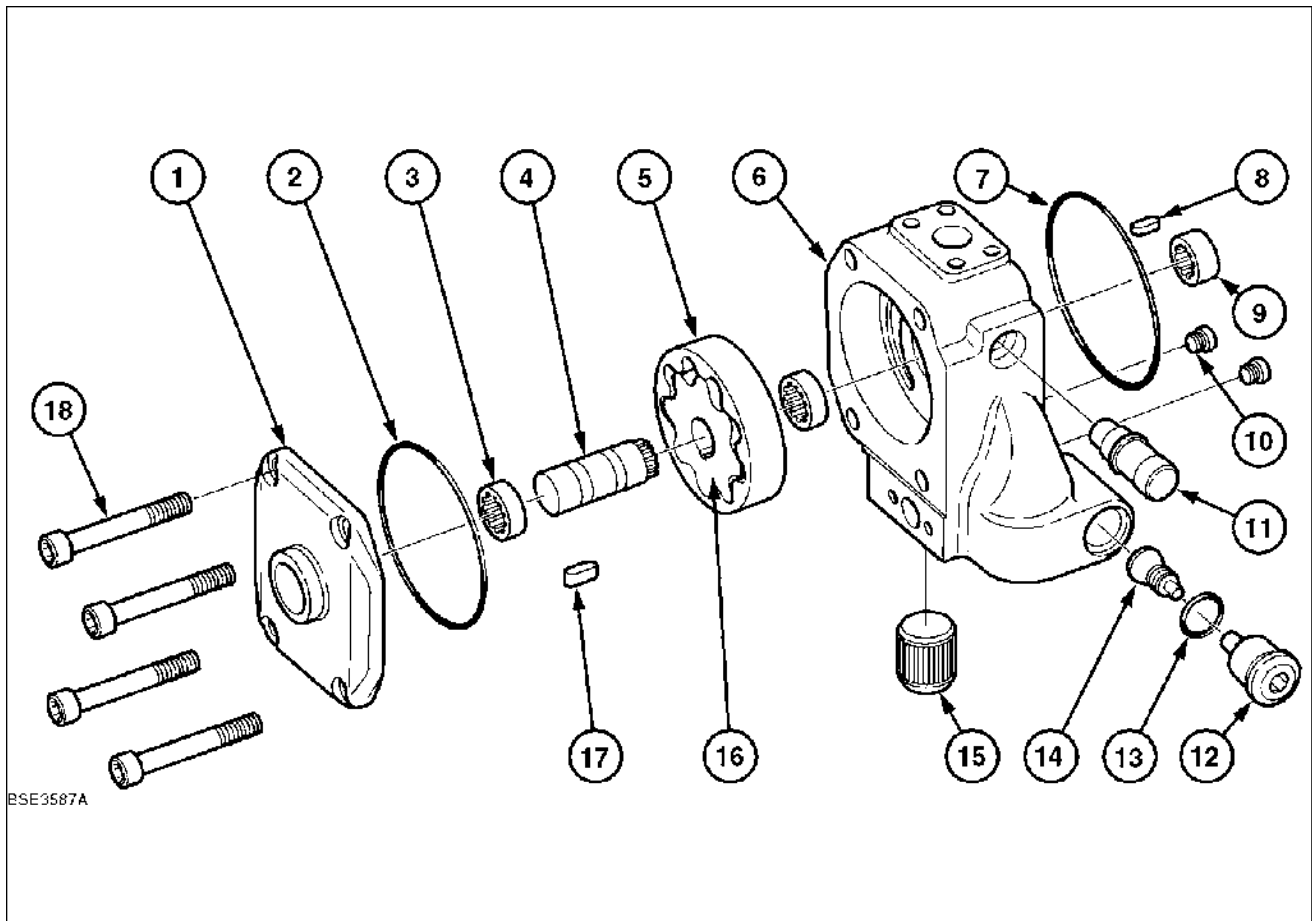
The Low-Pressure Priority Valve will continue to sense the changes in system pressure to regulate the low-pressure system to **17 bar (247 psi)**.

1	Electro Hydraulic Remote (EHR) Valve	2	Low Pressure Pilot Line for EHR Control Spool
3	Load Sensing Line from EHR Valve	4	Electronic Draft Control (EDC) Valve
5	Load Sensing Line from EDC Valve	6	Lift Ram
7	Load Sensing Line from Trailer Brake Valve	8	Load Sensing Shuttle Valves
9	Flow Compensating Valve 22 bar (319 psi)	10	Pressure Compensating Valve 205 bar (2973 psi)
11	Variable Displacement Pump Assembly	12	Low Charge Pressure Warning Switch
13	Steering System Supply oil	14	Steering Pump
15	Charge Pressure Bypass Valve 3 bar (44 psi)	16	Supplementary lube valve 0.8 bar (12 psi)
17	Main Intake Filter Vacuum Switch	18	Main Intake Filter
19	Low Temperature Switch 40 °C (104 °F)	20	Charge Pump
21	Charge Pressure Filter	22	Charge Pressure Filter Dump Valve 6 bar (87 psi)
23	Main System Relief Valve 245 bar (3553 psi)	24	Trailer Brake Valve Outlet
25	Low Pressure Regulating Valve	26	Low Pressure Relief Valve 30 bar (435 psi)
27	Trailer Brake Valve	28	Low Pressure Regulating Valve Assembly
29	End Plate with Pressure Regulator Valve for Supply to EHR Pilot Line 20 - 22 bar (290 - 319 psi)	30	High Pressure Supply to Front Suspension or Mid Mount Remotes, where fitted
31	Low pressure Supply to Transmission clutches, Four Wheel Drive, Differential Locks, PTO clutch and PTO Brake		

	System Pressure 205 bar (2973 psi)		Return To Reservoir
	Standby Pressure 22 bar (319 psi)		Steering Circuit
	Control Pressure		Low Pressure 17 bar (247 psi)
	Charge Pressure 3 bar (44 psi)		Trapped Oil
	Suction		Lubrication Oil



Charge pump - Exploded view [1701872]

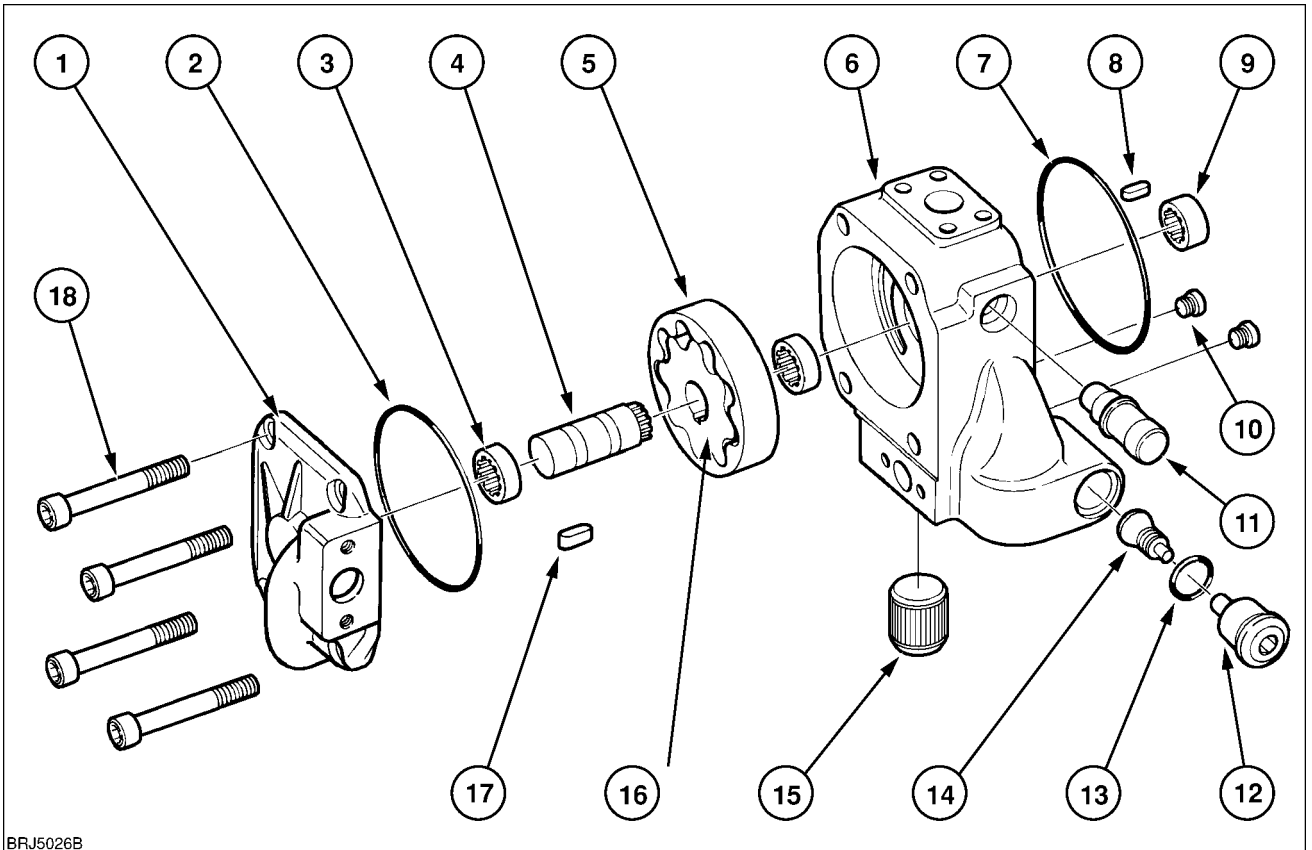


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Charge Pump Components

- | | |
|--|-----------------------|
| 1 End Plate | 2 Seal |
| 3 Coupling | 4 Shaft |
| 5 Rotor Housing | 6 Charge Pump Housing |
| 7 Seal | 8 Pin |
| 9 Hub | 10 Screw Plug |
| 11 System Relief Valve (245 bar (3552.5 psi)) | 12 Check Valve Plug |
| 13 Seal | 14 Check Valve Spool |
| 15 Main Charge Filter | 16 Pump Rotor |
| 17 Key | 18 Screws |



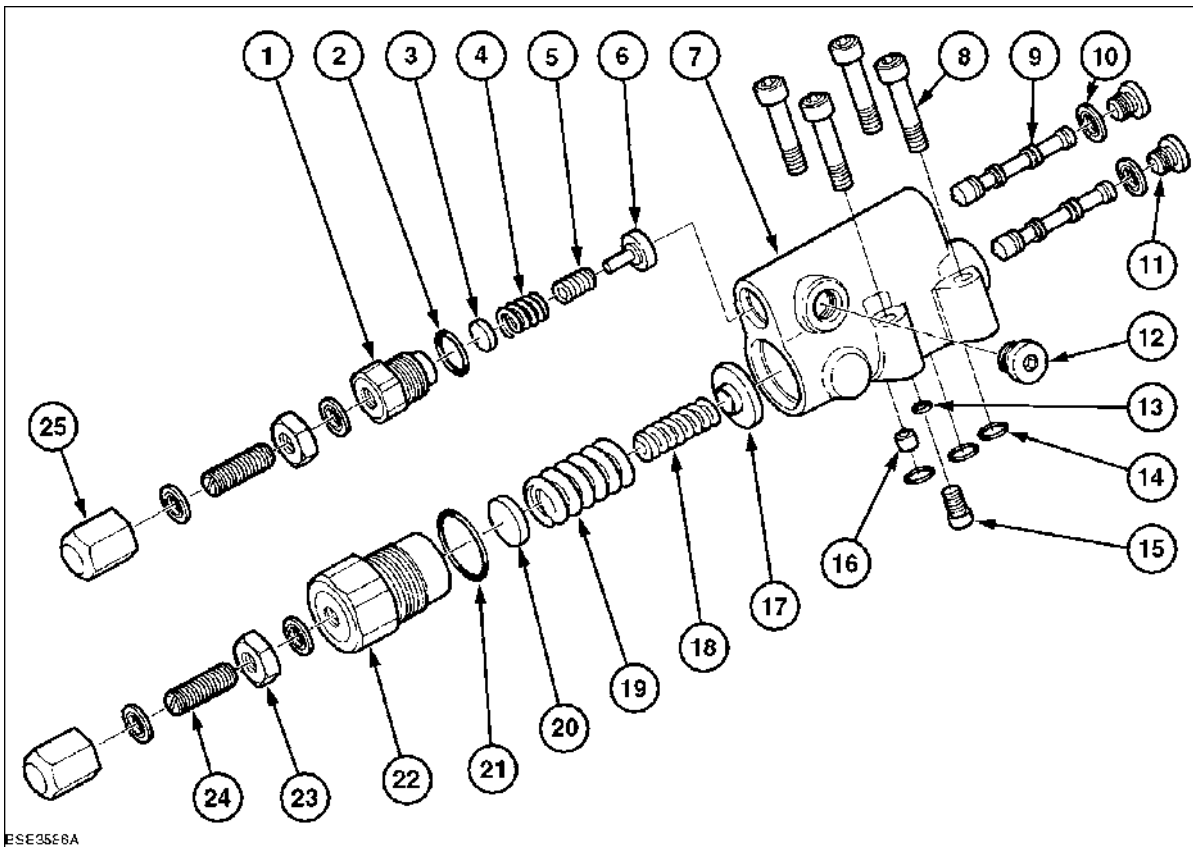
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Charge Pump Components

- | | |
|--|-----------------------|
| 1 End Plate | 2 Seal |
| 3 Coupling | 4 Shaft |
| 5 Rotor Housing | 6 Charge Pump Housing |
| 7 Seal | 8 Pin |
| 9 Hub | 10 Screw Plug |
| 11 System Relief Valve (245 bar (3552.5 psi)) | 12 Check Valve Plug |
| 13 Seal | 14 Check Valve Spool |
| 15 Main Charge Filter | 16 Pump Rotor |
| 17 Key | 18 Screws |

Compensator - Exploded view [1701904]



BSE3586A_454 1

Flow and Pressure Compensating Valves

- | | |
|-----------------|--------------|
| 1 Plug | 2 Seal |
| 3 Disc | 4 Spring |
| 5 Spring | 6 Seat |
| 7 Housing | 8 Screw |
| 9 Spool | 10 Snap-ring |
| 11 Plug | 12 Plug |
| 13 Seal | 14 Seal |
| 15 Damper Screw | 16 Nozzle |
| 17 Seat | 18 Spring |
| 19 Spring | 20 Disc |
| 21 Seal | 22 Plug |
| 23 Nut | 24 Screw |
| 25 Locknut | |

Hydraulic pump Fixed displacement pump - Remove [1704224]

Prior operation:

Remove the battery cover and disconnect the battery negative cable (refer to **Battery - Disconnect (A.30.A)**).

Prior operation:

Raise the rear of the tractor, place an axle stand under the right hand side final drive case and remove the right hand side rear wheel (refer to **Rear wheel - Remove (D.50.C)**).

Prior operation:

Remove the drain plug and drain oil into a suitable container.

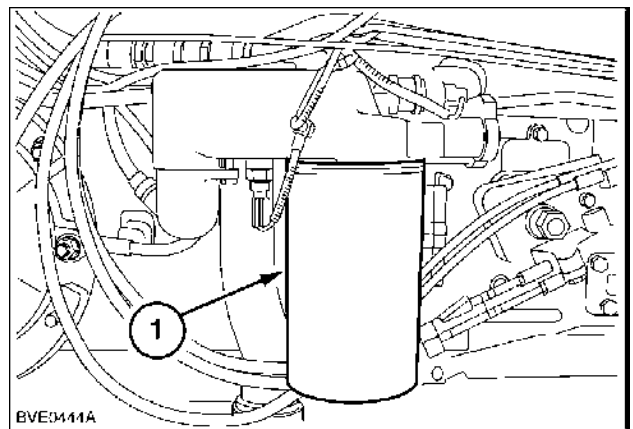
Install the drain plug after the oil has drained (refer to **REAR AXLE - Drain fluid (D.12.A)**).

⚠ **WARNING** ⚠

Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

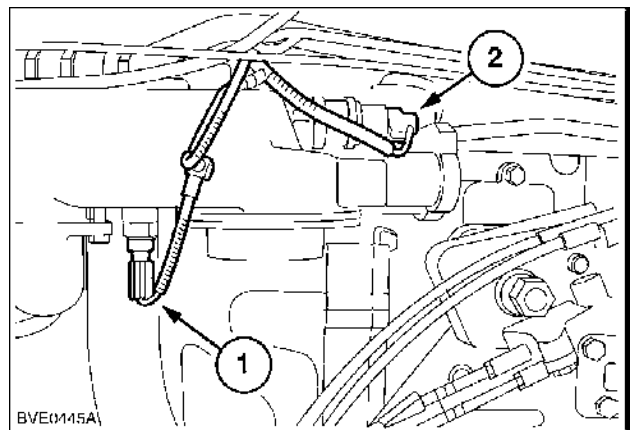
B026

1. Using a suitable filter strap, remove the oil filter (1).



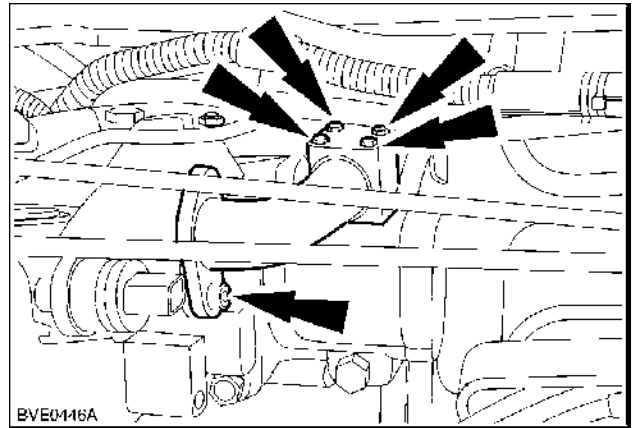
BVE0444A 1

2. Disconnect the low oil temperature switch electrical connector (1) and the main intake filter restriction switch electrical connector (2).
Cut the cable tie and reposition the wiring harness.



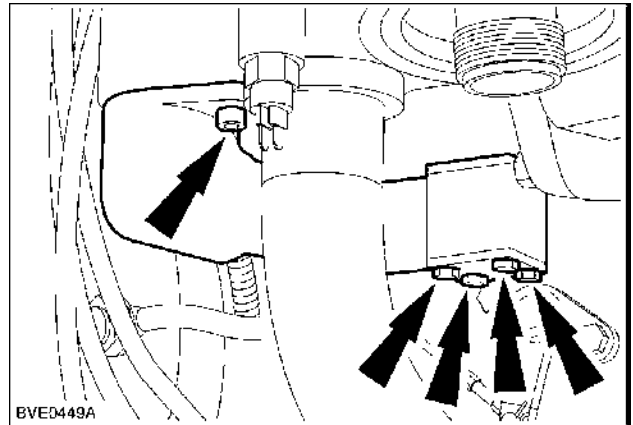
BVE0445A 2

3. Remove the steering / low pressure oil pump oil supply pipe.



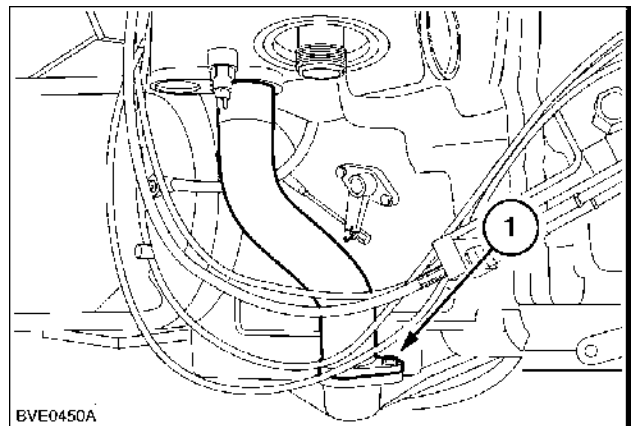
BVE0446A 3

4. Remove the hydraulic lift system oil pump oil supply pipe.



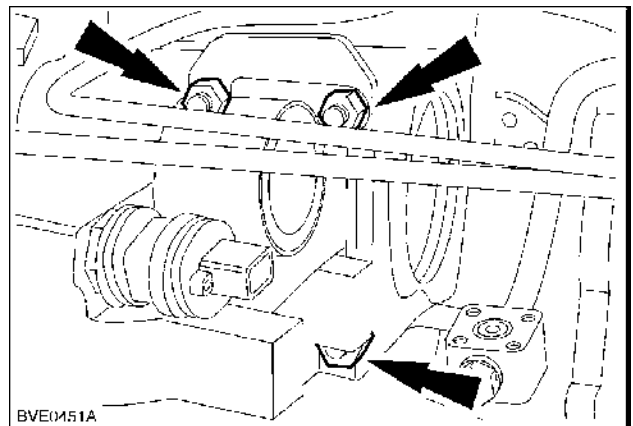
BVE0449A 4

5. Remove the main oil supply pipe lower retaining bolt (1).



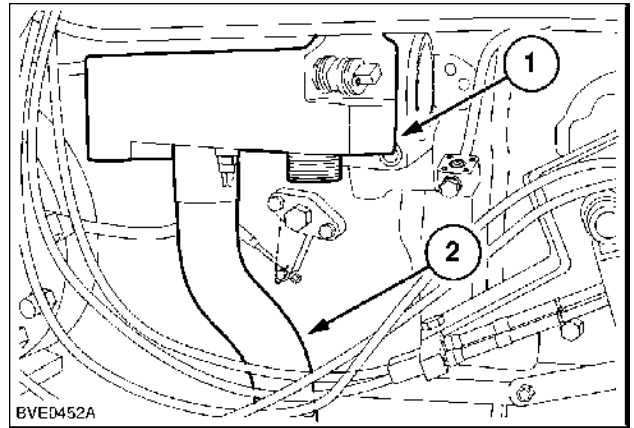
BVE0450A 5

6. Remove the oil supply manifold retaining nuts.



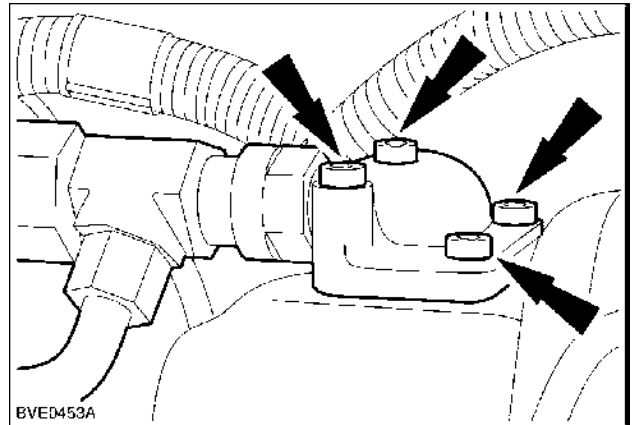
BVE0451A 6

7. Remove the oil supply manifold (1) and the main oil supply pipe (2) as an assembly.



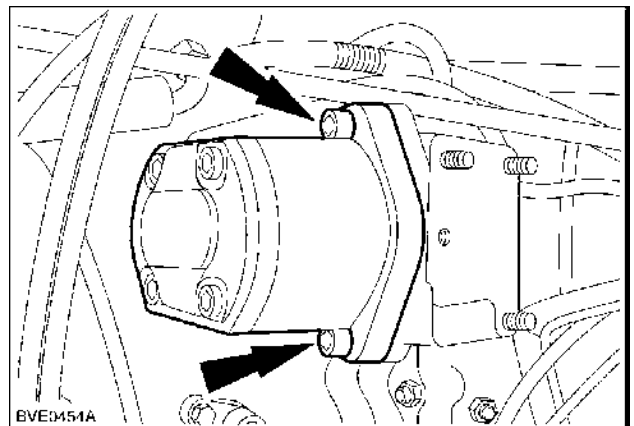
BVE0452A 7

8. Detach the hydraulic lift system oil pump supply pipe.



BVE0453A 8

9. Remove the hydraulic lift system oil pump.



BVE0454A 9

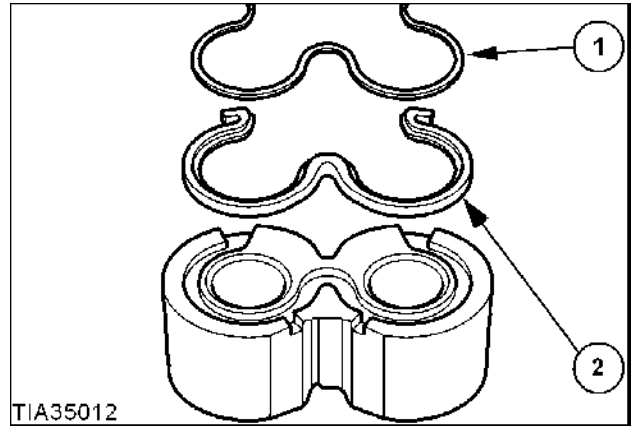
Hydraulic pump Fixed displacement pump - Overhaul [1705390]

⚠ **WARNING** ⚠

Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

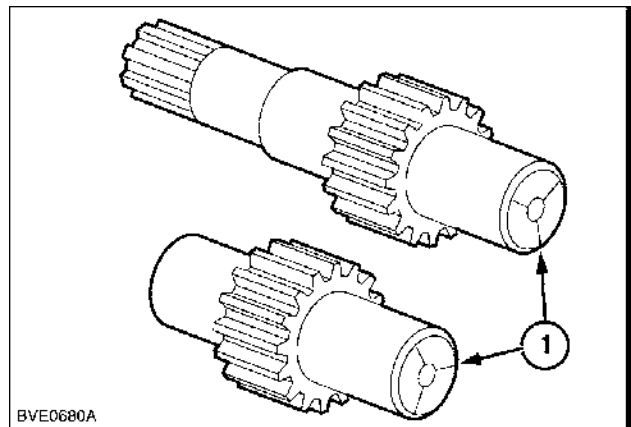
B026

1. Install new oil seals and O-rings. When installing oil seals in the bearing block ensure that the plastic back-up seal (1) is correctly positioned in the rubber seal (2). **Hydraulic pump Fixed displacement pump - Exploded view (A.10.A).**



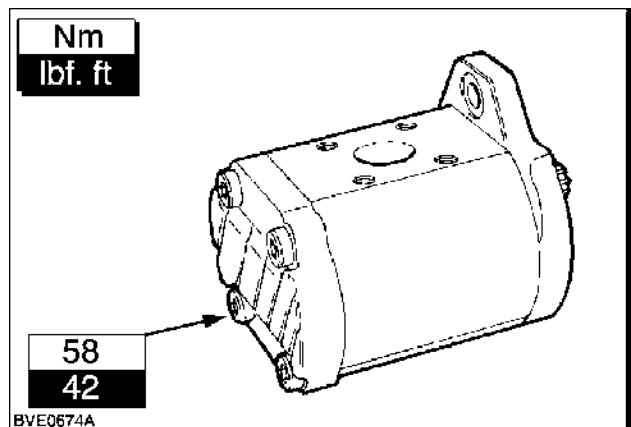
TIA35012 1

2. Install the driveshaft and driven gears into the hydraulic pump body, ensuring that the identification marks (1) face in the same direction.



BVE0680A 2

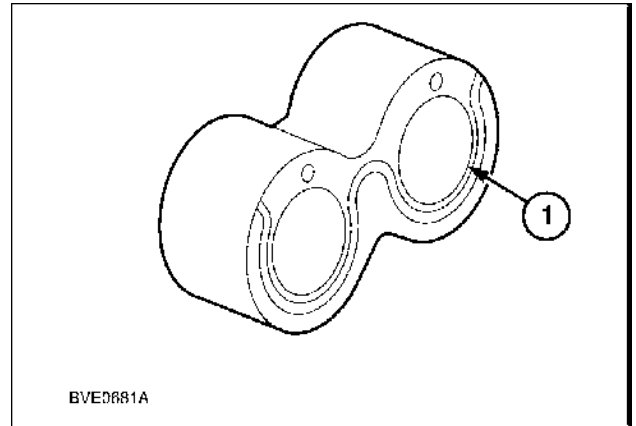
3. Tighten the retaining bolts to the specified torque value.



BVE0674A 3

Hydraulic pump Fixed displacement pump - Visual inspection [1705659]

1. Wash all components using a suitable degreaser.
2. Inspect the O-ring seal groove and the shaft oil seal recess in the mounting flange, these should be undamaged and free from burrs.
3. Examine the gears, shafts, and bearing blocks for wear. The pump must be renewed if:
4. The PTFE coated bearings (1) in the bearing blocks are worn through revealing the bronze backing. The gear side faces are scored. This concern is often caused by contaminated oil. There is a distinctive wear step on the side faces of the gears and bearing blocks.



BVE0681A 1

5. **IMPORTANT:** When servicing the pump gears, particular attention must be paid to the following points: The width of each gear set must be within **0.005 mm (0.0002 in.)** of each other to ensure satisfactory pump efficiency.
6. Journals must be within **0.013 mm (0.0005 in.)** of each other.
7. Gear faces must be flat. This feature may be checked using engineers blue on the bearing face and rotating against the gear. This check will also reveal any sharp edges on the teeth.

Hydraulic pump Variable displacement pump - Remove [15215706]

Prior operation:

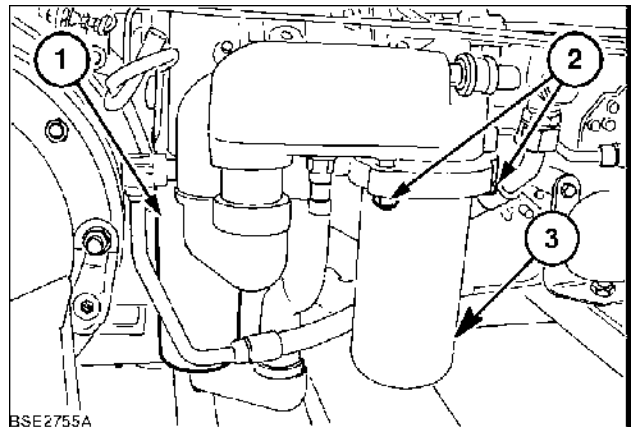
Remove the right hand rear wheel - see **Rear wheel - Remove (D.50.C)**.

NOTE: The hydraulic pump is a heavy component and weighs **30 kg (66 lb)**. It is important that it is securely supported when being removed from the tractor.

NOTE: If oil is not drained from transmission, do not remove tube from sump at sump end otherwise oil spillage will occur.

NOTE: To prevent excessive loss of oil loosen intake filter by approximately one turn and leave for one minute to allow oil in filter to drain into sump.

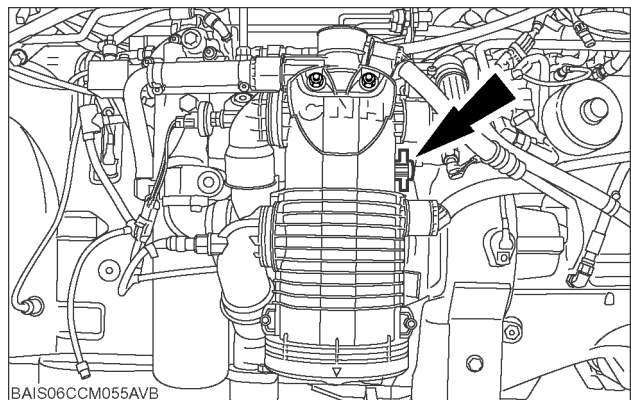
1. Drain oil into a suitable container.
2. Remove charge filter (1) by unscrewing anti-clockwise.
Remove the intake filter (3) by removing the retaining bolts (2).



BSE2755A_455 1

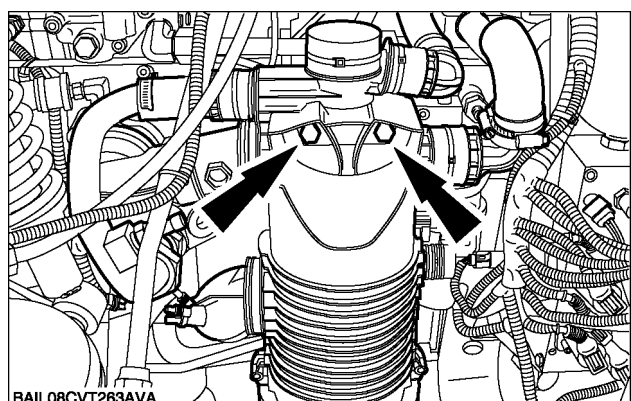
3. Disconnect all electrical and hydraulic connections to pump.

NOTE: Loosen the oil filter vent cap and leave for one minute to allow oil in the filters to drain into the sump.



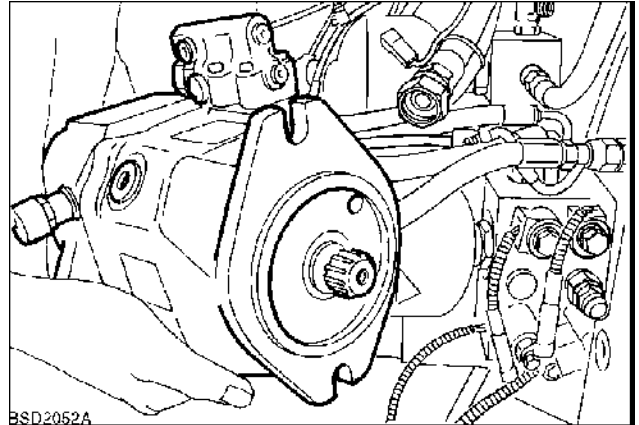
BAIS06CCM055AVB 2

Remove filter retaining bolts.



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4. Ensure lubrication pipe banjo connector and brake line retaining bracket are disconnected from pump body.
5. Remove filter housing and related tubes and elbows including the supplementary lube valve.
6. Undo pump retaining nuts and remove pump.



BSD2052A 4

Next operation:
Charge pump - Overhaul (A.10.A)

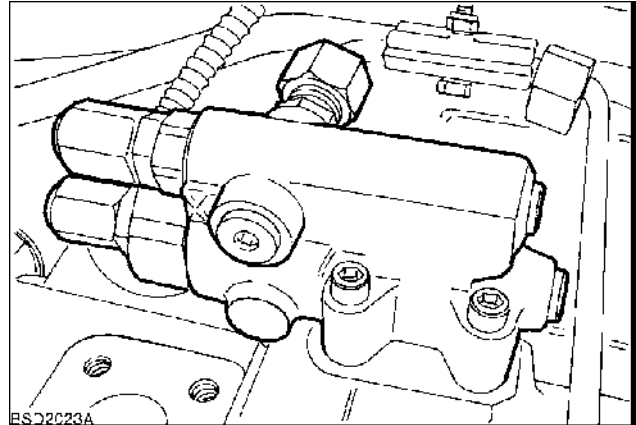
Hydraulic pump Variable displacement pump - Overhaul [15223572]

Hydraulic pump Variable displacement pump - Exploded view (A.10.A)

Prior operation:

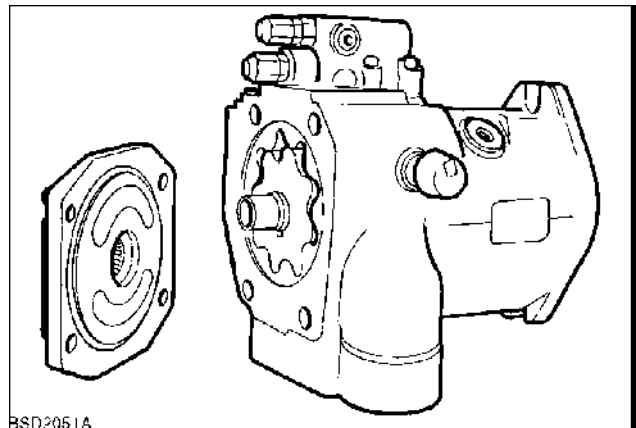
Hydraulic pump Variable displacement pump - Remove (A.10.A)

1. Remove pressure and flow compensating valves assembly.



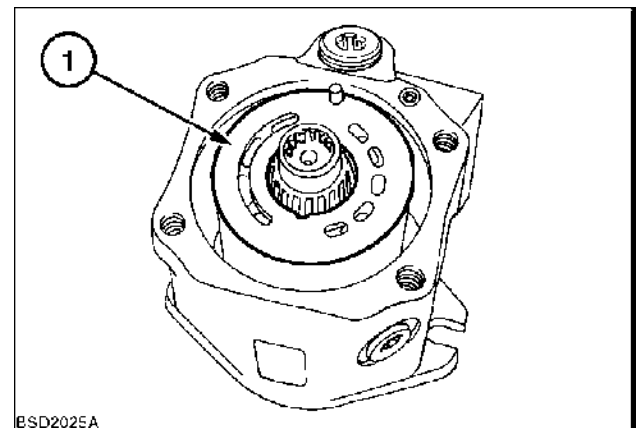
BSD2023A 1

2. Undo the 4 retaining bolts and remove circlip from opposite end of pump. Gently remove charge Pump from main pump assembly.



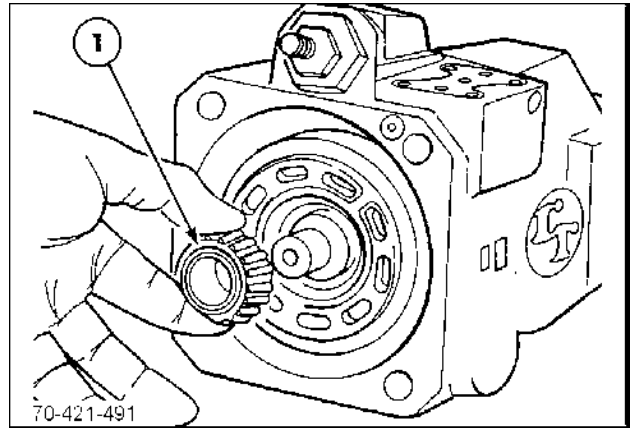
BSD2051A 2

3. Examine valve plate (1). Check to see if it is scored, nicked, warped or damaged by cavitation. Look for score marks or damage around the bearing surface area. Check the inlet and discharge port area for signs of contamination. This contamination may show as grooves starting in the feathering notch.



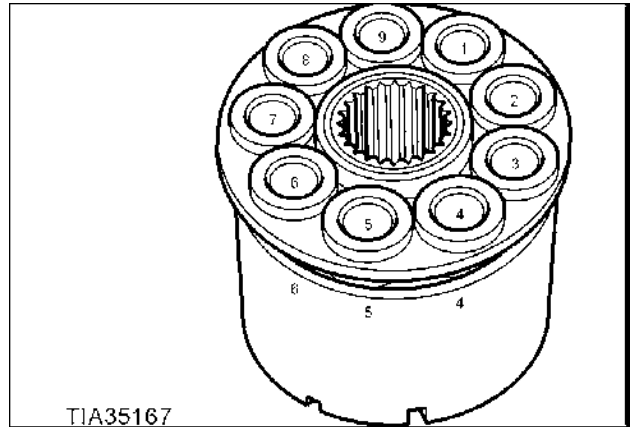
BSD2025A 3

4. Remove bearing cone (1) and splined connector.



70-421-491 4

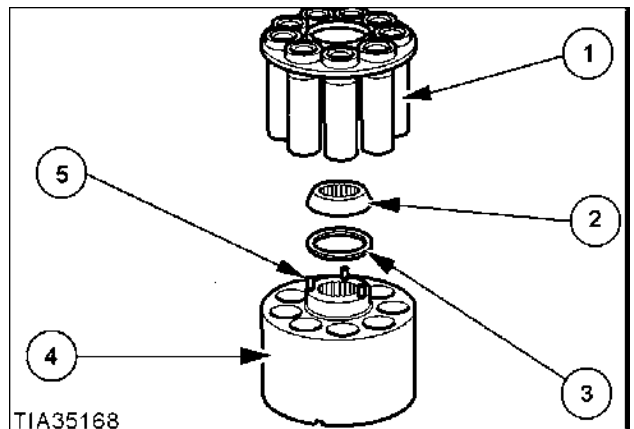
5. Remove preload spacer from driveshaft. Remove pumping head and piston from housing. Using a suitable marker identify each piston and slipper to their corresponding barrel in the pumping head.



TIA35167 5

Pumping Head and Slipper Assembly

6. Separate pumping head and slipper assembly and inspect for damage. Where damage is identified the pumping element must be replaced.
- 1 Pistons and Slippers
 - 2 Cone
 - 3 Washer
 - 4 Pumping Head
 - 5 Pins (3 off)

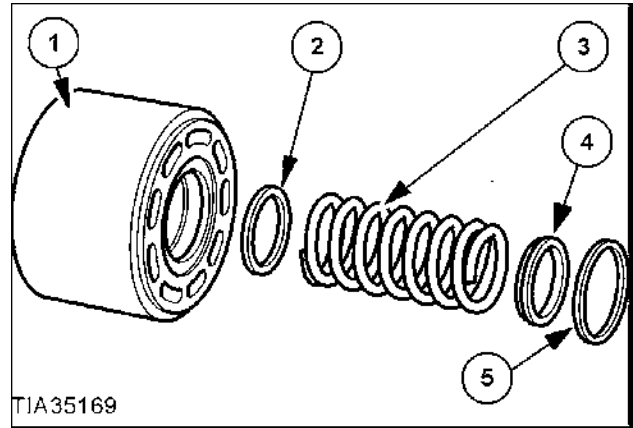


TIA35168 6

Pumping Head Spring Assembly

7. If necessary disassemble pumping head spring assembly by compressing the collar against the spring.
- 1 Pumping Head
 - 2 Washer
 - 3 Spring
 - 4 Collar
 - 5 Retaining Ring

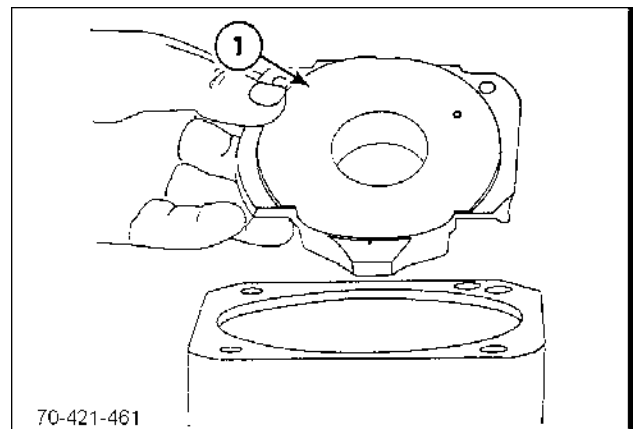
NOTICE: Due to high spring pressure take care when removing retaining ring.



TIA35169

TIA35169 7

8. Remove swash plate (1) assembly.



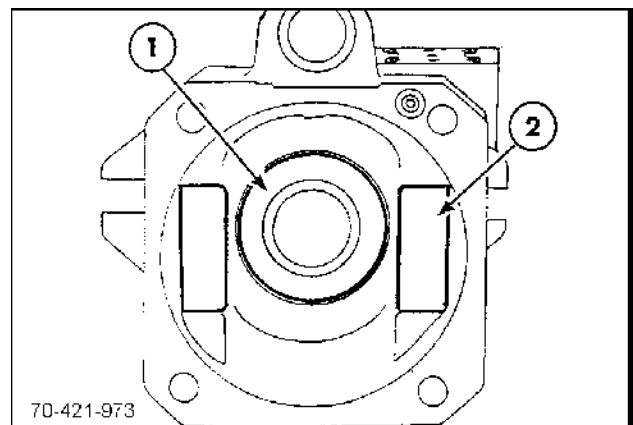
70-421-461

70-421-461 8

9. Inspect components for wear and replace if damaged.

Pump Reassembly

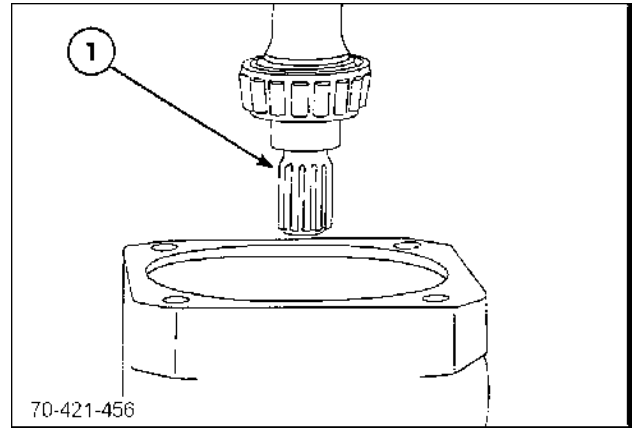
10. Before reassembling the load sensed variable displacement pump, replace all worn and damaged parts and assemblies and all seals and O rings. Lubricate the seals and O rings with petroleum jelly to retain them during reassembly and provide lubrication to the dust and shaft seals. Also lubricate all part surfaces freely with clean hydraulic fluid. Install a new input shaft bearing cup (1), and swash plate bearings (2).



70-421-973

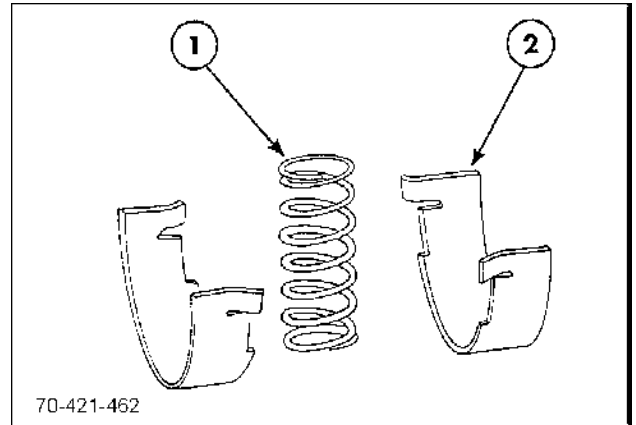
70-421-973 9

11. Install input shaft into housing.



70-421-456 10

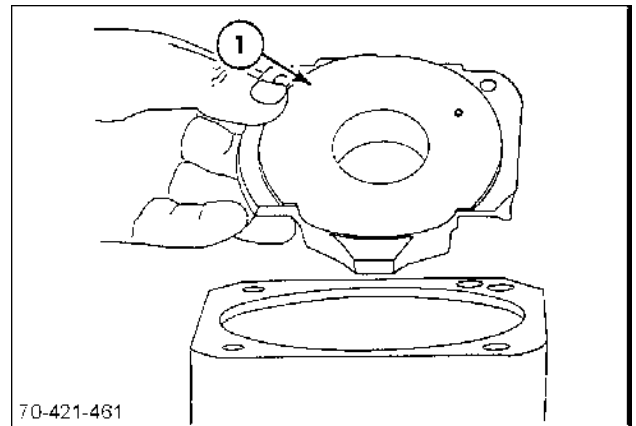
12. Install swash plate control spring (1) and swash plate bearings (2).



70-421-462 11

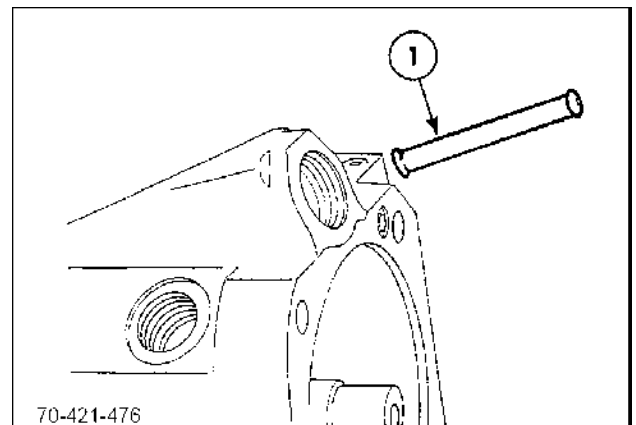
13. Reassemble the swash plate (1), into the housing by tilting the swash plate with the push rod socket up slightly and installing.

NOTE: Caution must be used when installing the complete swash plate so as not to dislodge the swash plate spring or the saddle bearings.



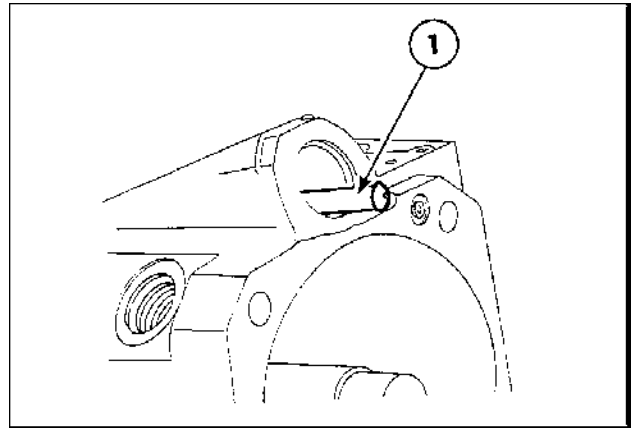
70-421-461_460 12

14. Insert the push rod (1), through the stroke piston bore and reengage the end of the tube into the swash plate socket.



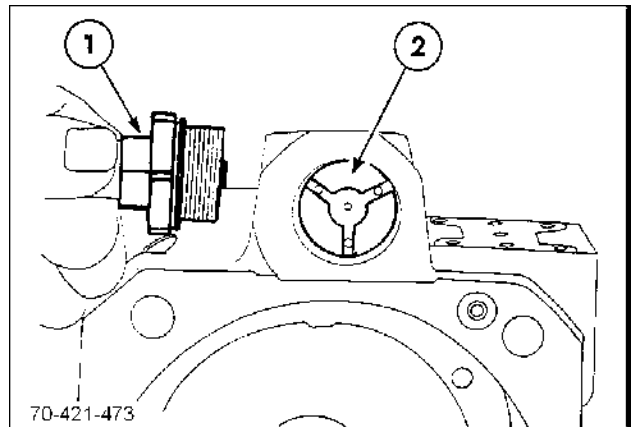
70-421-476 13

15. Tilt the swash plate up and insert the push rod (1), down and into the socket. Make sure the push rod is engaged in the socket correctly.



1b0o2004061062 14

16. Install the stroke control piston (2), in the bore. Screw the plug (1), back on.

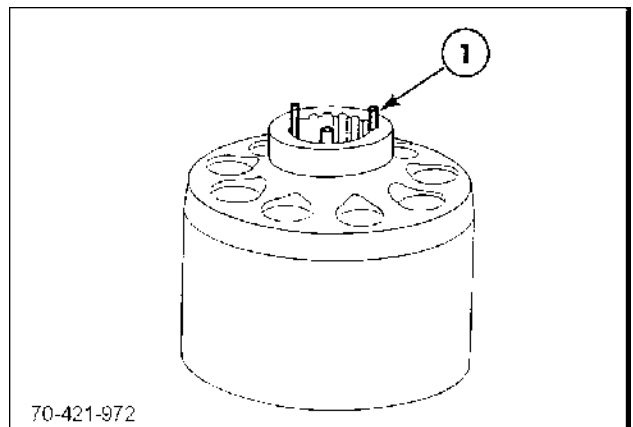


70-421-473

70-421-473 15

Pumping Head and Piston Assembly

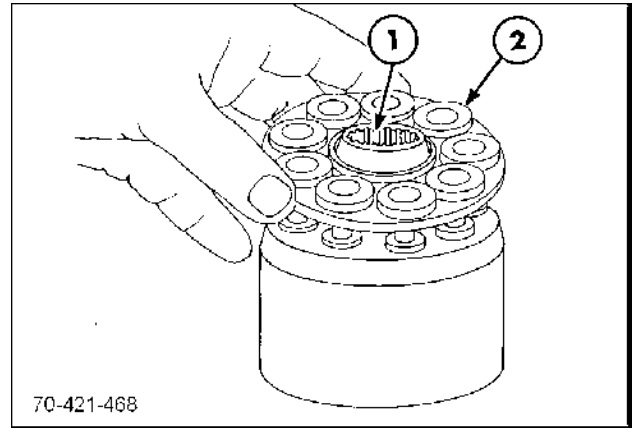
17. Install the guide pins (1), in the block splines.



70-421-972

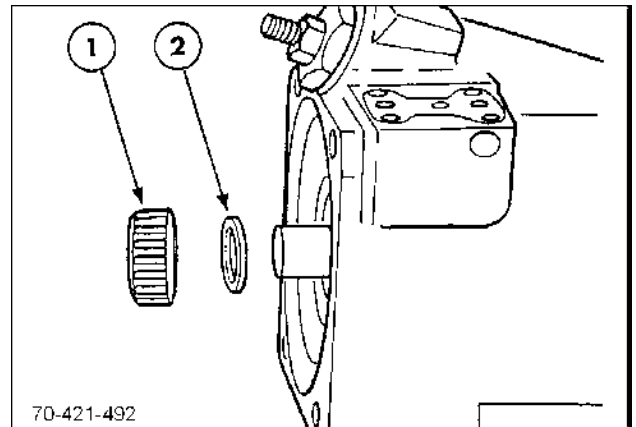
70-421-972 16

18. Lubricate and install the bearing (1), spider and piston assemblies (2), on the pivot and into the block assembly.



70-421-468 17

19. Check bearing preload before installing the rotating group. Install bearing (1), and spacer (2), on the shaft.



70-421-492 18

Next operation:

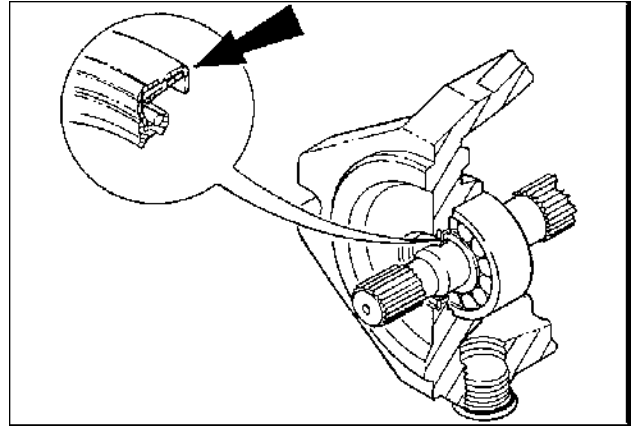
Install the charge pump as described in **Charge pump - Overhaul (A.10.A)**.

Hydraulic pump Variable displacement pump - Replace (Input shaft seal) [15216440]

Prior operation:

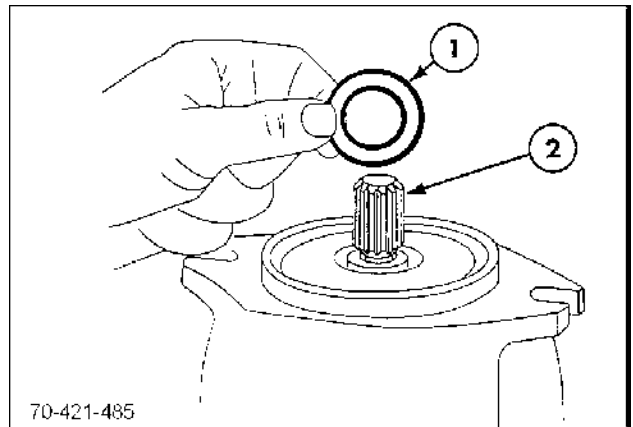
Hydraulic pump Variable displacement pump - Remove (A.10.A)

1. When replacing the input shaft seal, make sure the pump housings mounting flange is clean. Use circlip pliers to remove the input shaft seal retaining ring.



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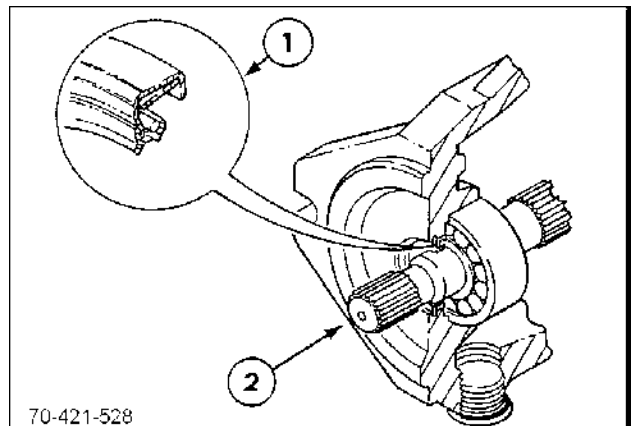
2. With the retaining ring removed, use a punch or similar tool, and carefully pierce the top of the lip seal. Using the punch, pry the seal from its bore.



70-421-485

70-421-485 2

3. Protect the inner lip of the new shaft seal (1), lubricate and install the seal over the input shaft (2), and into the pump housing.



70-421-528

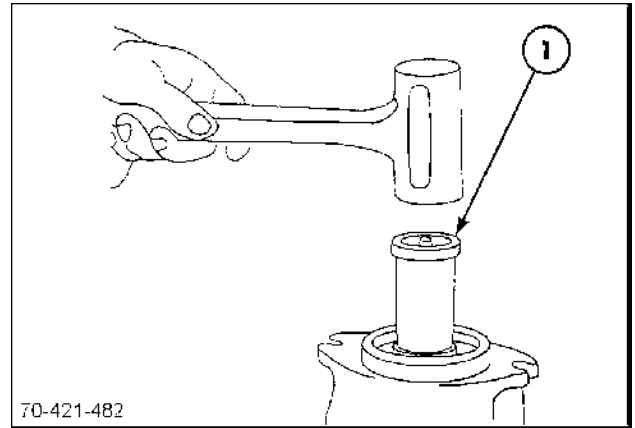
70-421-528 3

4. Tap the shaft seal into the pump housing until it is just slightly below flush of the counterbore face.

NOTE: Do not seat the seal this time.

5. Use a seal driver, (1), such as a **31.8 mm (1.25 in)** ID **38.1 mm (1.5 in)** OD x **63.5 mm (2.5 in)** long pipe as shown here, to press both the retaining ring and shaft seal into the pump housing.

NOTE: Press the retaining ring in just far enough that it snaps into the retaining ring groove machined into the pump housing.



70-421-482_456 4

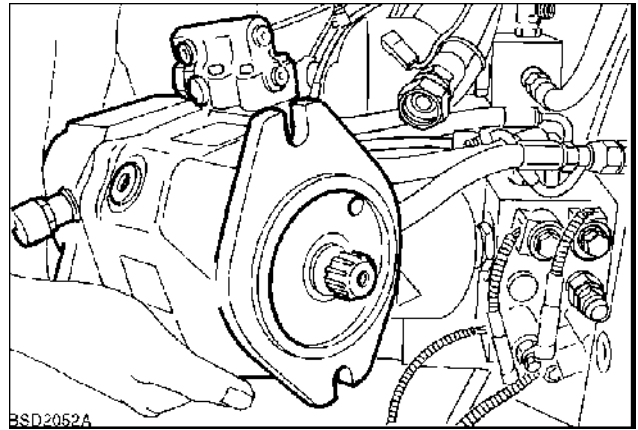
Next operation:
Hydraulic pump Variable displacement pump - Install (A.10.A)

Hydraulic pump Variable displacement pump - Install [15215155]

Prior operation:

Charge pump - Overhaul (A.10.A)

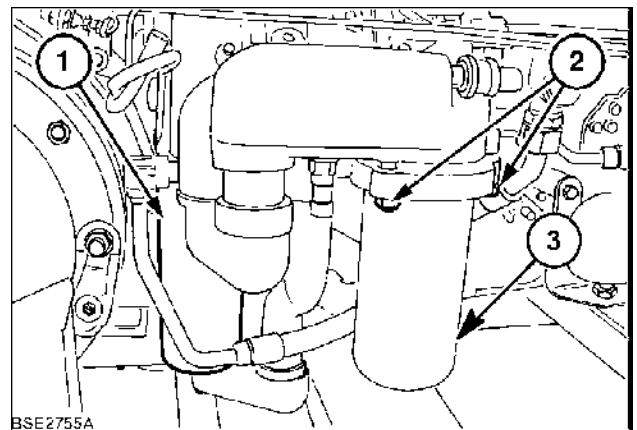
1. Install the pump and tighten the nuts.



BSD2052A

BSD2052A 1

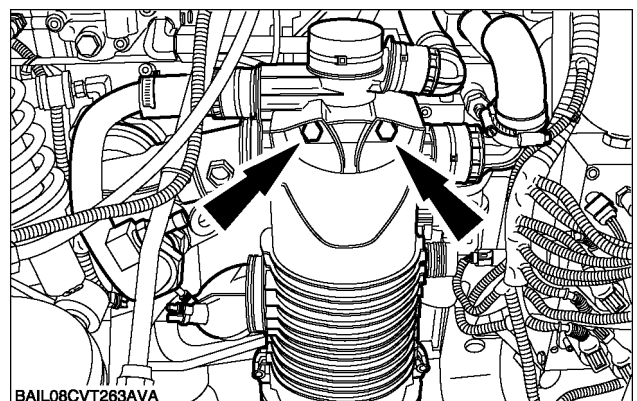
2. Install filter housing, related tubes and elbows including the supplementary lube valve.
3. Ensure lubrication pipe banjo connector and brake line retaining bracket are connected to the pump body.
4. Connect all electrical and hydraulic connections to pump.
5. Install the intake filter (3) by installing the retaining bolts (2).
Install charge filter (1) by screwing clockwise.



BSE2755A

BSE2755A_455 2

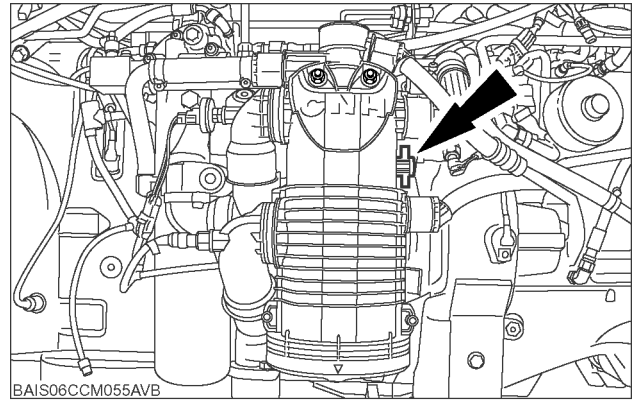
Install the filter housing and tighten the retaining bolts to **40 N·m (29.5 lb ft)**.



BAIL08CVT263AVA

BAIL08CVT263AVA 3

6. Connect all the relevant hoses and pipes. Ensure the oil filter vent cap is tightened.



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Next operation:

Install the right hand rear wheel - see **Rear wheel - Install (D.50.C)**.

Refill the driveline with the correct specification oil - see **Consumables Lubrications and Coolants**.

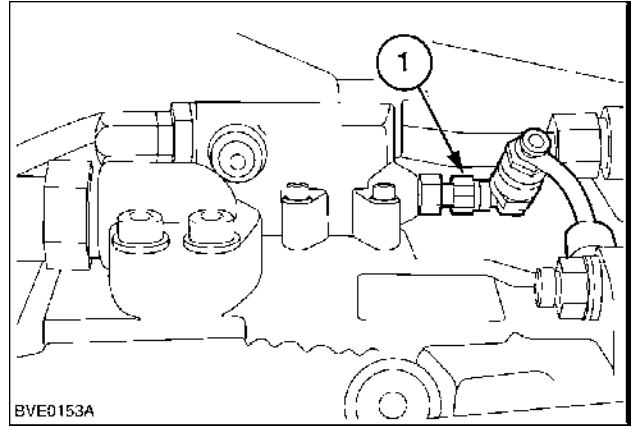
Hydraulic pump Variable displacement pump - Pressure test [17129424]

The following tests check operation of the hydraulic pump and associated high pressure circuits.

NOTICE: Before performing any pressure testing operate the tractor until the oil in the rear axle is at normal operating temperature **75 °C (167 °F)**.

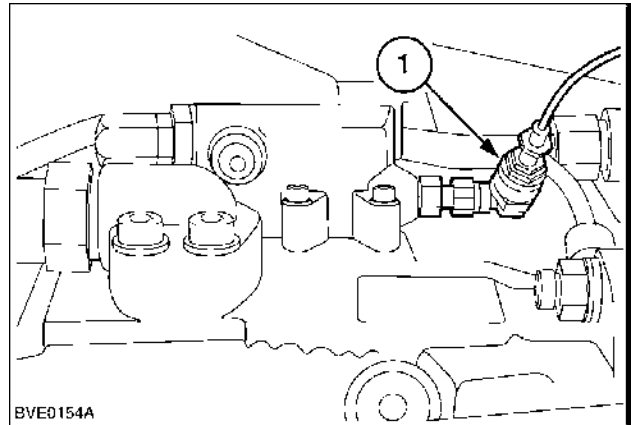
Standby Pressure

1. Remove the pressure compensating valve plug and install the **90 °** quick release fitting adaptor **380001146 (1)**.
- Test port thread **M8 x 1.0**



BVE0153A 1

2. Attach a **0 - 40 bar (0 - 580 psi)** pressure gauge **380000552**, using the quick release coupler **380000543 (1)** and the hose **380000545**.

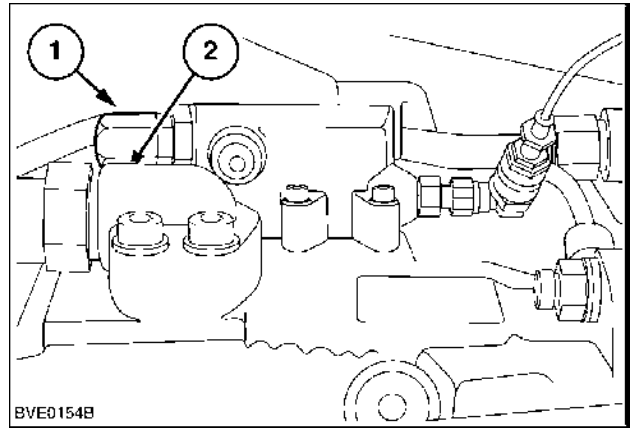


BVE0154A 2

3. Set the engine speed to **1500 rev/min** to observe the system operation pressure or **2200 rev/min** for the maximum system pressure.
The pressure reading should be **22 - 24 bar (319 - 348 lbf/in²)** and is the `Standby Pressure`.

NOTICE: Do Not operate the tractor brakes or any remote control valve lever, otherwise the system pressure will increase to maximum pressure of **205 - 215 bar (2973 - 3118 psi)** this will result in damage to the pressure gauge.

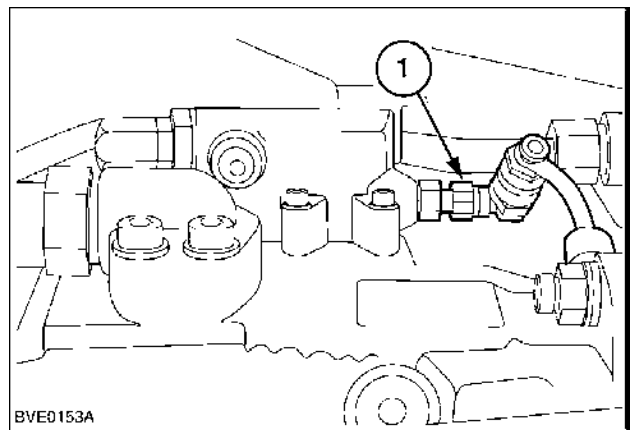
4. If the pressure reading is not to the specification, adjust the flow compensating valve (1).
If the pressure reading is high, examine the flow compensating valve (1) spool for sticking.



BVE0154B 3

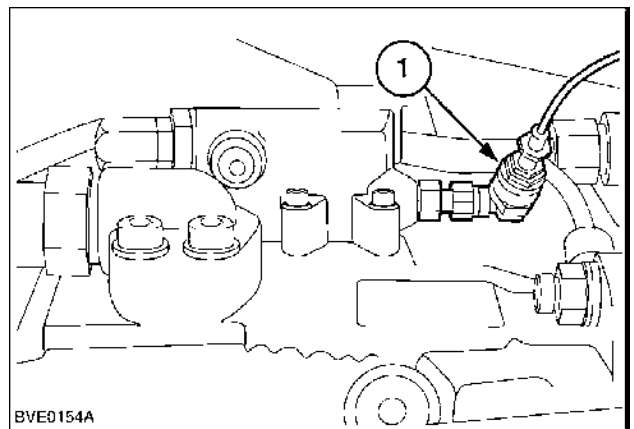
Maximum Pressure

5. Remove the pressure compensating valve plug and install the 90 ° quick release fitting adaptor **380001146 (1)**.
- Test port thread M8 x 1.0



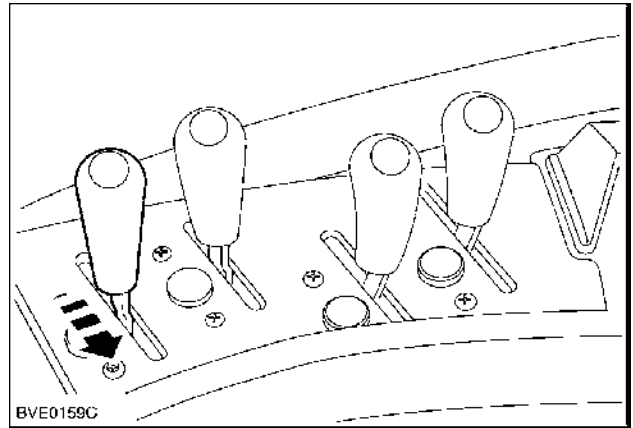
BVE0153A 4

6. Attach a **0 - 250 bar (0 - 3625 psi)** pressure gauge **380000553**, using the quick release coupler **380000543 (1)** and the hose **380000545**.



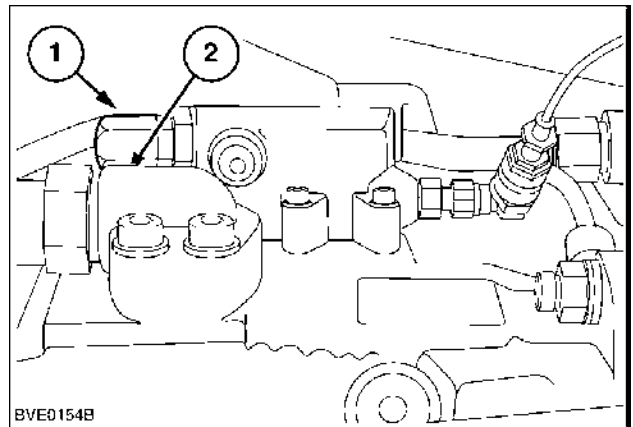
BVE0154A 5

7. Set the remote control valve number 1 in the 'Extend' position.
 Set the engine speed to **1500 rev/min** to observe the system operation pressure or **2200 rev/min** for the maximum system pressure.
 The pressure reading should be **205 - 215 bar (2973 - 3118 psi)** and is the 'Maximum Pressure'.



BVE0159C 6

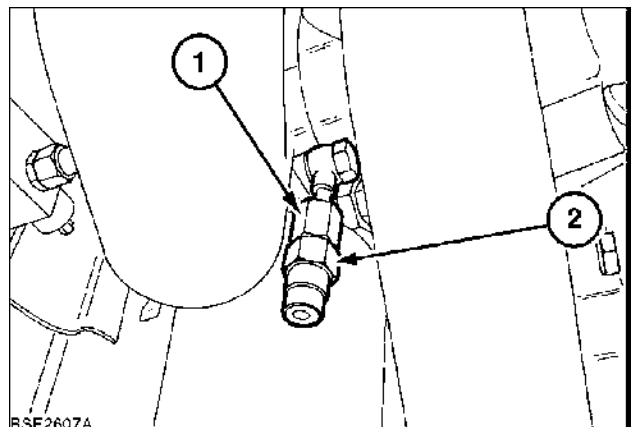
8. If the pressure reading is not to specification adjust the pressure compensating valve (2).



BVE0154B 7

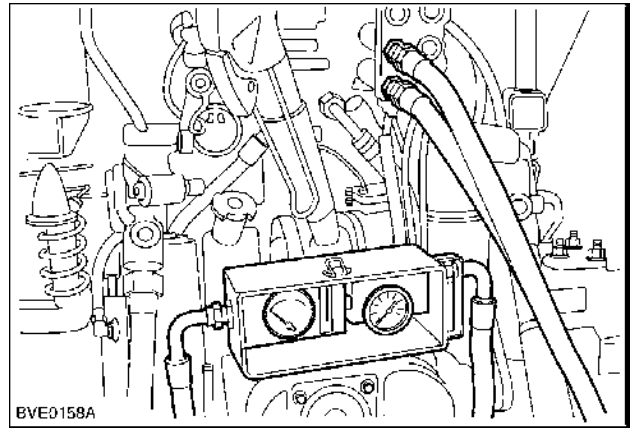
Charge Pressure

9. Remove the charge pressure switch and install the adaptor 380000572 (1) and the quick release fitting 380000492 (2).
 - Test port thread M10 x 1.0
 Attach a **0 - 10 bar (0 - 145 psi)** pressure gauge 380000551, using the quick release coupler 380000543 and the hose 380000545.



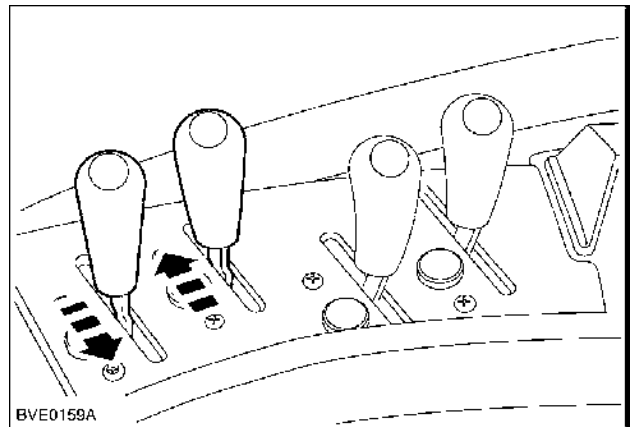
BSE2607A 8

10. Install a **180 l/min (47.55 US gpm)** flow meter between the remote control valves number 1 and number 2. Ensure the inlet hose of the flow meter is installed into the extend port of valve number 1. Fully open the load valve on the flow meter. Set the hydraulic oil flow to maximum.



BVE0158A 9

11. Set the remote control valve number 2 in the 'Float' position. Set the remote control valve number 1 in the 'Extend' position. Set the engine speed to **1500 rev/min** to observe the system operation pressure or **2200 rev/min** for the maximum system pressure.



BVE0158A 10

12. Move the remote control valve lever for the remote control valve number 1 between the extend and neutral position.
13. The following pressures should be observed:
- **6 - 8 bar (87 - 116 psi)** - Neutral
 - **2 bar (29 psi)** - Extend
- If the pressure reading is below **1.6 bar (23.2 psi)**, replace the hydraulic oil filters and re-test. If after re-test the charge pressure is still below the specification, check the supplementary lube valve, examine both the charge pressure filter dump valve and the charge pressure valve before disassembling the hydraulic oil pump to inspect for wear.

**Thank you very much
for your reading.**

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**Then Get More
Information.**