SERVICE MANUAL

T6010 / T6020 / T6030 / T6040 / T6050 / T6060 / T6070

Tractor

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NEW HOLLAND AGRICULTURE

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Foreword

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 customers 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 customers 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 customers 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 customers 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.

	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
PRODUCT											
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		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

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.

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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

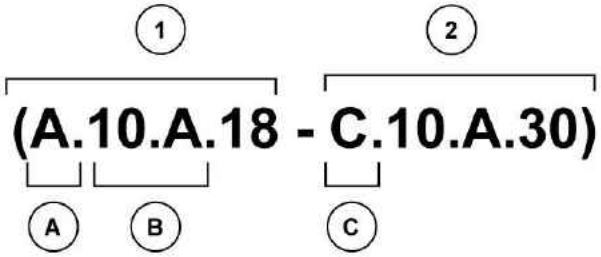
POWER PRODUCTION - B
ENGINE

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 NEW HOLLAND 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

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.

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SAFETY RULES

Generalities

- Carefully follow specified repair and maintenance procedures.

- 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

CONTENT

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.

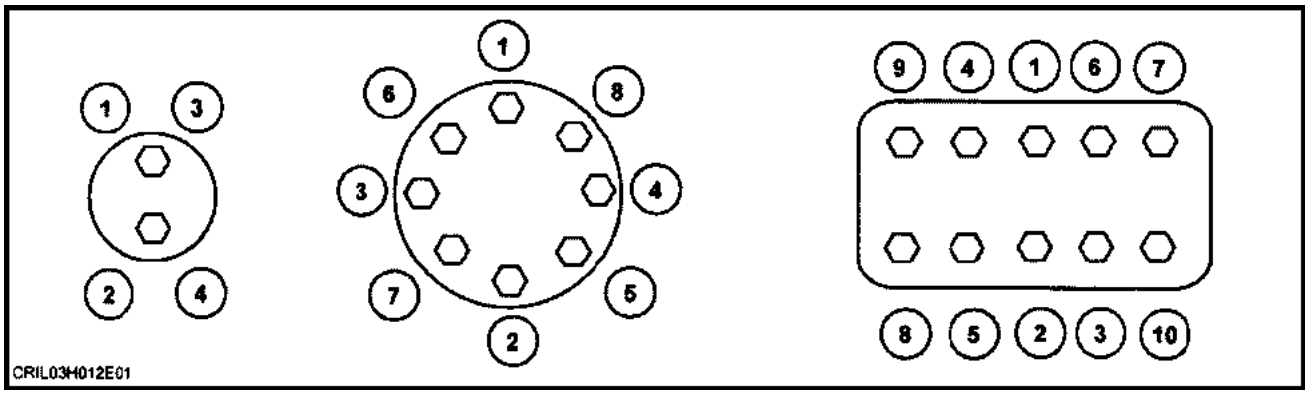
HELPFUL HINTS

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

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.*



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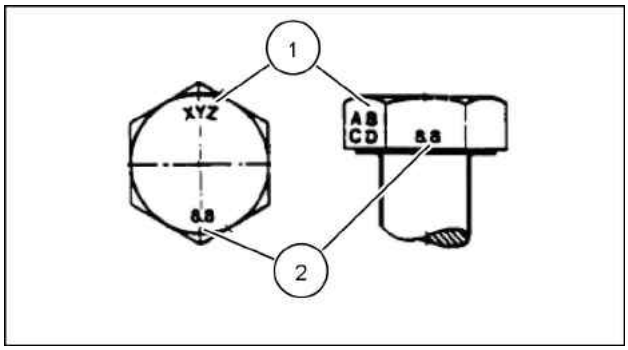
Imperial hardware

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 8Unplated 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

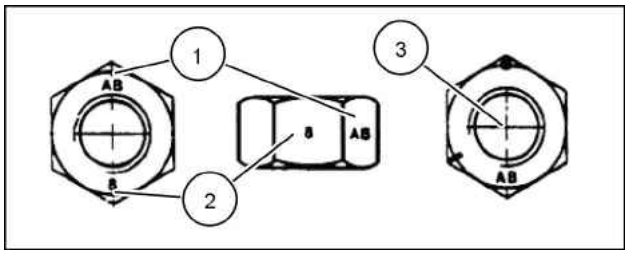
Nominal Size	CLASS 5.8 UNPLATED	CLASS 5.8 UNPLATED	CLASS 8.8 UNPLATED	CLASS 8.8 UNPLATED	CLASS 10.9 UNPLATED	CLASS 10.9 UNPLATED	LOCKNUT CL.8 w/CL8.8 BOLT
M4	**1.7 Nm 15 lb in**	**2.2 Nm 19 lb in**	**2.6 Nm 23 lb in**	**3.4 Nm 30 lb in**	**3.7 Nm 33 lb in**	**4.8 Nm 42 lb in**	**1.8 Nm 16 lb in**
M6	**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

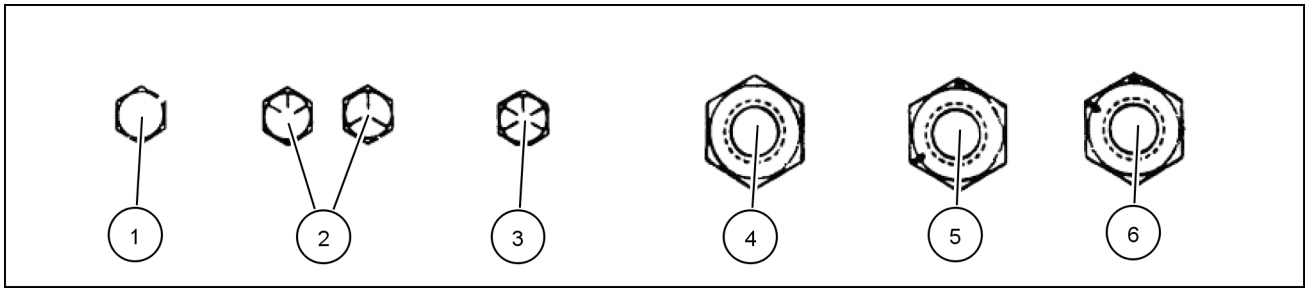
1.Manufacturers identification
2. Property class



20083681 3

Identification - Hexagonal nuts and locknuts classes 05 onwards

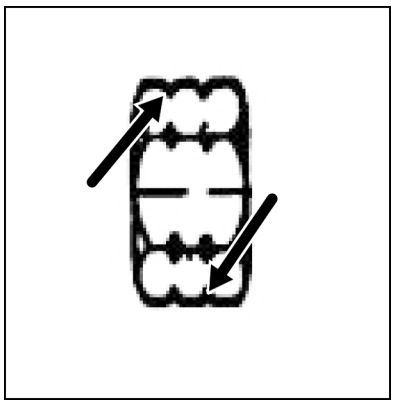
1. Manufacturers identification
2. Property class
3. Clock marking



20083682 4

Identification - Cap screws and carriage bolts

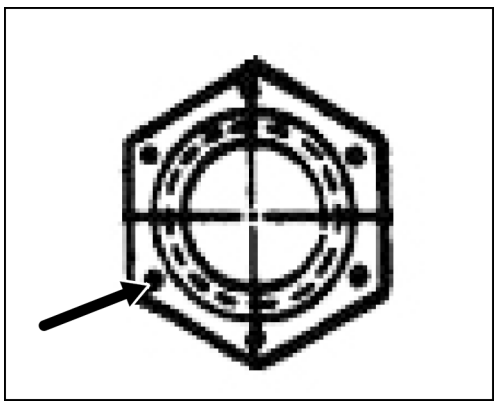
1. SAE grade 2
2. SAE grade 5
3. SAE grade 8
4. Regular nuts
5. SAE grade 5 hex nuts
6. SAE grade 8 hex nuts



20083683 5

Locknuts - grade identification

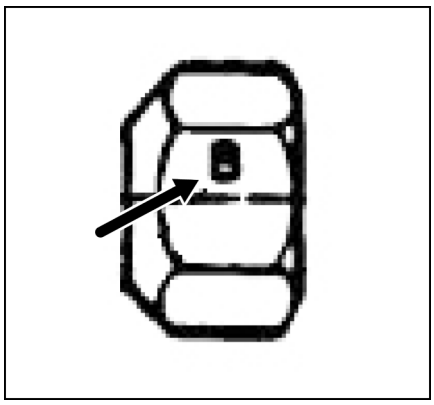
Grade A : no notches
Grade B : one circumferential notch
Grade C : two circumferential notches



20083684 6

Locknuts - grade identification

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



20083685 7

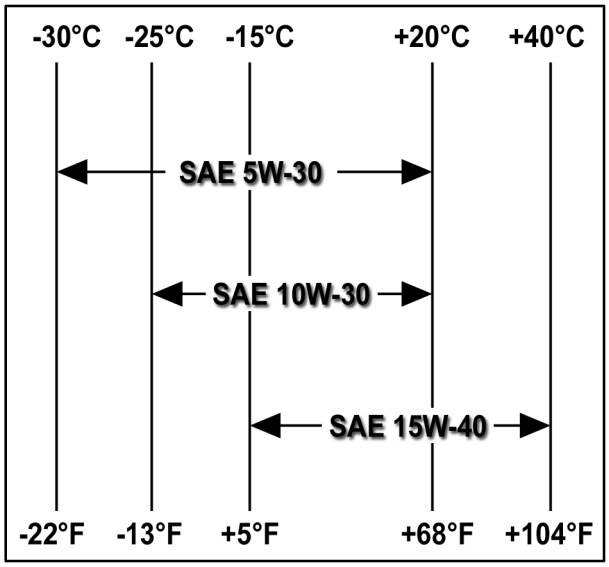
Locknuts - grade identification

Grade A : no marks
Grade B : letter B
Grade C : letter C

Consumables Lubrications and Coolants

Lubrications

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



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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.

⚠ CAUTION ⚠

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

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- 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	NH SPECIFICATION	INTERNATIONAL SPECIFICATION
ENGINE OIL **AMBRA MASTERGOLD HSP 15W-40** **AMBRA MASTERGOLD HSP 10W-30**	NH 330 H NH 324 H	API CI-4/CH-4, ACEA E7/E5
TRANSMISSION, REAR AXLE AND HYDRAULIC SYSTEM OIL **AMBRA MULTI G**	NH 410 B	SAE 10W-30 API GL4, ISO VG32/46
FRONT AXLE (Axle and Hubs) **AMBRA MULTI G**		
FRONT P.T.O GEARBOX OIL **AMBRA MULTI G**		
ENGINE RADIATOR COOLANT **AMBRA AGRIFLU** (mixed with 50% of water)	NH 900 A	Ethylene Glycol
BRAKE OIL **AMBRA BRAKE LHM**	NH 610 A	ISO 7308
AIR CONDITIONING COMPRESSOR OIL Low Viscosity Oil SP10	n/a	PAG-E13, ISO100 Viscosity
GREASE FITTINGS AND BEARINGS **AMBRA GR9**	NH 710 A	NLGI 2

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

Capacities

UNIT	T6010	T6020	T6040	T6060	T6030	T6050	T6070
FUEL TANK (with Standard Steer)	176 l (46.5 US gal)				250 l (66 US gal)		
FUEL TANK (with Super Steer)	152 l (40.2 US gal)				230 l (60.8 US gal)		
COOLING SYSTEM (with cab) *) only for DELTA models T6010, T6020 and T6030	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)						

NEW HOLLAND
AGRICULTURE

SERVICE MANUAL

HYDRAULIC - PNEUMATIC - ELECTRICAL - ELECTRONIC SYSTEMS

T6010 , T6020 , T6030 , T6040 , T6050 , T6060 , T6070

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HYDRAULIC - PNEUMATIC - ELECTRICAL - ELECTRONIC SYSTEMS - A

HYDRAULIC - PNEUMATIC - ELECTRICAL - ELECTRONIC SYSTEMS - A

PRIMARY HYDRAULIC POWER SYSTEM - 10.A

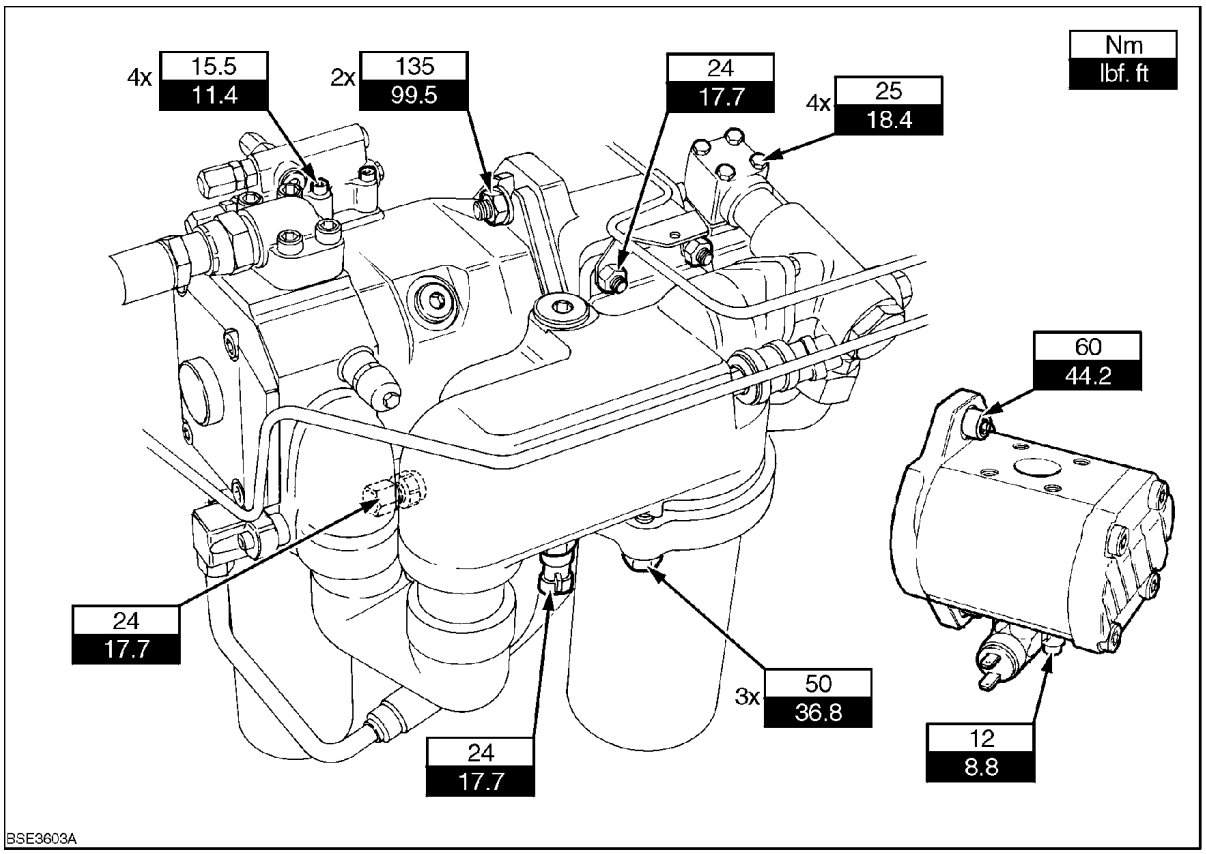
T6010 , T6020 , T6030 , T6040 , T6050 , T6060 , T6070

Contents

HYDRAULIC - PNEUMATIC - ELECTRICAL - ELECTRONIC SYSTEMS - A

PRIMARY HYDRAULIC POWER SYSTEM - 10.A

PRIMARY HYDRAULIC POWER SYSTEM - Torque



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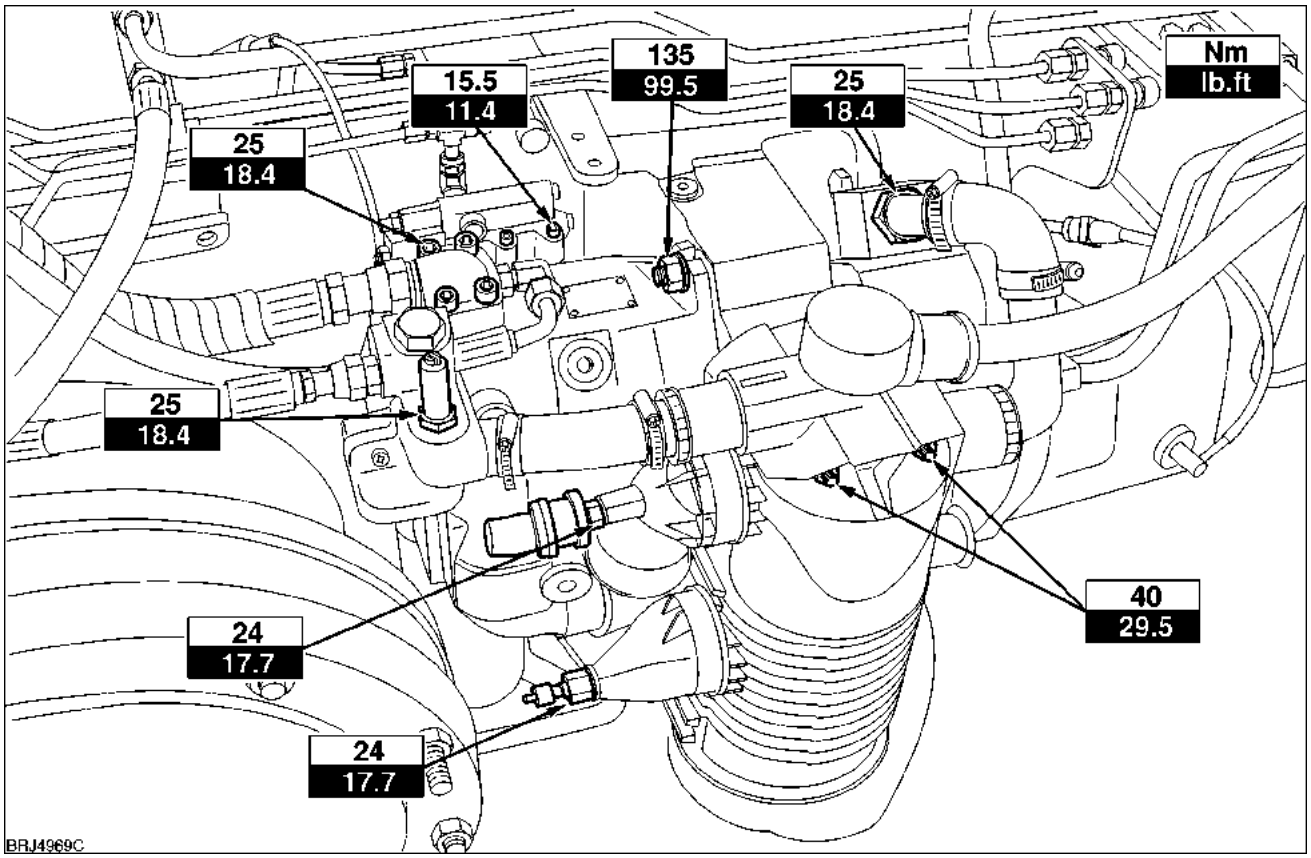

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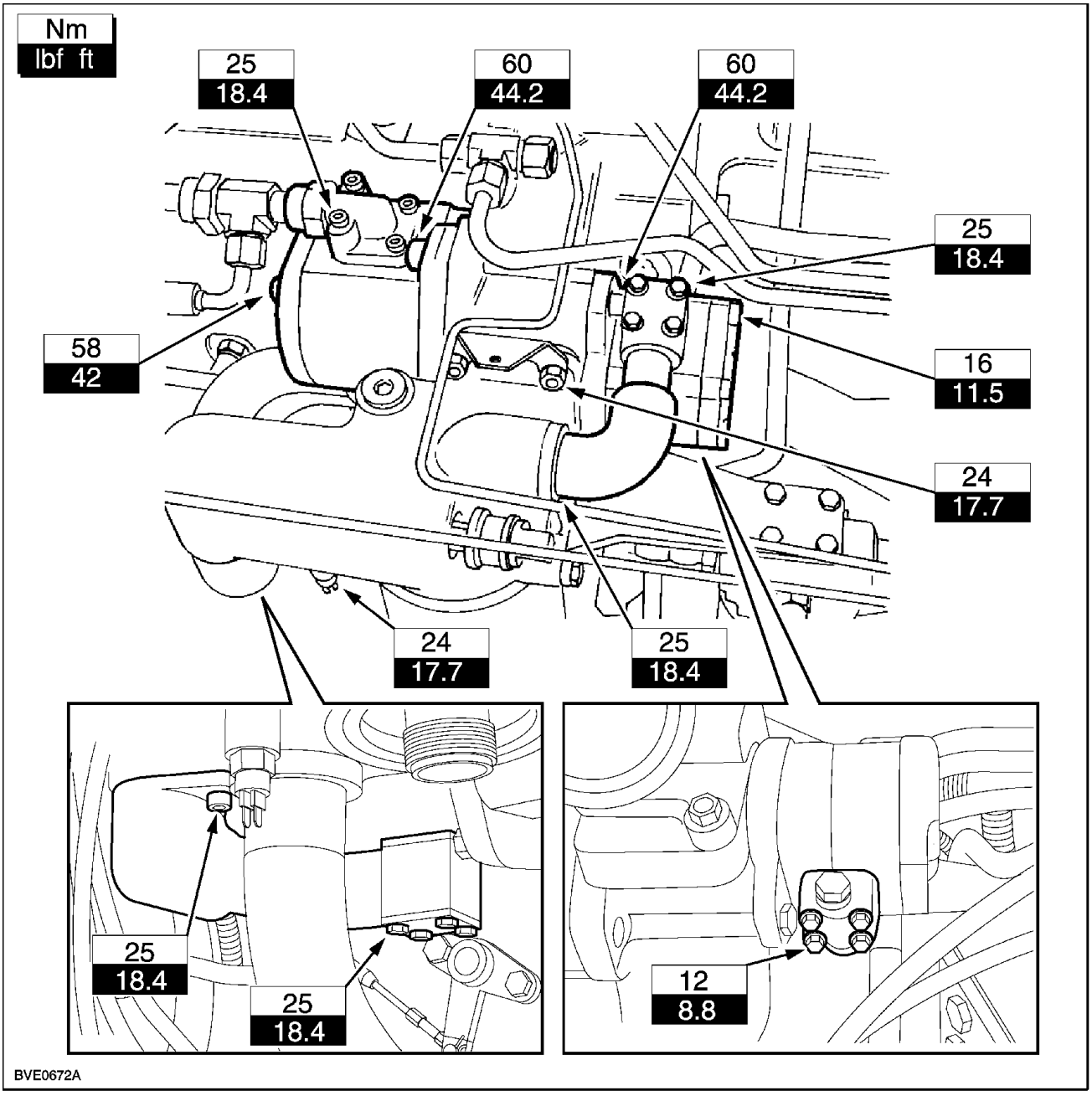
PRIMARY HYDRAULIC POWER SYSTEM - Special tools

DESCRIPTION	PART NUMBER	Previous part number
Tee adaptor 11/16 ORFS female x 11/16 ORFS male x 7/16 UNF female	**380000570***	**297600***
Adaptor M10 banjo x 7/16 UNF female	**380000572***	297602*
Adaptor 7/16 UNF female x M12 x 1.5p male	**380000577***	297607*
Adaptor 7/16 UNF male	**380000999**	292928#
Adaptor M14 banjo x M14 x 1.5p female	**380000579***	297609*
Tee adaptor 7/16 UNF female x 1/4 BSP hose tail x 1/2 hose	**380000580***	297610*
7/16 UNF male Quick release adaptor	**380000492**	**297240***
Adaptor M10 x 1.0p x 7/16 UNF female	**380000493**	**297404***
Hand pump	**380000215**	
Lift relief valve fitting	**380000217**	
90 quick release fitting with adaptor M8 x 1.0 male	**380001146**.	**297241**
Blanking Cap 11/16 ORFS	**380000599***	297671*
Pressure Gauge 0–10 bar	**380000551#**	293241#
Pressure Gauge 0–27 bar	**3800001145**	**297167**
Pressure Gauge 0–40 bar (5 off)	**380000552#**	**293242#**
Pressure Gauge 0–250 bar	**380000553 #**	293244#
Remote valve coupling	**380000554#**	5101741 or 293449#
Quick release adaptor	**380000543**	**291924**
Pressure gauge hose	**380000545#**	**292246#**
1/8 NPT fitting to attach hose 292246 to gauge	**380000544#**	**291927#**
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**	**297417**
diagnostic switch	**380000488**	**295041**
Bypass connector	**380001147**.	**297407**
Bypass connector	**380000561**	**295044**
Trailer brake fitting	**380000550#**	293190#
Open Centre Lift Pressure Regulating Valve Adjusting Tool	**380000231**	**291863**
Flow Meter **120 l/min**)		
* Part of hydraulic adaptor kit **380000464**		**297611**
# Part of hydraulic pressure test kit **380000240**		**292870**
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

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

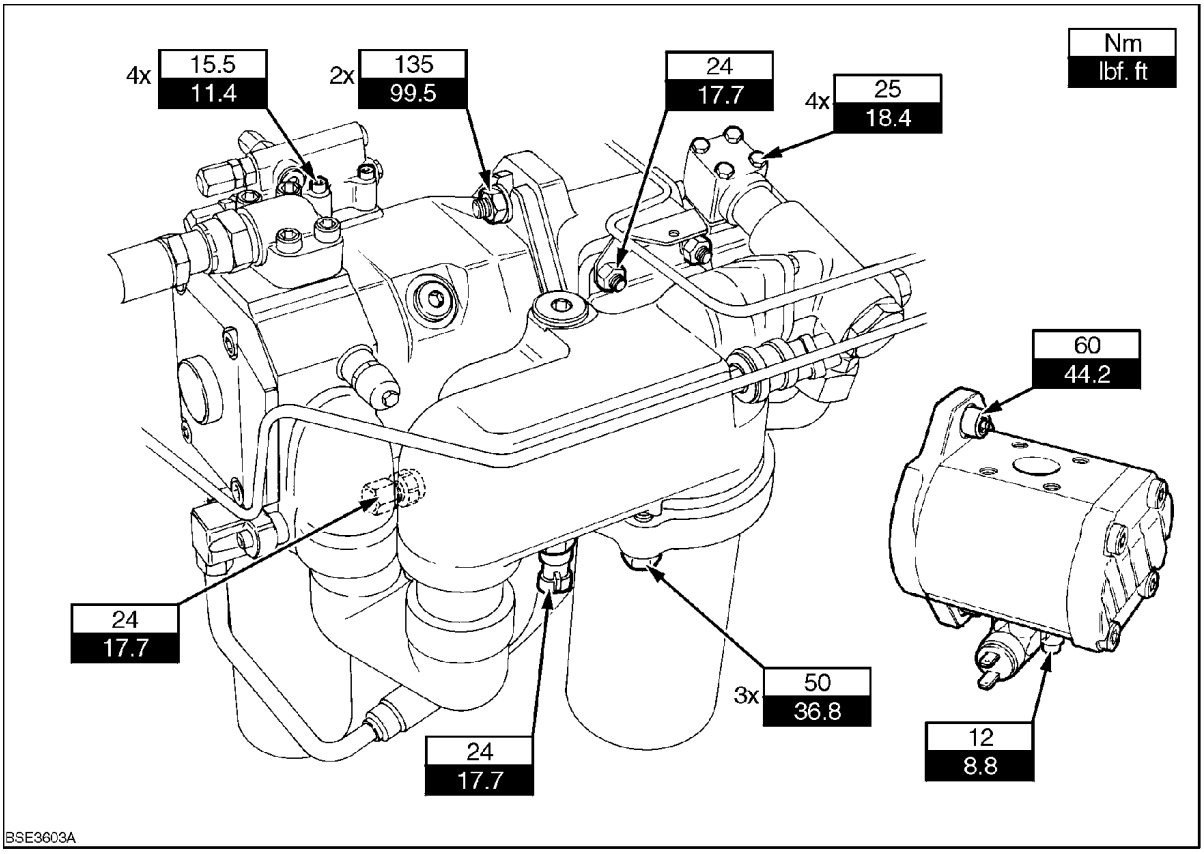


BVE0672A 1

Hydraulic pump Variable displacement pump - General specification

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



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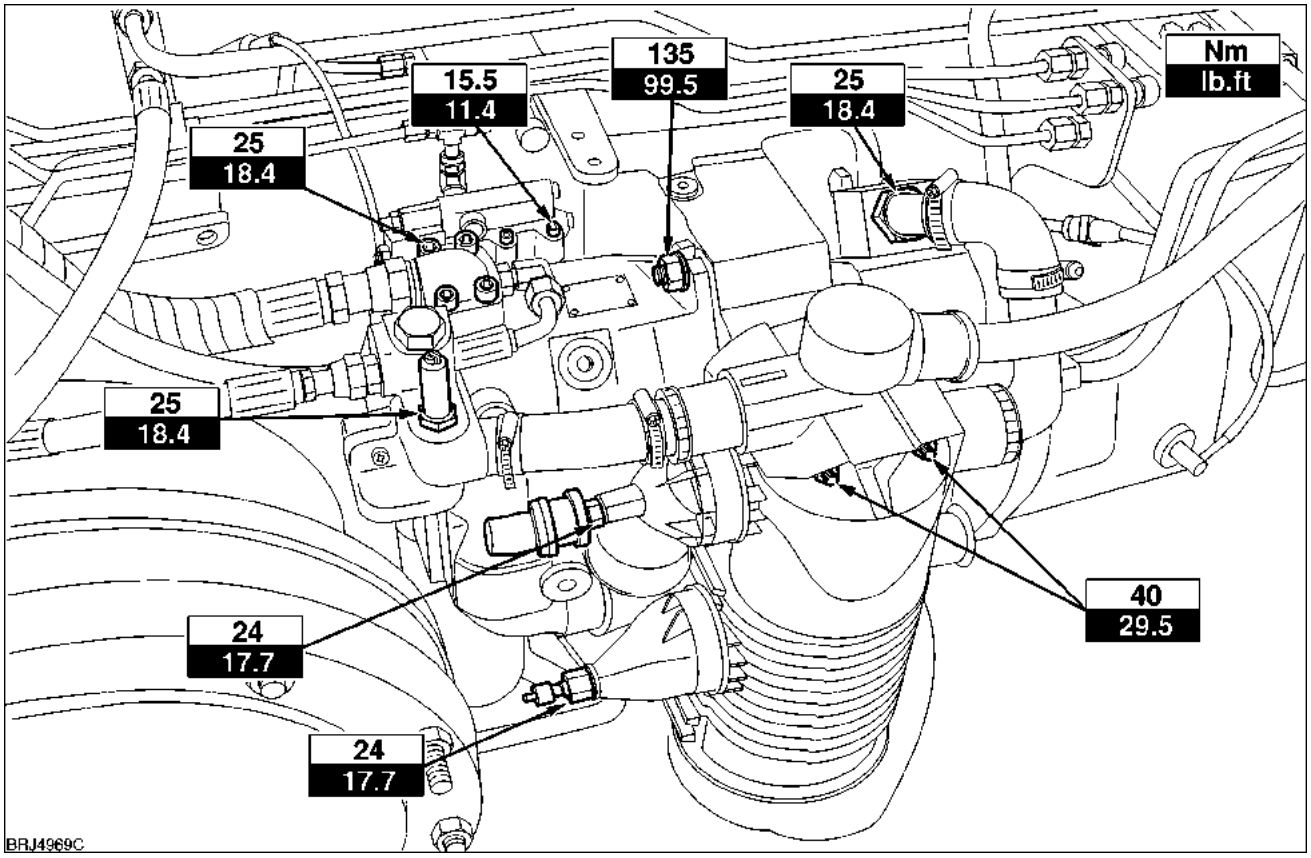

Nm
lb.ft
135
99.5
15.5
11.4
25
18.4
25
18.4
25
18.4
40
29.5
24
17.7
24
17.7
BRJ4969C

BRJ4969C 2

Charge pump - General specification

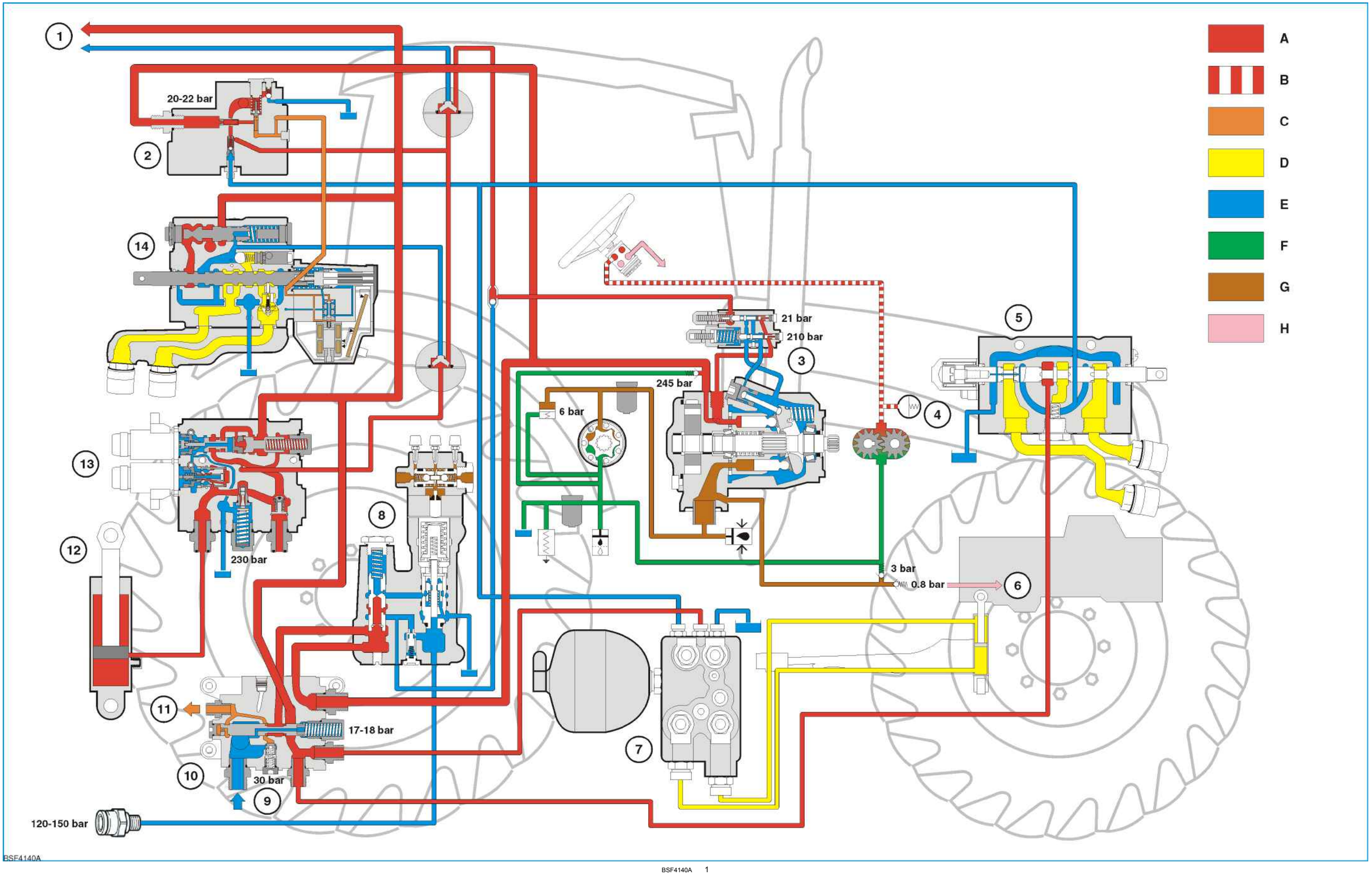
Type	Rotor Pump
Displacement	**57 cm³/rev** (**3.48 in³/rev**)
Output (new pump) @ **2200 RPM** (enginespeed)	**143 l/min** (**31.5 UK gpm**) **37.8 US gpm**
Charge Pressure Filter Dump Valve	Open @ **6 bar** (**87 psi**)
Charge Pressure Limiting Valve	Open @ **1.72 bar** (**24.9 psi**)
Charge Pressure 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.

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


1
2
20-22 bar
14
13
12
230 bar
11
17-18 bar
10
30 bar
9
120-150 bar
8
6 bar
21 bar
210 bar
3
245 bar
4
5
3 bar
0.8 bar
6
7
A
B
C
D
E
F
G
H
BSF4140A

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PRIMARY HYDRAULIC POWER SYSTEM - Static description

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

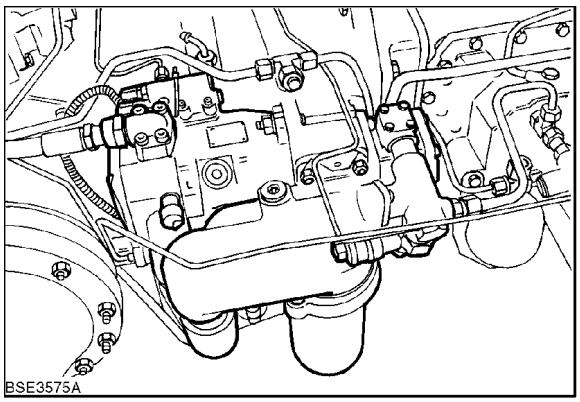
Independent Power Take Off (PTO).
Differential Lock
Front Wheel Drive engagement
Transmission clutch and synchroniser engagement
Creeper engagement (Where fitted)
Front PTO (Where fitted)
50 kph engagement (Where fitted)

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. On models with Supersteer axles, the steering circuit has dynamic load sensing.

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	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..

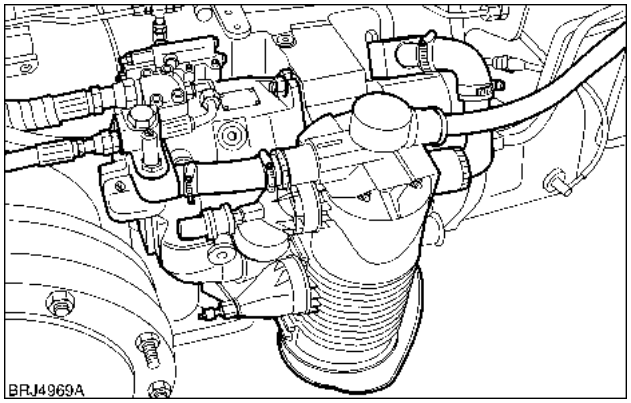


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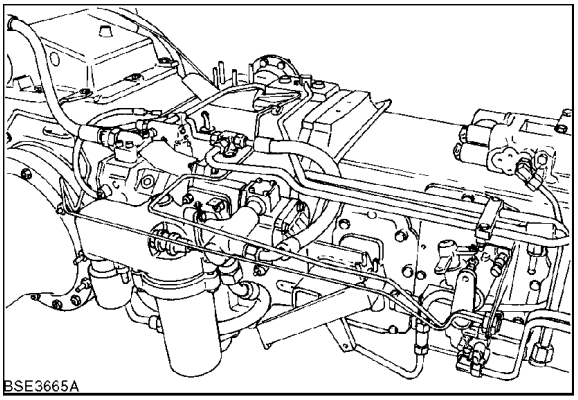
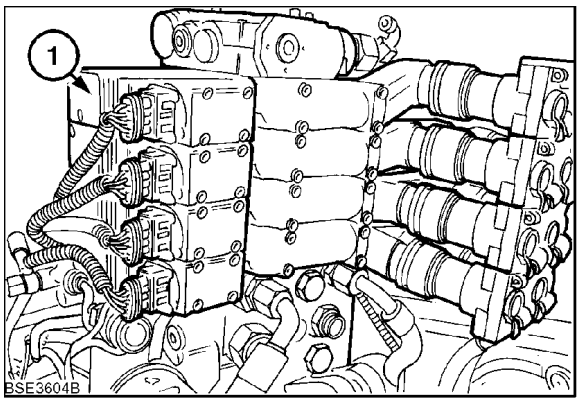
Figure **3** shows the fixed displacement pump with a 24 x 24 Transmission.



BSE3665A 3

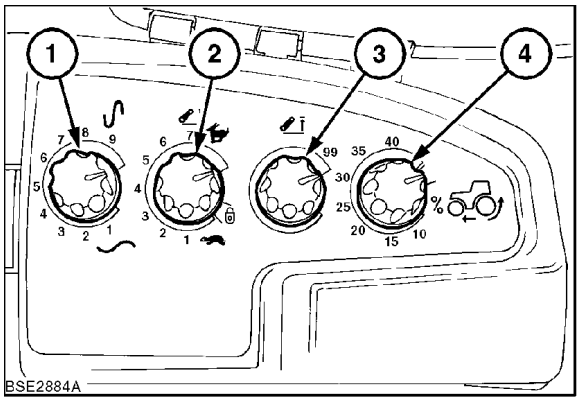
Closed centre remote valves **(1)** and Electronic draft control .



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



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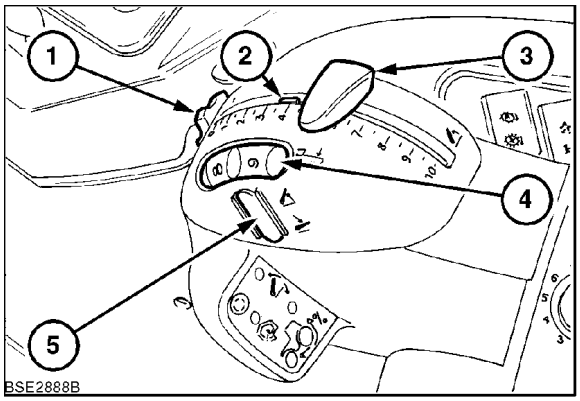
The lift arm position control is unique to tractors with electronic draft control.
.
(1). Stop adjuster thumbwheel
(2). Stop
(3). Position control lever
(4). Draft loading wheel
(5). Raise/lower switch



BSE2888B 6

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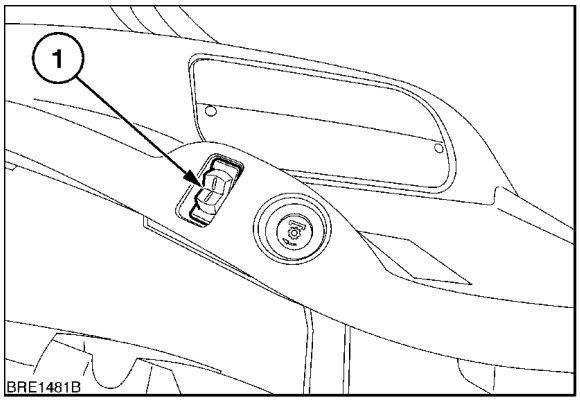
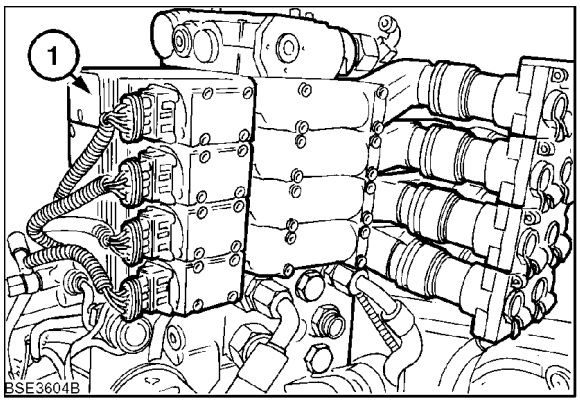
The raise and lowering functions of the electronic draft control lift system can also be operated from the rear fender switch **(1)**.



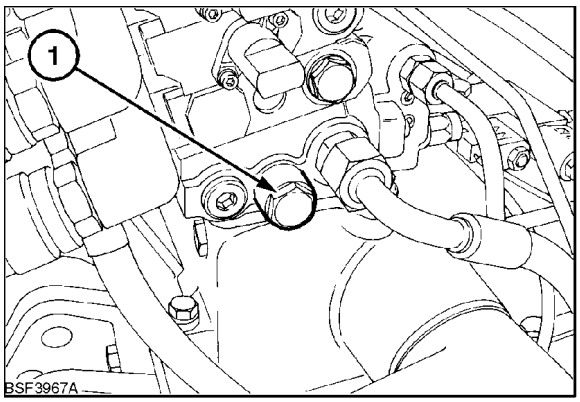
BRE1481B 7

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



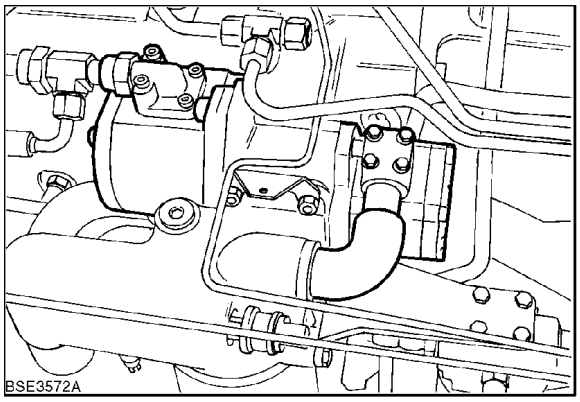
BSE3604B 8

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.



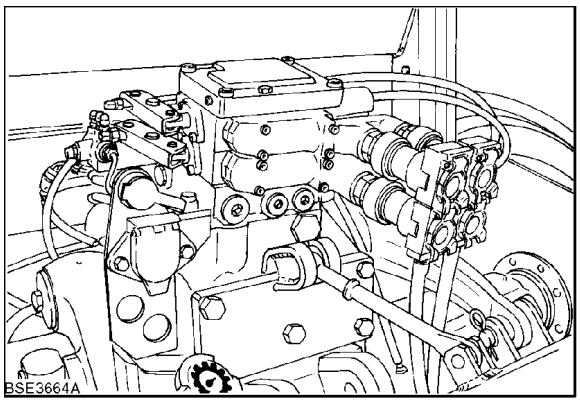
BSF3967A_430 9

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



BSE3572A 10

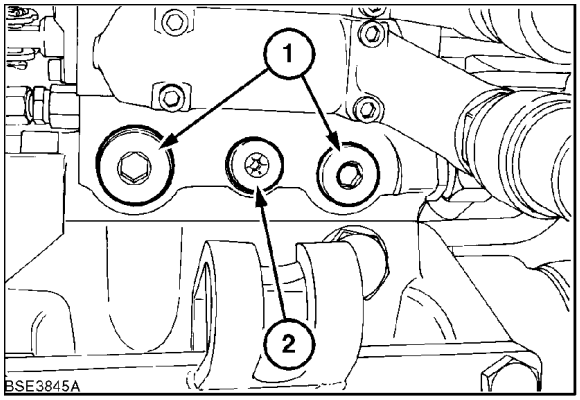
Mechanical remote control valves



BSE3664A 11

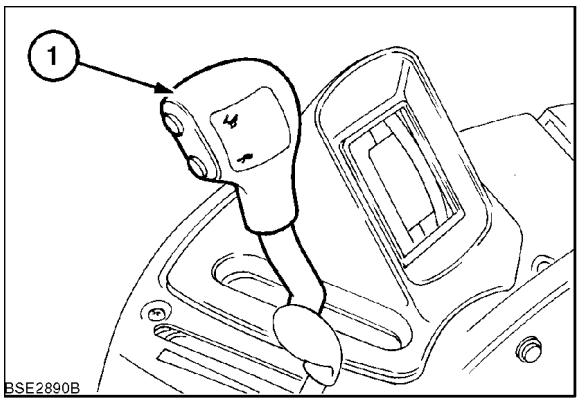
Located below the Electronic Draft Control valve (Where fitted), is the Hydraulic Power Tapping port (Power Beyond) block. This includes a priority valve and also a low pressure regulating valve. This block also has a flange plate which allows the addition of a trailer brake valve.

1. Power Beyond Ports
2. Pressure Relief Valve



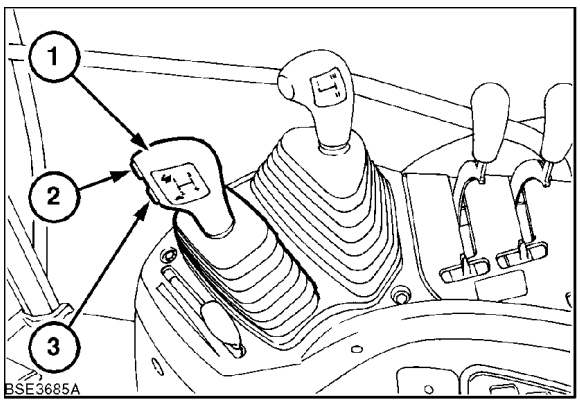
BSE3845A 12

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 **13** shows Semi-Powershift control lever..



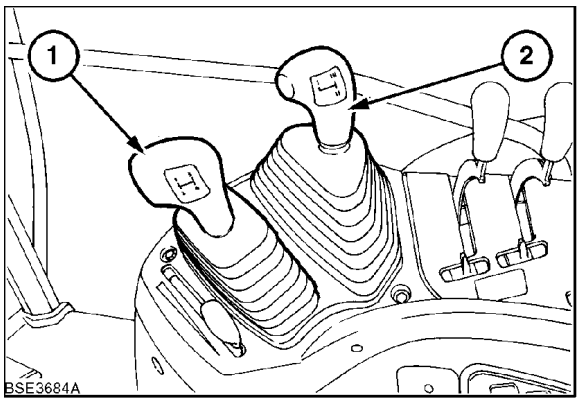
BSE2890B_431 13

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.



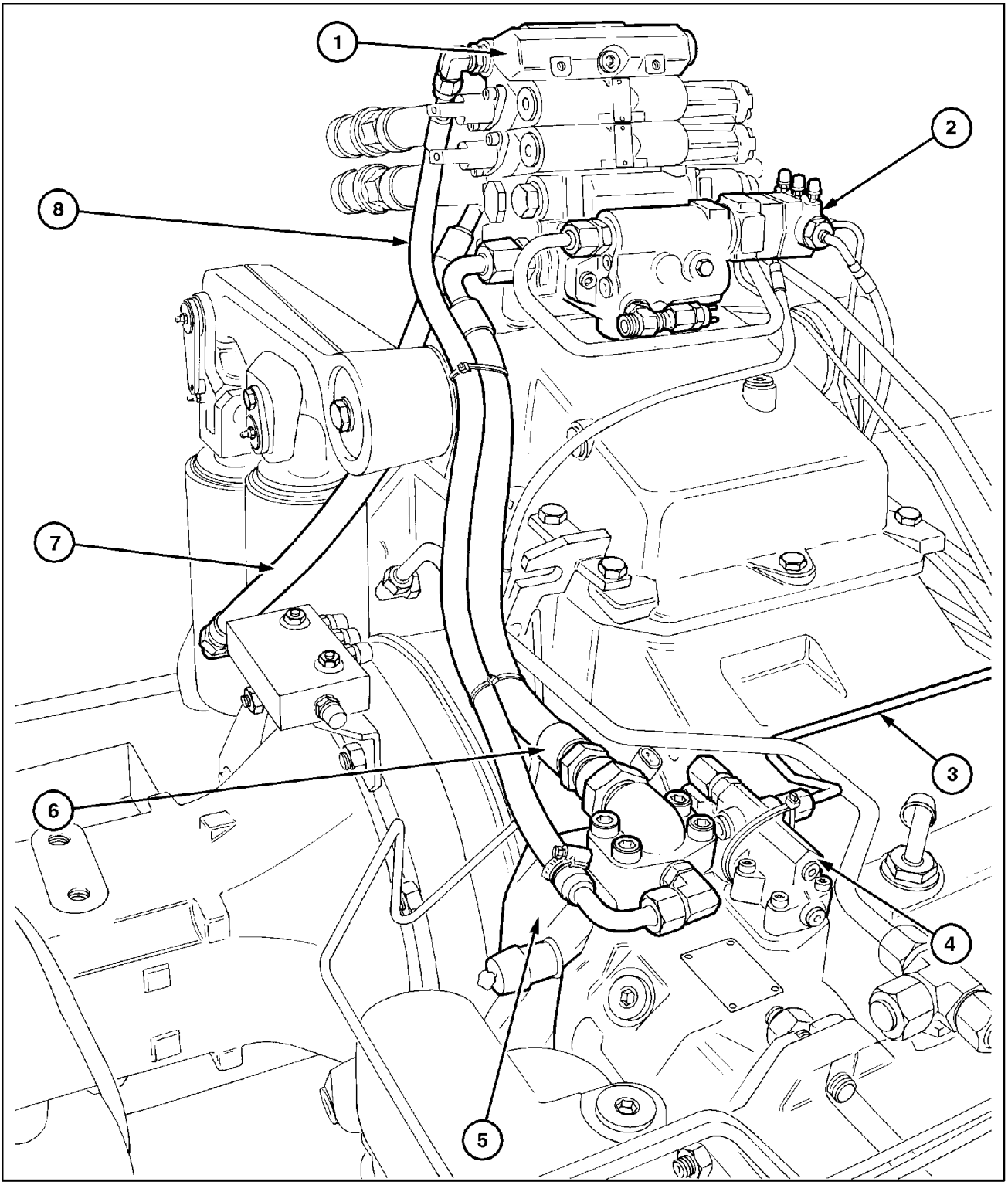
BSE3685A_432 14

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



BSE3684A_433 15

CLOSED CENTRE LOAD SENSING HIGH PRESSURE HYDRAULIC CIRCUIT



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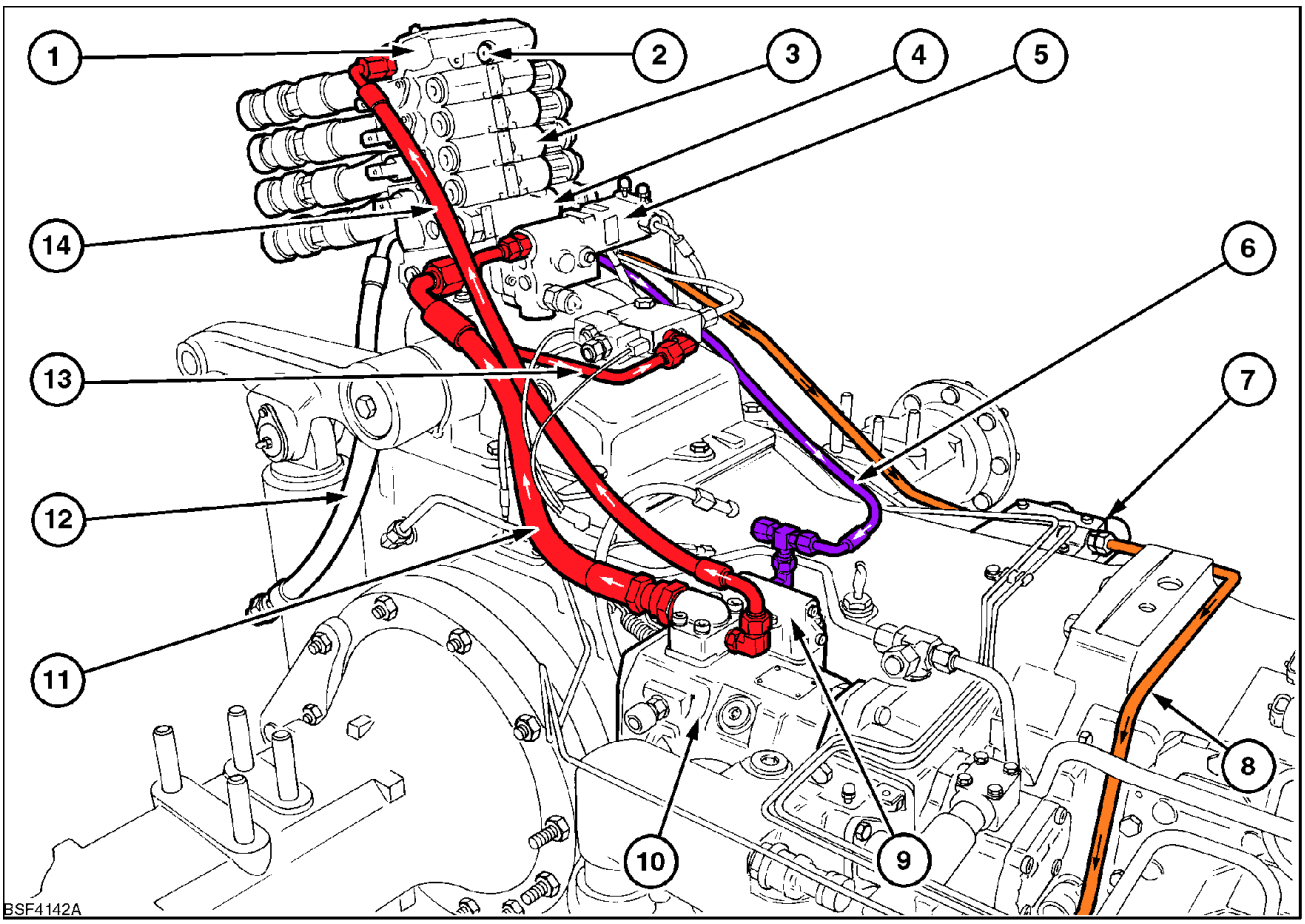
High Pressure Circuit Components and Pipework
Tractors with Variable Flow Piston Pump

1 Remote and EDC Control Valves
2 Trailer Brake Valve
3 Load Sense Lines
4 Flow and Pressure Compensator Valve
5 Variable Flow Hydraulic Pump
6 Feed to Remote Valves
7 To Hydraulic Lift Ram
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.



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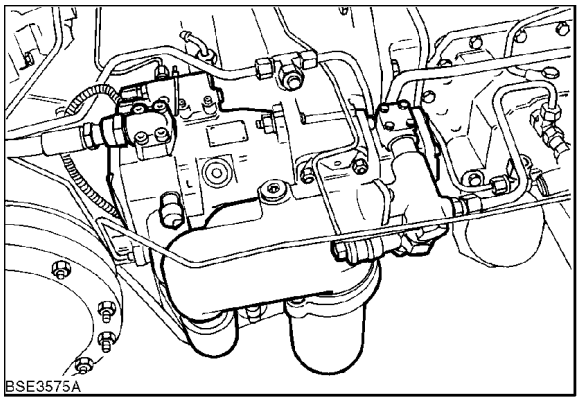
High Pressure Circuit Components and Pipework
Tractors with Variable Flow Piston Pump

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

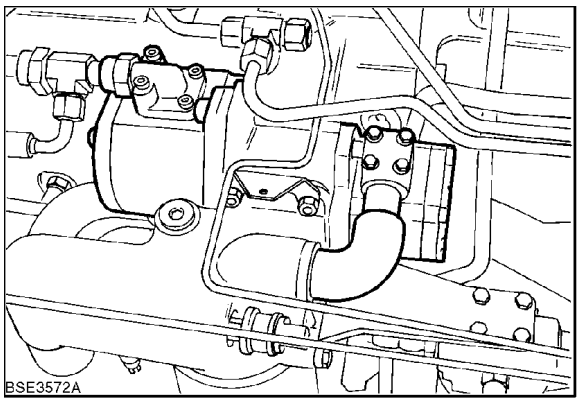
The high pressure circuit is illustrated in **PRIMARY HYDRAULIC POWER SYSTEM - Overview (A.10.A)**. Hydraulic pump assembly.

Figure **18** 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.



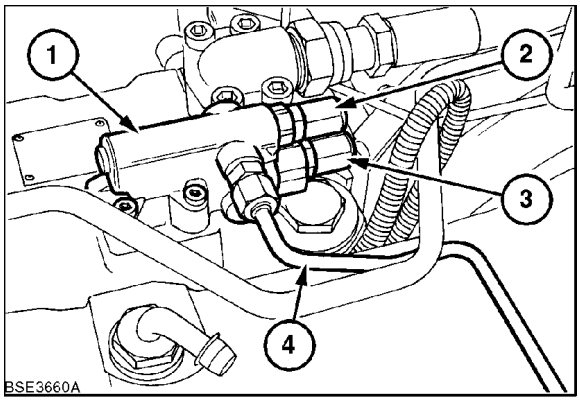
BSE3575A 18

Figure **19** shows the fixed displacement pump assembly.



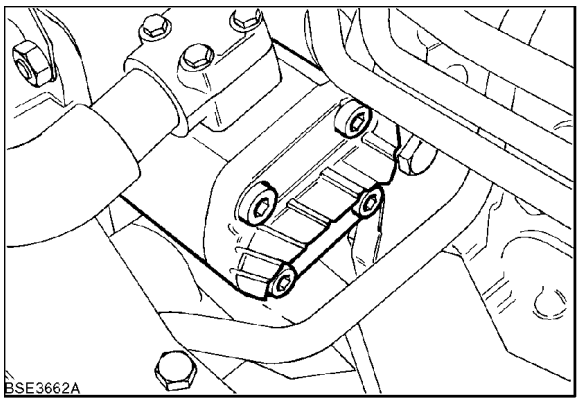
BSE3572A_434 19

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 **20** shows the load sense valve assembly.



BSE3660A 20

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



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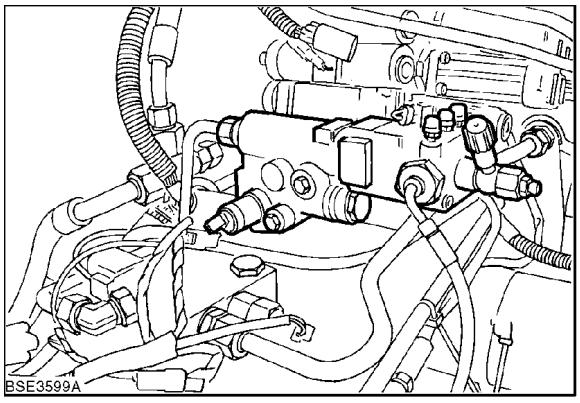
Trailer brake valve which is located beneath the cab just in front of the hydraulic lift assembly. The valve diverts oil pressure to the trailer brakes whenever both tractor brake pedals are depressed.

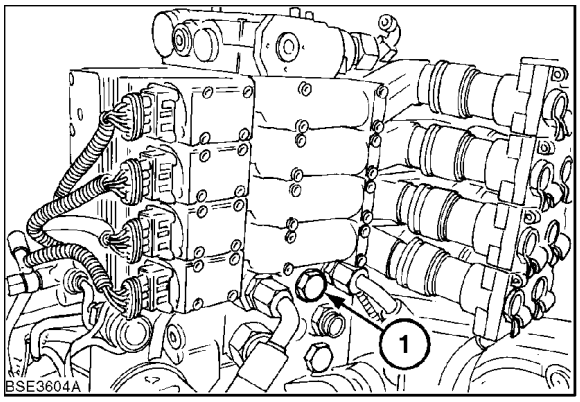


BSE3599A 22

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.

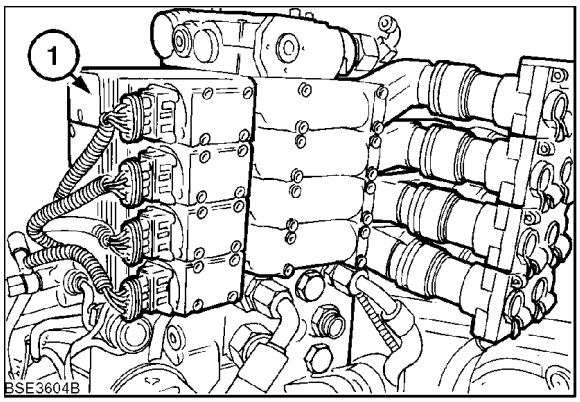


BSE3604A 23

Closed centre load sensing remote control valves

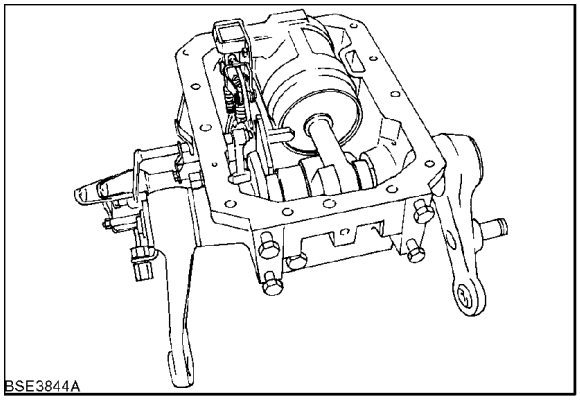
There are two types of remote valves available for the closed centre system. Standard fitment are the mechanical remote valves operated via a cable from within the cab and optional on all 16 x 16 models are electro hydraulically operated valves, **(1)**, Figure **24**, which are operated by electrical 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.



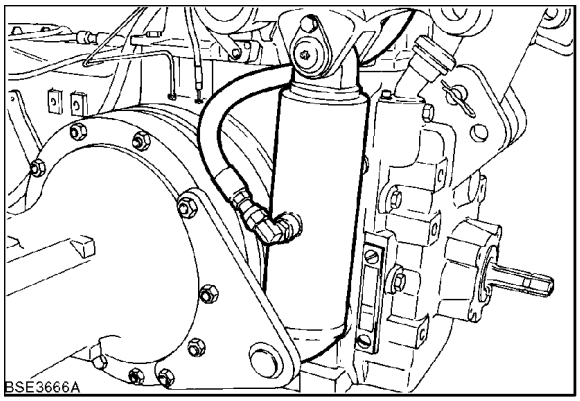
BSE3604B 24

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 **25**.



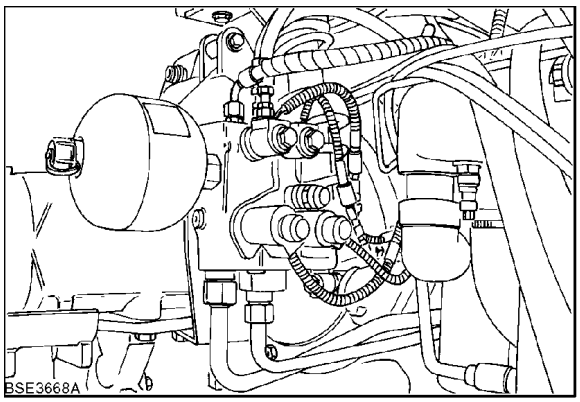
BSE3844A 25

Models with electronic draft control utilize two external cylinders, one per lift arm, anchored to the rear axle with a bracket, Figure **26**.

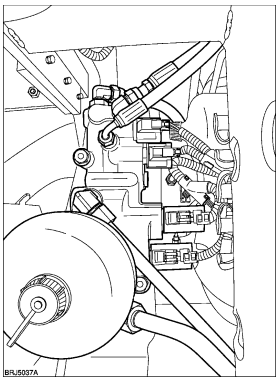


BSE3666A 26

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 27



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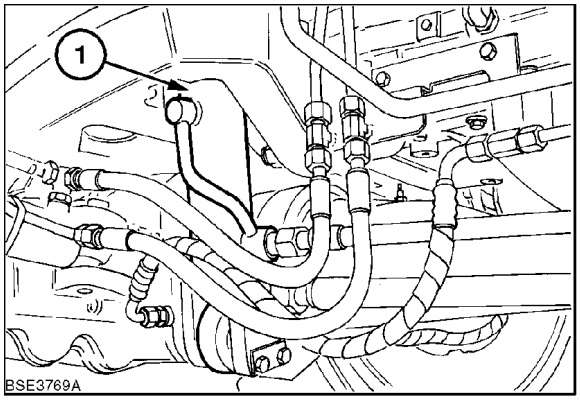
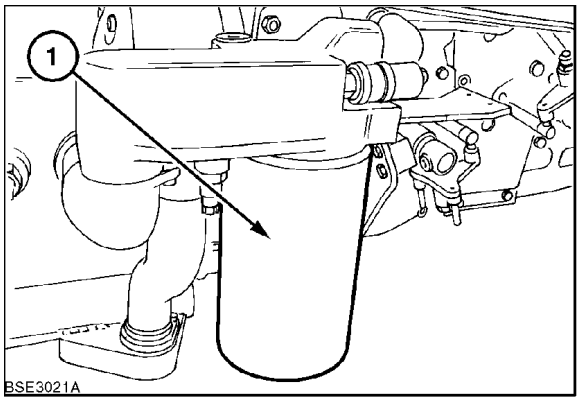
Front axle to front support hydraulic control cylinder **(1)**.



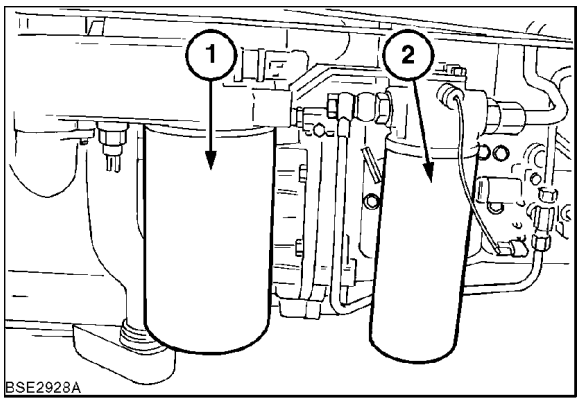
BSE3769A 29

Hydraulic system filters.
Figure **30** shows the main hydraulic filter **(1)** for tractors fitted with 12 x 12 Transmission with mechanical draft control.



BSE3021A 30

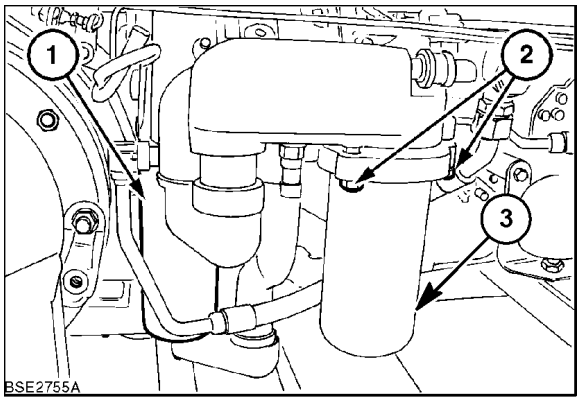
Figure **31** shows the main hydraulic filters for tractors with fixed displacement hydraulic pump. this type of pump is only fitted to tractors with 24 x 24 with mechanical draft control.



BSE2928A 31

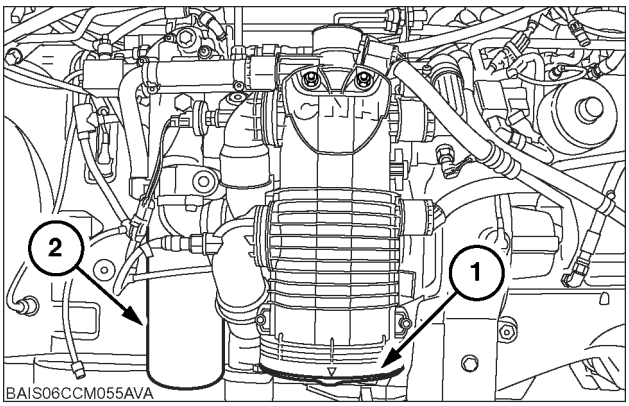
1. Intake Filter
2. Transmission Feed Pressure Filter

The main filter **(3)** and the charge filter **(1)** Figure **32** are only installed on tractors with variable displacement pump (CCLS system).



BSE2755A 32

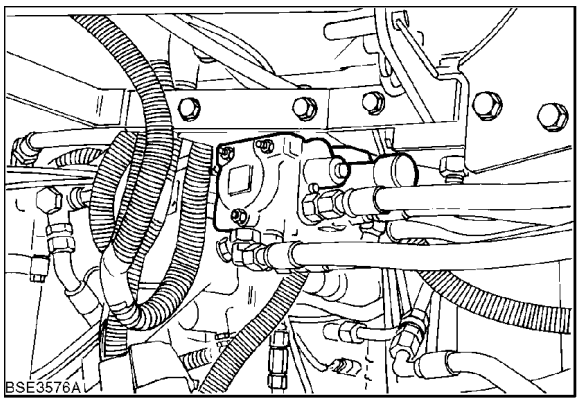
The main filter **(1)** and the charge filter **(2)** Figure **25** are installed on tractors with variable displacement pump (CCLS system).



BAIS06CCM055AVA 33

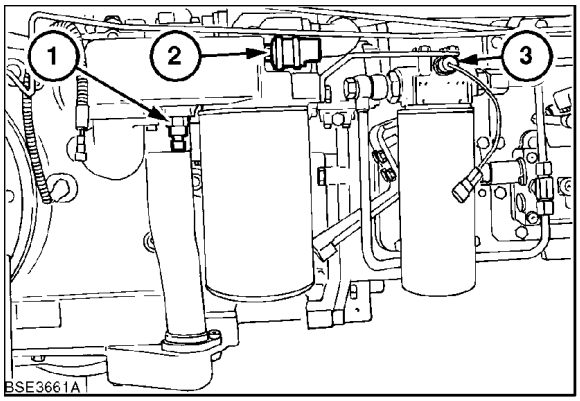
1. Main Intake (Suction) Filter
2. Charge Filter

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 34

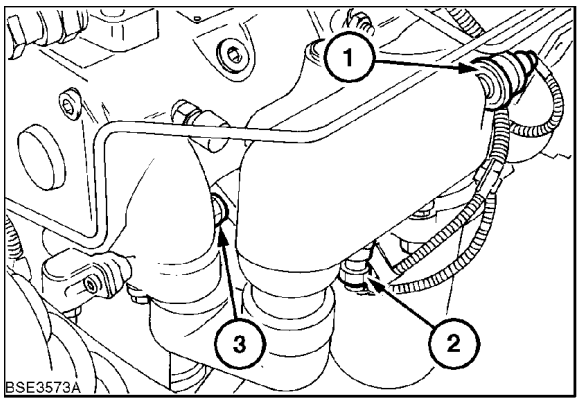
High Pressure Hydraulic System, Fixed Displacement Pump - Electrical Switches



BSE3661A 35

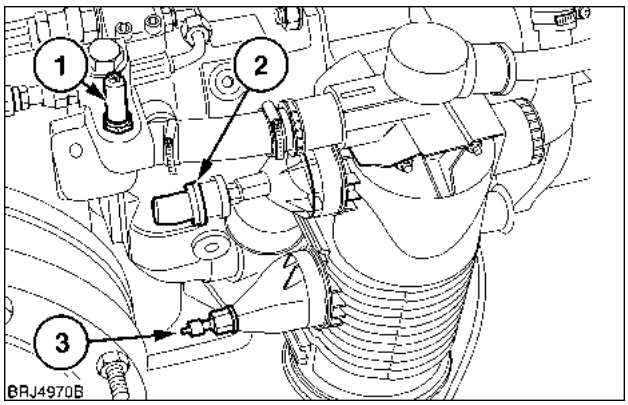
1. Oil Temperature Switch
2. Intake Filter restriction (vacuum) Switch
3. Steering Pressure Switch

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



BSE3573A 36

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



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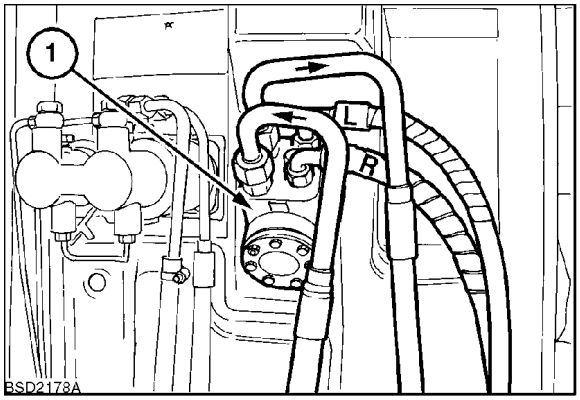
1. Low Charge Pressure Warning Switch
2. Intake Filter restriction (vacuum) Switch
3. Low Oil Temperature Switch

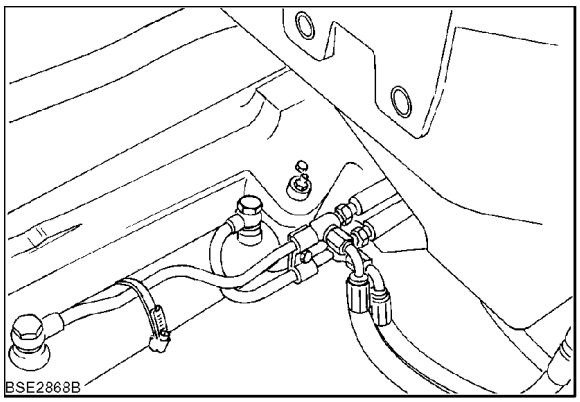
Steering Motor

There are two types of steering motors fitted depending on whether the tractor is with or less Supersteer. The with Supersteer models are of a Dynamic load sensing type with a variable displacement, depending on the speed the steering wheel is rotated. The less Supersteer models use a fixed displacement motor.



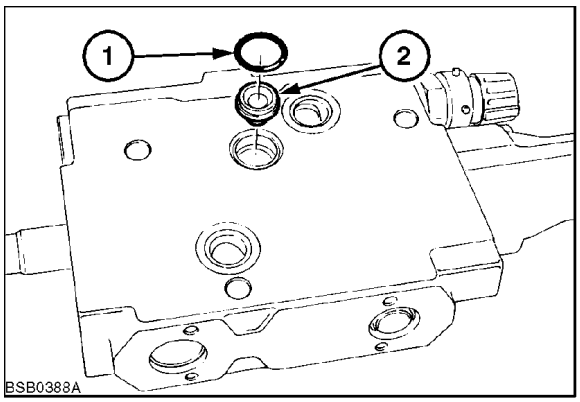
BSD2178A 38

Steering Cylinders.
Receives high pressure oil directly from the steering motor.



BSE2868B 39

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 **41**, on the variable displacement pump.



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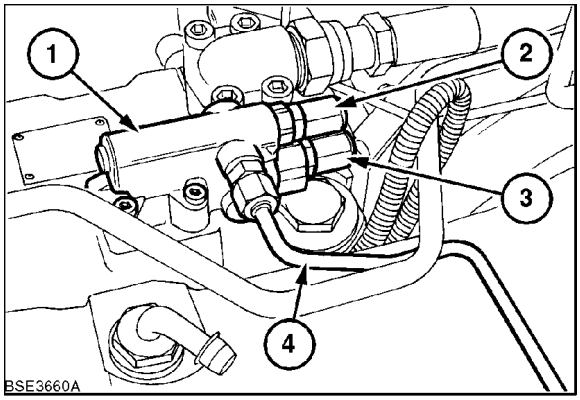
1. Valve Body
2. Flow Compensating Valve
3. Pressure Compensator Valve
4. Load Sensing Line

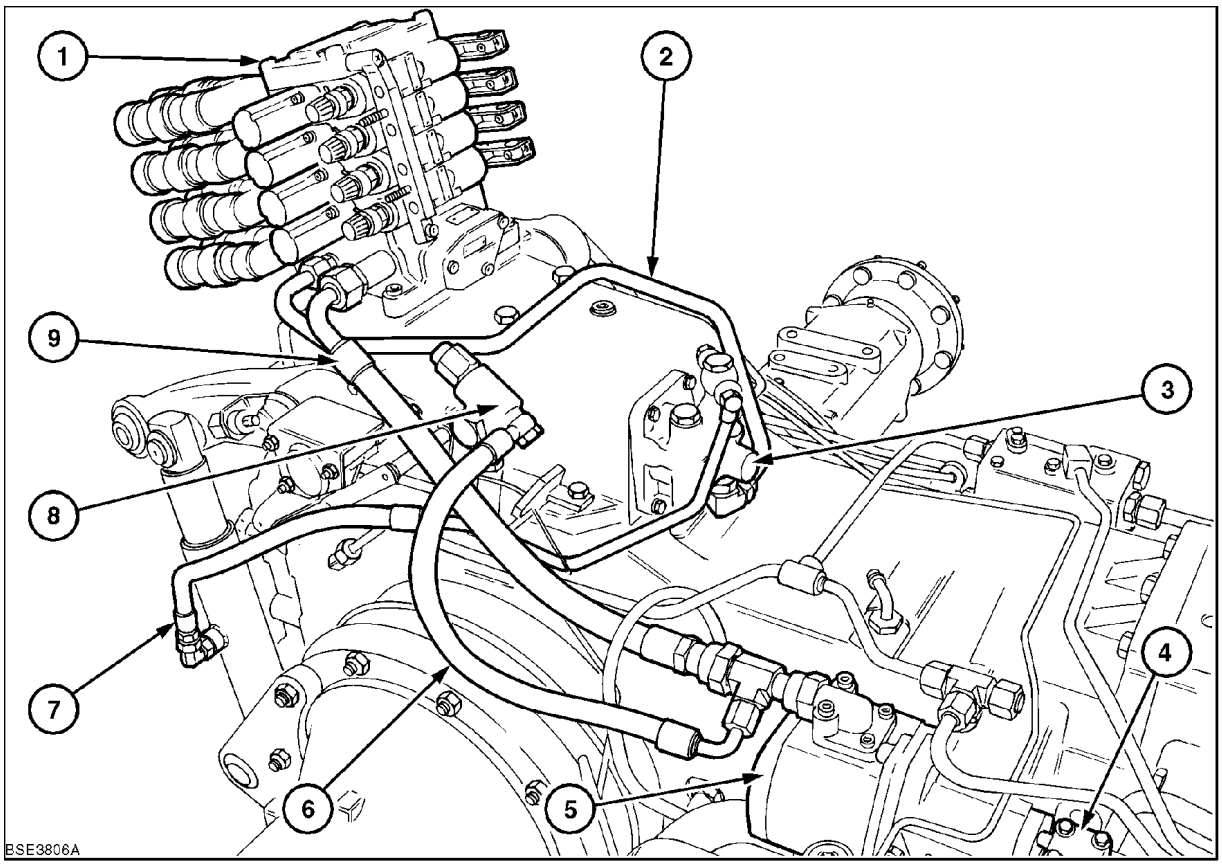


BSE3660A 41

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



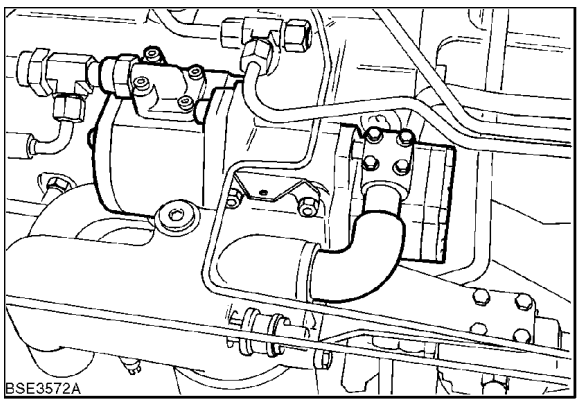
BSE3806A 42

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 **49** 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 .



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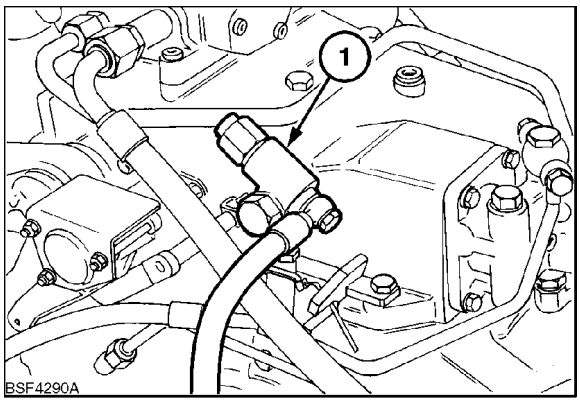
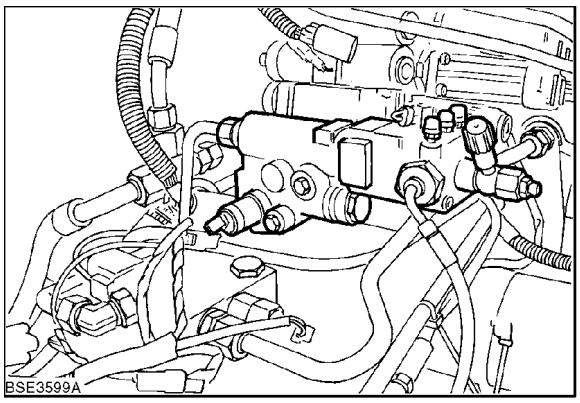
High pressure circuit relief valve **(1)** located on the right hand side of the top cover diverts pump flow to sump if the system pressure reaches **190 bar** (**2755 lbf/in2**).



BSF4290A 44

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.



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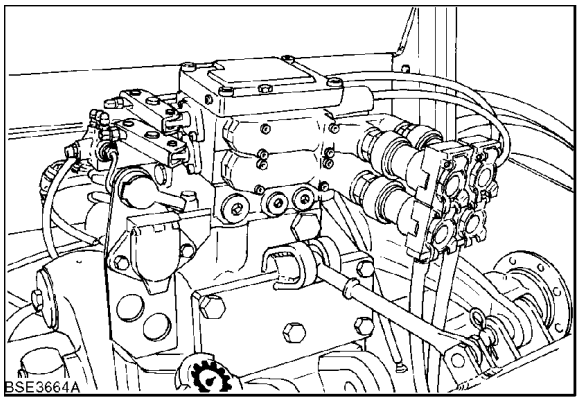
The remote valves are available as two, three or four valves per tractor.
The valves can be double-acting with float and kick out.
Double acting convertible to single-acting with float.
Double acting convertible to single-acting.
When four remote valves are installed the optional flow divider valve **(1)** is available enabling simultaneous operation of remote valve No 1 with another remote valve or hydraulic lift.



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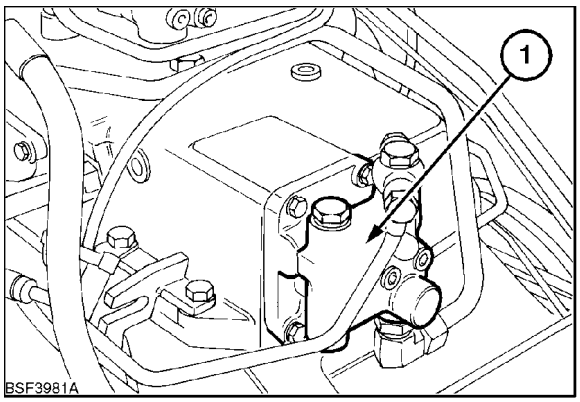
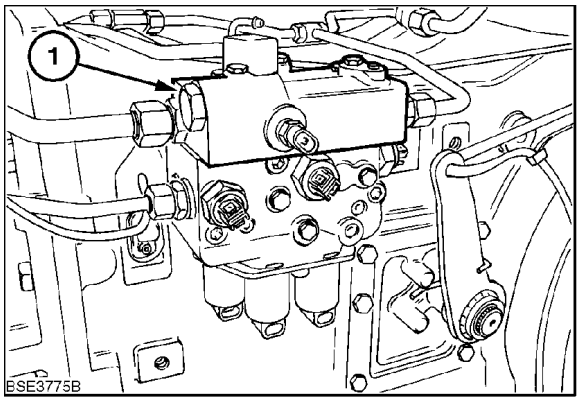
On tractors which are fitted with mechanical hydraulic lift, the lift cylinder control valve **(1)** assembly is located at the front of the hydraulic lift assembly. The lift cylinder safety valve is mounted on the rear face of the control valve which must be removed to obtain access. This safety valve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



BSF3981A 47

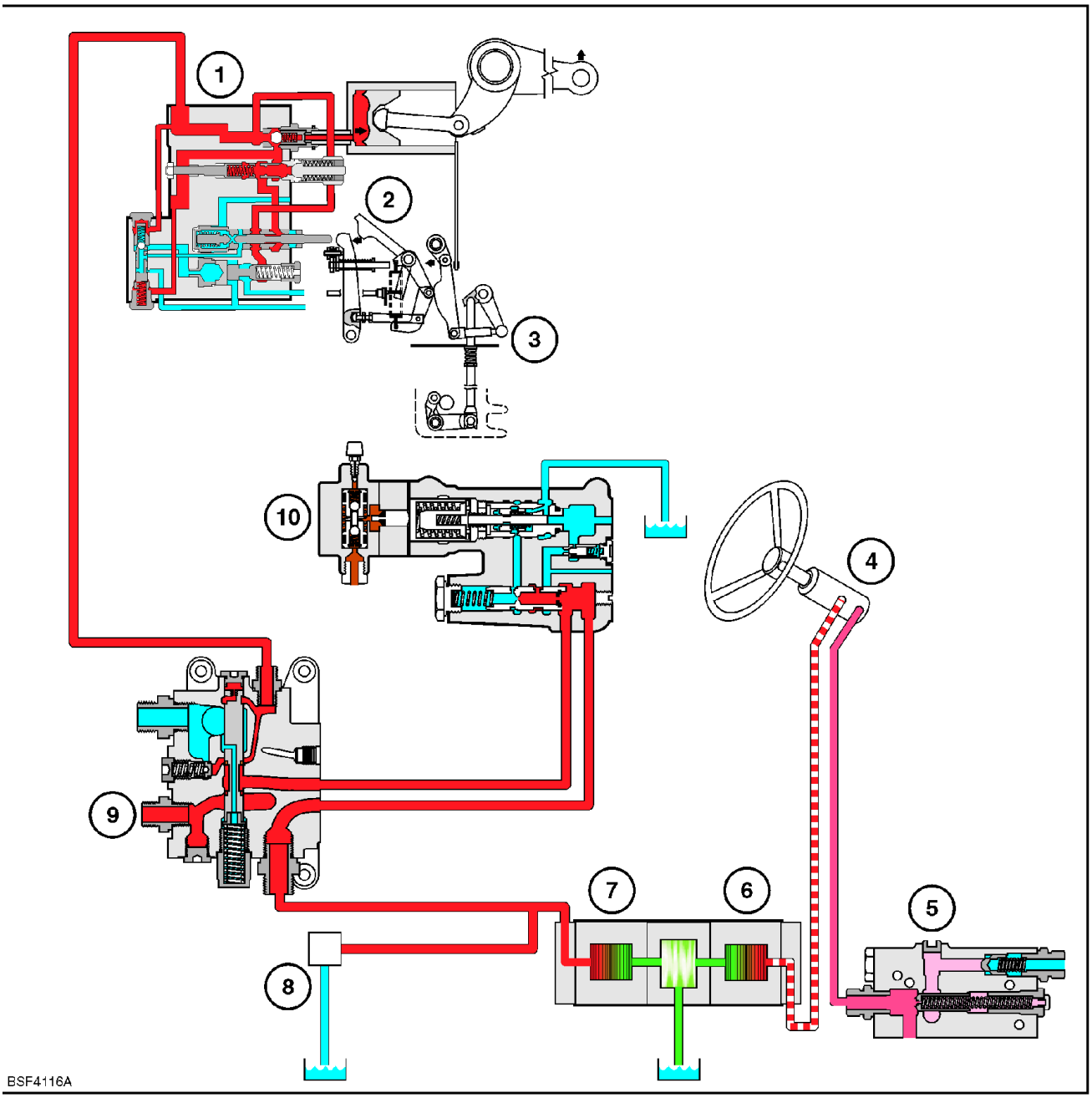
The low pressure regulating valve is located in the top manifold situated on the lubrication services distribution block on the left hand side of the rear axle centre housing. This valve regulates the pressure in the low pressure circuit to **17 - 18 bar** (**246 - 261 lbf/in2**).
Also located in this 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 48

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

With Reference to Figure **49**.
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 49

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/in²**)
- Return to Reservoir Oil
- Lubrication Oil
- Suction Oil

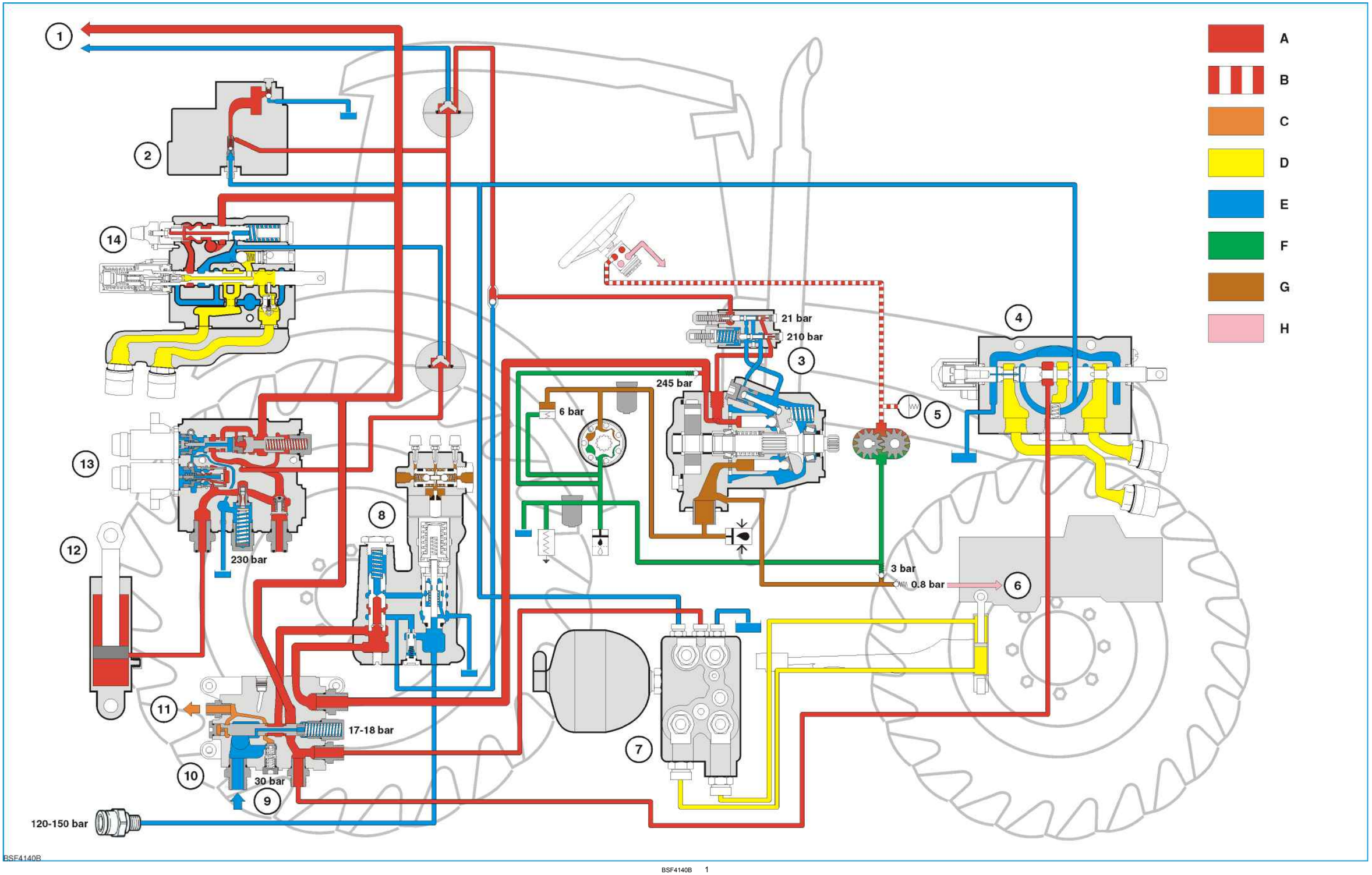
1. Lift Control Valve
2. Lift Cylinder Safety Valve
3. Mechanical Hydraulic Lift Assembly
4. Steering Motor
5. Low Pressure Circuit Pressure Regulating Valve
6. Steering and Low Pressure Circuit Gear Pump
7. Fixed Displacement Pump
8. Pressure Relief Valve (**195 - 205 Bar**)
9. Subplate with Pressure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

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

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


1
2
14
13
12
11
10
9
8
7
6
5
4
3
A
B
C
D
E
F
G
H
21 bar
210 bar
245 bar
6 bar
230 bar
17-18 bar
30 bar
120-150 bar
3 bar
0.8 bar
BSF4140B

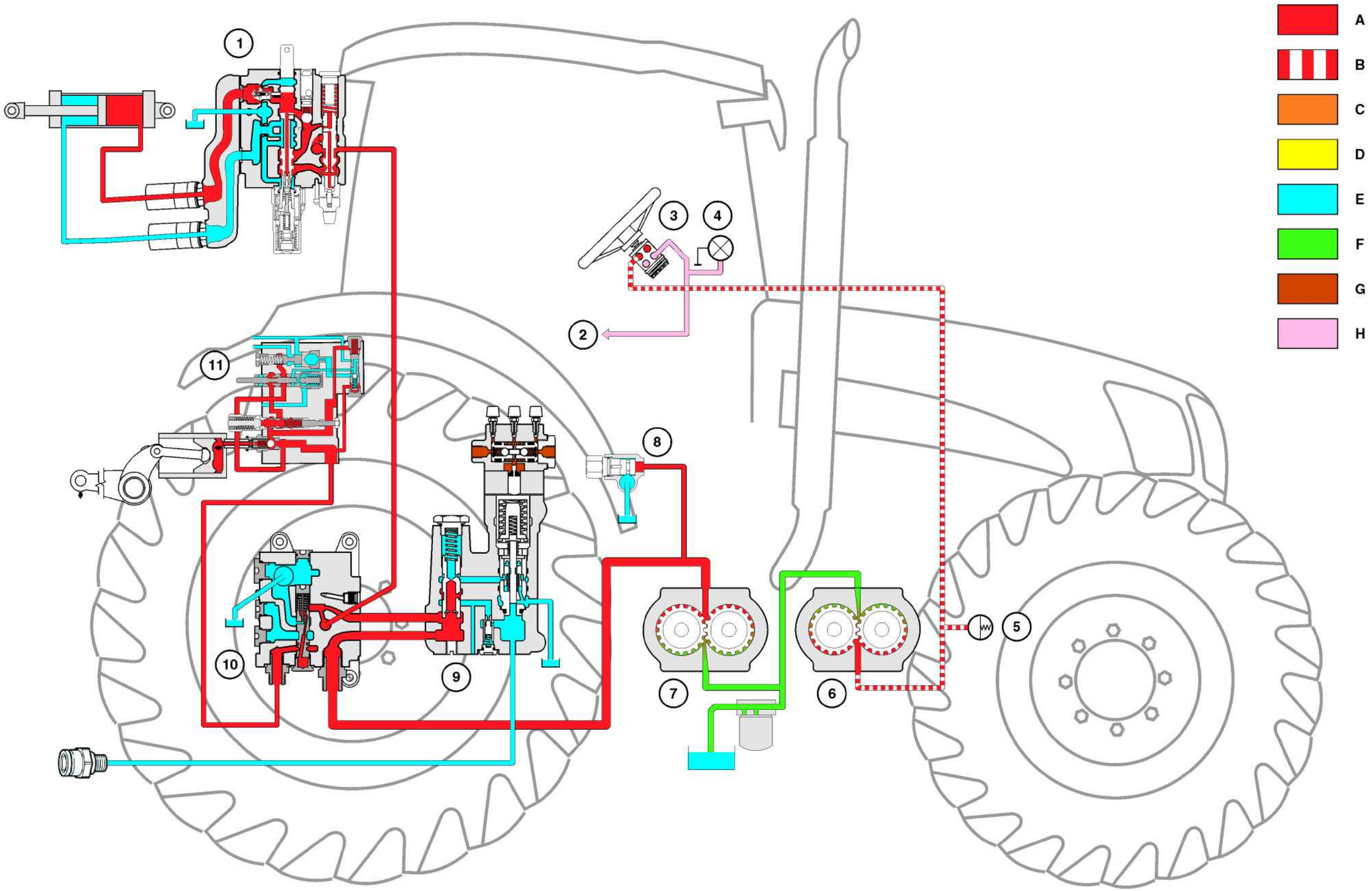
BSF4140B 1

PRIMARY HYDRAULIC POWER SYSTEM - Overview - Fixed Displacement Pump Hydraulic Circuit 12 x 12 and 24 x 24 Models

Fixed Displacement Pump Hydraulic Circuit 12 x 12 and 24 x 24 Models

1 Remote Control Valves
2 Low Pressure Services Manifold
3 Steering Motor
4 Low Pressure Warning Lamp
5 Low Pressure Switch
6 Steering Pump
7 Fixed Displacement Pump
8 Pressure Relief Valve (**195 - 205 bar**)
9 Trailer Brake Valve
10 Subplate with Low Pressure Compensator Valve
11 Mechanical Draft 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



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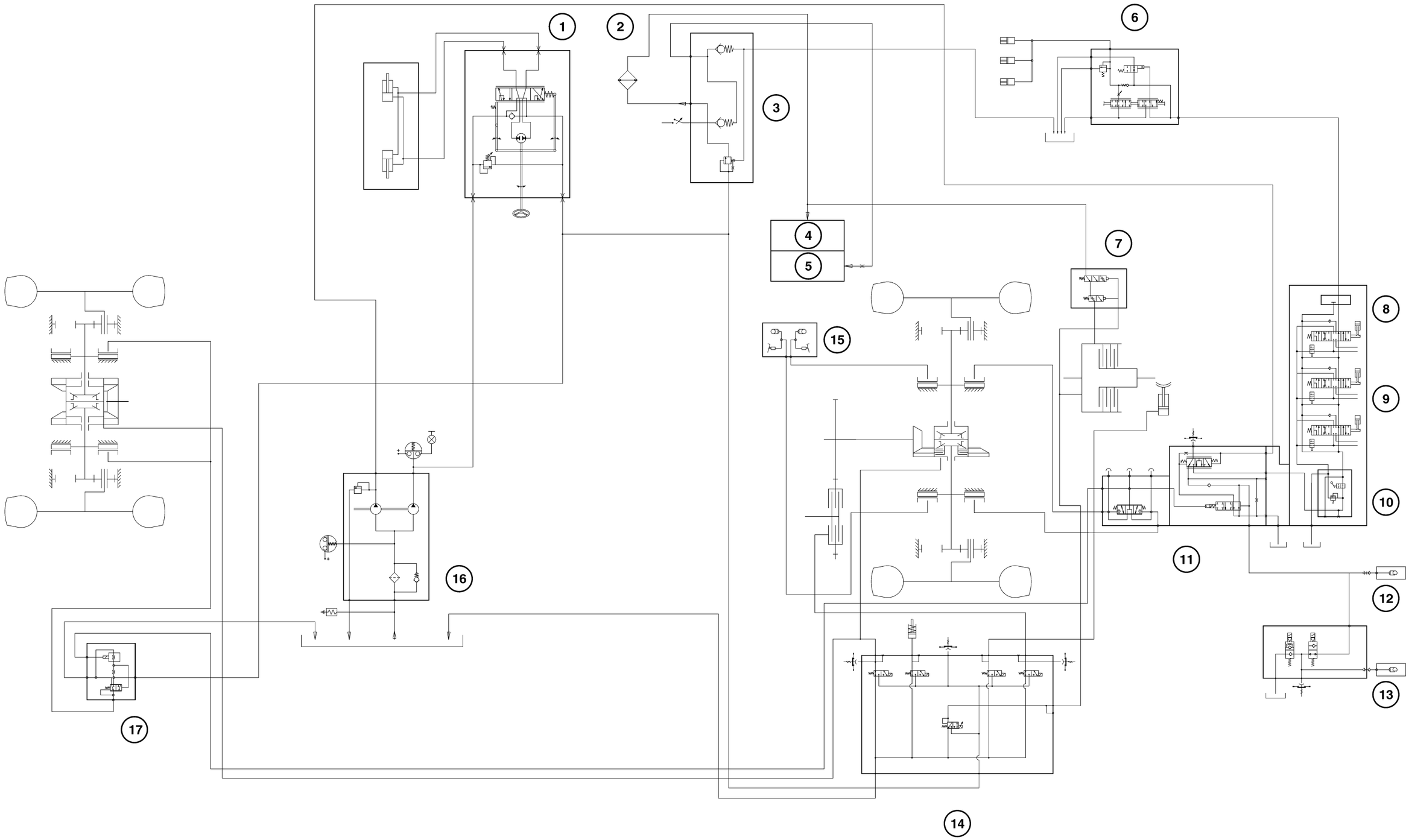
PRIMARY HYDRAULIC POWER SYSTEM - Hydraulic schema

Tractors with 12 x 12 Transmission with Fixed Displacement Pump and Mechanical Draft Control

1. Steering Motor
2. Oil Cooler
3. Oil Cooler Bypass Valve,Low Pressure Regulating Valve, lube relief valve
4. Transmission Lubrication
5. Pumps Drive Lubrication
6. Mechanical Draft Control Valve
7. PTO lubrication Control Valve
8. End Plate
9. Mechanical Remote Valves
10. Sub Plate with Relief Valve and Power Beyond Tap and ports
11. Trailer Brake Valve
12. Trailer Brake Coupling
13. Italian Version Trailer Brake coupling and Solenoid Assembly
14. Low Pressure Distribution Manifold
15. Brake Pedals and Master Cylinder
16. Fixed Displacement Pump and Steering Pump
17. Brake Valve



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12x12 OC W/MDC

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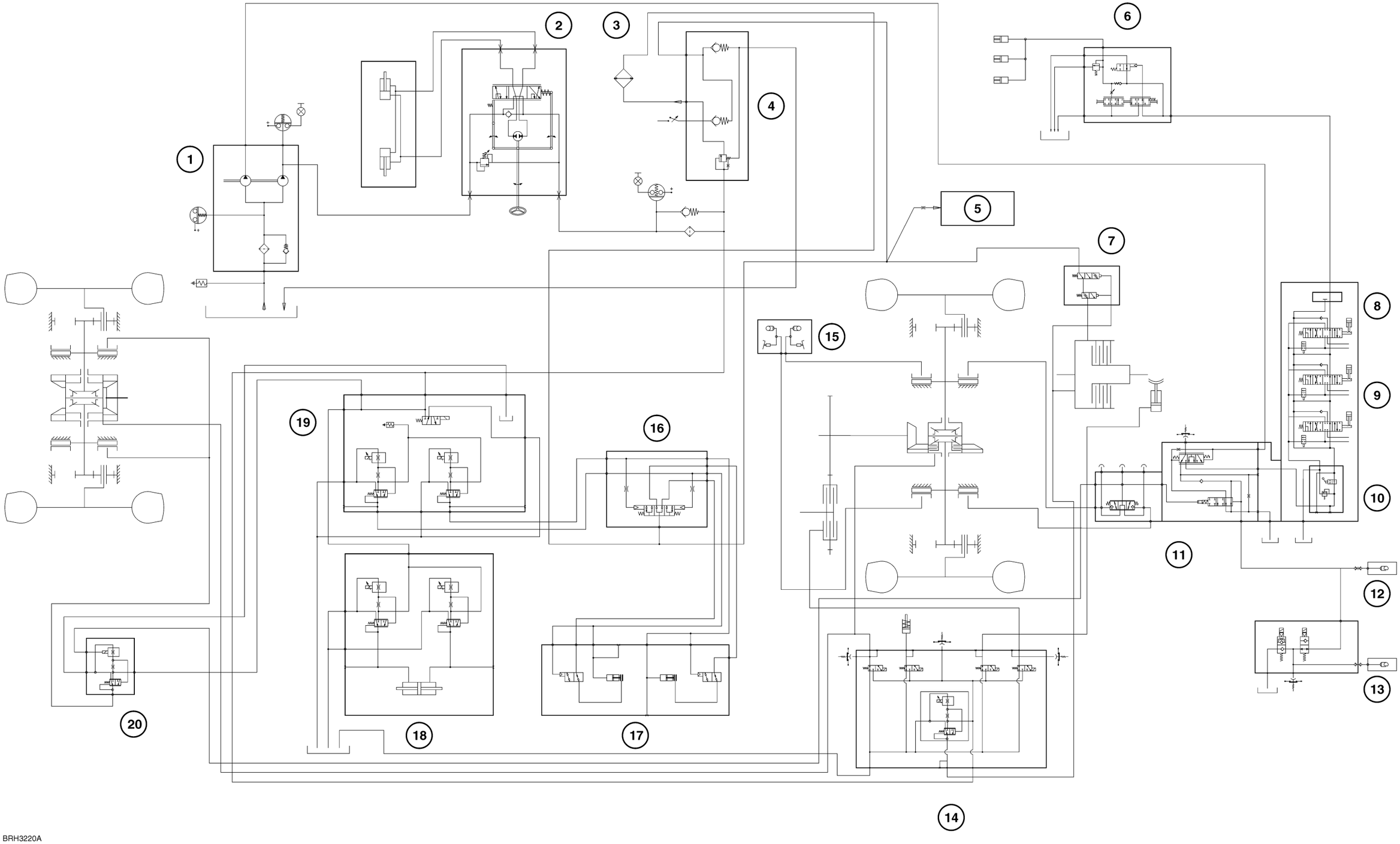
24 x 24 Model with Fixed Displacement Pump and Mechanical Draft control

1. Fixed Displacement Pump and Steering Pump
2. Steering Motor
3. Oil Cooler
4. Oil Cooler By-pass Valve,Lubrication Relief Valve,Low Pressure Regulating Valve
5. Pumps drive lubrication
6. Mechanical Draft Control Valve
7. PTO lubrication control valve
8. End Plate
9. Remote control valves
10. Sub plate with relief valve and power beyond tap and ports
11. Trailer Brake valve
12. Trailer Brake Coupling
13. Italian Trailer Brake Coupling and Solenoid assembly
14. Low Pressure Distribution Manifold
15. Brake Pedals and Master Cylinders
16. Hi Lo Lube Valve
17. Transmission Solenoids
18. Forward and Reverse Valve
19. Hi Lo Valve Assembly
20. Front Brake Valve



BRH3220A

24x24 OC MDC

BRH3220A 2