FR-120.2

WHEEL LOADER

OPERATION AND MAINTENANCE

INSTRUCTION MANUAL

THIS MANUAL MAY NOT BE REPRINTED OR REPRODUCED, EITHER IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF FIATALLIS.

The information in this manual was current at the time of publication. It is our policy to constantly improve our product and to make available additional optional items. These changes may affect procedures outlined in this manual. If differences are observed, verify the information through your Dealer.

ONE MANUAL IS SUPPLIED WITH EACH MACHINE

MACHINE - SERIAL NUMBER

1 ST EDITION - FORM FA 75314950

(MARCH 1998)

PRINTED IN BRAZIL

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SAFETY RULES

This symbol is your safety alert sign. It **MEANS ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED.**

Read and heed all safety instructions carrying the signal words **WARNING** and **DANGER.**

STUDY THE OPERATION AND MAINTENANCE INSTRUCTION MANUAL THROUGHLY BEFORE STARTING, OPERATING, MAINTAINING, FUELING OR SERVICING THIS MACHINE.

Machine mounted safety signs have been color coded yellow with black borders and lettering for warning and red with white borders and lettering for danger points.



MOST ACCIDENTS ARE CAUSED BY FAILURE OF SOME INDIVIDUAL TO FOLLOW SIMPLE AND FUNDAMENTAL SAFETY RULES OR PRECAUTION. FOR THIS REASON MOST ACCIDENTS CAN BE PREVENTED BY RECOGNIZING THE REAL CAUSE AND DOING SOMETHING ABOUT IT BEFORE ACCIDENT OCCURS. REGARDLESS OF THE CARE USED IN THE DESIGN AND CONSTRUCTION OF ANY TYPE OF EQUIPMENT THERE ARE MANY CONDITIONS THAT CANNOT BE COMPLETELY SAFEGUARDED AGAINST WITHOUT INTERFERING WITH REASONABLE ACCESSIBILITY AND EFFICIENT OPERATION.



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SPECIFICATIONS

ENGINE

Make ..... Cummins
Model ..... 6 BT 5.9
Type: Diesel, in line, vertical, 4 stroke, direct injection, turbo charged, open combustion chamber, water cooled.
Number of cylinders 6
Bore ..... 102 mm (4,0 ")
Stroke ..... 120 mm (4,7 ")
Total displacement ..... 5.880 cm³ (359 in³)
Net flywheel power
- (DIN 6270) ..... 130 CV (95 KW)
- (SAE J1349) ..... 145 HP (95 KW)
Maximum torque (at 1.500 rpm) ..... 556 Nm
..... 409,77 lb.ft
Governed rpm 2.200
Fuel injection Pump ..... Robert Bosch
Low Idle ..... 900 RPM
Compression Ratio 18,5:1
Valve clearance:
- Intake (engine cold) ..... 0,25 mm
- Exhaust (engine cold) ..... 0,51 mm
Firing Order 1-5-3-6-2-4
Fuel Injection Timing ..... 20° before PMS
Fuel INjectors release pressure ..... 245 Bar

TORQUE CONVERTER

Type ..... single phase
Multiplication ratio 2,87:1

TRANSMISSION

Full power-shift, countershaft, 4 forward and 4 reverse speeds, hydraulically actuated. Electric operated by a single lever on steering column. Automatic transmission cut-off. Four wheel drive.

Speeds (forward and reverse)	km/h	mph
1ª	4,9	3,1
2ª	10,5	6,6
3ª	21,6	13,5
4ª	32,9	20,6

AXLES

Axles with hypoid gear and pinion. Torque proportioning diferentials, "Max Trac" type.Rear axle with vertical oscillation of 25°(411 mm/16.2" stroke). Planetary reductions at axles end.
Optional: "Super Max Trac".

BRAKE SYSTEM

Service :4 wheel multidisc oil bath brakes, power assisted hydraulically with an independent circuit for each axle.

Safety: Each of the circuits in the service system is equipped with a nitrogen accumulator that maintains braking efficiency, even with the engine turned-off.

Parking: mechanical, drum type, installed transmission front axle dutput shaft.

STEERING SYSTEM

Hydraulically controlled by steering wheel and power assisted with a vane pump (also provides hydraulic system control).
Two, double-acting steering cylinders.
As the steering wheel is turned, one cylinder retracts and the other extends, this causes the loader to pivot (articulate) where the front and rear frames are joined.
Priority flow. ..... 88,1 l/min (23,1 gpm)
Maximum pressure ..... 185 kgf/cm² (1.848 psi)
Bore and stroke .... 80 x 440 mm (3,1 x 17,3 in)
Emergency steering (optional).

HYDRAULIC SYSTEM

Pressurized reservoir, electrically welded and chemically treated for total protection.
Suction and return line filters.
Filler neck with screen type filter.
Dual section vane pump, tandem assembled, for main system and steering system.

Main flow ..... 138,7 l/min (36,5 gpm)
Maximum pressure ..... 200 kgf/cm² (2.843 psi)

Monoblock 3 spool control valve, equipped with internal relief and lock valves, with mechanical lock in the float position.
Single lever command of lift and dump functions.
Automatic, electromagnetic kick-out and bucket leveler.
Cylinders, bore and stroke:

Boom cylinders (2) ..... 125 x 716 mm (4,92 x 28,1")
Bucket cylinders ("Z" linkage) (2)..115x428mm (4,53 x 16,85")

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SPECIFICATIONS

Operating times :	seconds:
Boom lift	5,7
Boom lower	3,4
Bucket dump	1,2
Bucket roll back	1,9

FRAME

Articulated consisting of upper and lower sealed articulation joints.
The upper articulation joint consists of a pin and bushing.
The lower articulation joint consists of 2 self-compensating bearings, pin, and bushing.

ELECTRICAL SYSTEM

Tension	24 V
Alternator	45 A
Starter	5,5 kW
Batteries	2
Capacity	135 Ah

WHEELS AND TIRES

Rims ..... 13 Ir X 25 " STD.
Tires :

17,5 x 25 - 12 PR tubeless, L2	Standard
20,5 x 25 - 16 PR, L3	Optional
20,5 x 25 - 16 PR, L5	Optional

• IMPORTANT:
TIRE AND BUCKET COMBINATIONS

17,5 X 25 tire with 2,5 YD^3 bucket for materials with a density up to 1900 kg/m^3.

17,5 x 25 tire with 2,0 YD^3 bucket for materials with density above 1900 kg/m^3.

The combination of a 20,5 x 25 tire with a 2,5 YD^3 bucket can be used for materials with a maximum density of 1600 kg/m^3.

For materials with density above 1600 kg/m^3 with a 20,5 x 25 tire, use the 2,0 YD^3 bucket.

CAPACITIES

	litres	US gallons
Cooling system	38,0	10,0
Crankcase	20,0	5,28
Fuel tank	180,0	47,52
Front/rear axles,differentials and wheel hubs	72,0	19,0
Torque converter and transmission	27,0	7,1
Hydraulic system	120,0	31,74

OPTIONAL EQUIPMENT

Some of the equipment items described and illustrated are supplied to certain markets to meet specific requirements.Other special devices and attachments are also available as optional equipment. Check with your FIATALLIS dealer.

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SERVICE AND LUBRICATION GUIDE

HOURS	SERVICE POINTS	*	Nº OF POINTS	LUBRICANT	APROX. CAPACITY
10 Hours or daily	1- Engine sump and filter	V	1	A	14,2L (3,7488 GAL)
	2- Transmission oil level	V	1	E	27,0 L (7,128 GAL)
	3- Hydraulic tank and implement	V	1	C	123,0 L (32,472 GAL)
	4- Fuel filter water separator (A) and(B)	V / D	2	-	
	5- Radiator coolant level	V	1	-	30,0L (7,92 GAL)
50 Hours or each 15 days	6- Differential and planetary oil level	V	2/4	B	52,0 L (13,728 GAL)
	7- Fuel tank	D	1	-	200,0L (52,8 GAL)
	8- Fuel sediment bowl filter	CL	1	-	
	9- Bucket linkage grease fittings	LU	4	D	
	10- Steering cylinders grease fittings	LU	4	D	
	11- Rear axle support grease fittings	LU	2	D	
	12- Drive shaft grease fittings	LU	7	D	
	13- Articulation joint grease fittings	LU	2	D	
100 Hours	14- Fuel filter	R	2	-	
	15- Boom and linkage grease fittings	LU	10	D	
	16- Lift cylinder grease fittings	LU	2	D	
	17- Dump cylinder grease fittings	LU	2	D	
	18- Batteries	V	6	-	
250 Hours	19- Engine sump and filter	R	1	A	14,2 L (3,7488 GAL)
	20- Engine oil filter	R	1	-	
	21- Alternator and fan belt	V	1	-	
	22- Tire pressure	V	4	-	
	23- Brake line pressure filter	CL	1	-	
	24- Fuel filter water sepataror	R	1	-	
	25- Breathers	CL	4	-	
500 Hours	26- Hydraulic system return oil filter	R	1	-	
	27- Transmission oil filter	R	1	-	
	28- Hydraulic suction line filter	CL	1	-	
	29- Hydraulic tank filler neck filter	CL	1	-	
1000 Hours	30- Transmission oil level	R	1	E	27,0 L (7,128 GAL)
	31- Hydraulic tank and implement	R	1	C	123,0 L (32,472 GAL)
	32- Differential and planetary oil level	R	2/4	B	52,0 L (13,728 GAL)
	33- Valve lash adjustment	V	12	-	
	34- Hydraulic tank filler neck filter	R	1	-	
	35- Radiator coolant level	R	1	-	30,0 (7,92 GAL)
	36- Transmission screen filter	CL	1	-	
	37- Fuel injection nozzles	V	6	-	
As required	38- Engine air filter	CL	1	-	
	39- Engine air filter	R	1	-	
	40- Brake system bleeding	V	2/4		
	41- Fuel filter water separator	D	1		

* *Symbols for service intervals:* ***V***= *Check* ***R***= *Change* ***LU***= *Lubricate* ***CL***= *Clean* ***D***= *Drain*

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OPERATION

GENERAL INFORMATION

Before starting engine and/or placing loader in motion, be certain it has been properly prepared for use and has been properly seviced since last operating period. Refer to Preliminary Instructions and Break-in Period for detailed information.

ELECTRICAL SYSTEM MASTER SWITCH



The master switch is located at the rear of the machine, near the hydraulic oil cooler.

When electrical system operation is needed, this switch must be turned on.

Turn it off when the machine is parked after work, then remove the key from the switch. This practice will prevent machine abuse and misuse by unauthorized persons.

To be sure that the master switch is turned off, remember that the key can only be removed with switch in the off position.

FUEL TANK

DANGER

Extinguish all smoking materials and open flames before checking and filling fuel tanks.

Fluid under pressure. Turn cap or cover slowly to relieve pressure before removing.

Never refill tank while engine is running.

Do not use matches, lighters or torches as a light source near flammables.

Always use the specified fuel. When transferring fuel to the machine tank, use a pump provided with fine mesh strainer.

It is recommended to fill the fuel tank at the end of each day's work: this will prevent condensation (especially overnight) of moisture from the air. Do not allow tank to run dry: this will permit entry of air in the fuel system with consequent need for a bleeding operation.

ENGINE STARTING

WARNING

Warn all people who may be servicing or working around machine before starting engine.

Starting fluid is flammable. Do not puncture or burn containers for storage and disposal.

Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.

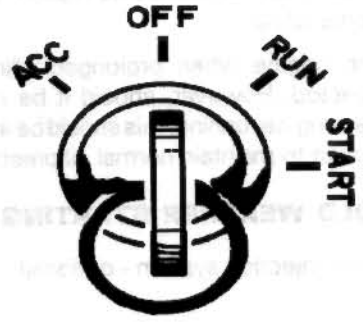
Turn ON the electrical system master switch.

Check that parking brake is applied.

Check that gearshift selector lever is in NEUTRAL position.

Make sure the boom/bucket lever is in NEUTRAL position.

Turn engine starting switch key to its 1st click setting (position ST).



Check that all warnings indicators in the CHECK CONTROL panel are flashing (indicator test).

Possible insufficient pressures will be indicated by the associated warning lights and simultaneous sounding of the buzzer.

With engine cold, press the ACCELERATOR PEDAL to its stop, with engine warm, to one third of travel.

Push and turn STARTING SWITCH KEY clockwise to start position START.

Once engine is started, release key.

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MAINTENANCE

WARNINGS

Do not allow unauthorized personnel to service or maintain this machine. Study the operation and maintenance instruction manual throughly before starting, operating, maintaining, fueling or servicing this machine.

If engine is to be started and run indoors, make certain there is proper ventilation to remove deadly exhaut gases.

Do not work under or near unblocked or unsupported linkage, parts or machine.

Do not use matches, lighters or torches as a light source near the machine due to the presence of flammables fluids.

Always turn the master switch to the OFF position before cleaning, repairing, servicing, or parking the machine prevent injury.

Never use gasoline or solvent or other flammable fluid to clean parts.

Never lubricate, service or adjust with the engine running, except as called for in the Operation and Maintenance Instruction Manuals, to keep from being caught by moving parts or by a moving machine.

Shut down machine according to Instruction Manual procedure before lubricating or any other servicing.

When any machine component must be removed or installed and jacks are used, be sure the jack support at the machine and on the ground are the load. Transfer the load to authorized blocking or jack stand immediately. Do not work on or under the machine or its components while supported only on a jack or other lifting device, according to Local or National requirements.

There is insufficient clearance for a person in the articulation area between the front and rear frames. Stay away from this area while engine is running. If it is necessary to do any servicing in this area lock the articulation.

Attachments and operating tools can be lowered to ground in response to the control lever whether engine is running or not.

Lift and handle parts with lifting devices with proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.

Use proper tools to bring holes into alignment. DO NOT USE FINGERS OR HANDS.

It is unsafe to strike steel parts with anything other than a soft iron or removing such parts wear safety glasses with side shields and heavy gloves, etc., to reduce the possibility of injury.

When servicing or maintenance requires access to areas that cannot be reached from the ground, use a ladder or step platform that meets local or national requirements to reach the service point. Perform all service or maintenance carefully.

MAINTENANCE OPERATION

The service intervals indicated herein refer to normal service conditions. During initial operation of the machine, or under particularly severe operating conditions, other intervals may be required.

Use this guide to coordinate maintenance sheduled at the same intervals.

No routine maintenance operations require the implement to be kept raised while performing them are specified.

Before proceeding with any service operation, lower implement to ground and stop machine following the specified shut-off procedure.

WARNING

Always block with external support any linkage or part on machine that requires work under the raised linkage, parts, or machine per local or national requirements. Never allow anyone to walk under or be near unblocked raised equipment unless you are assured of your safety.

It is advisable to change oils immediately after stopping the machine as warm fluids will drain more easily along with any suspended deposits and scale. Before and after lubrication, completely clean any fittings, covers and plugs to prevent dirt from entering the system.

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1.2 REMOVAL AND INSTALATION

⚠ WARNING

Position the machine on a flat surface and set the parking brake on .

Position bucket flat on the ground.

⚠ WARNING

*Always turn the master switch to the **OFF** position before cleaning, repairing, servicing or parking the unit, to prevent injuries.*

Remove radiator guards, upper hoods and side panels;

Remove hydraulic reservoir plug and drain oil completely. Collect it in a proper clean recipient;

Disconnect the hoses from hydraulic reservoir and remove it from the machine;

Disconnect the water and hydraulic oil radiators hoses and remove both radiators from the machine;

Disconnect the fuel system hoses, electric wiring and brake pump hoses mounted on engine side;

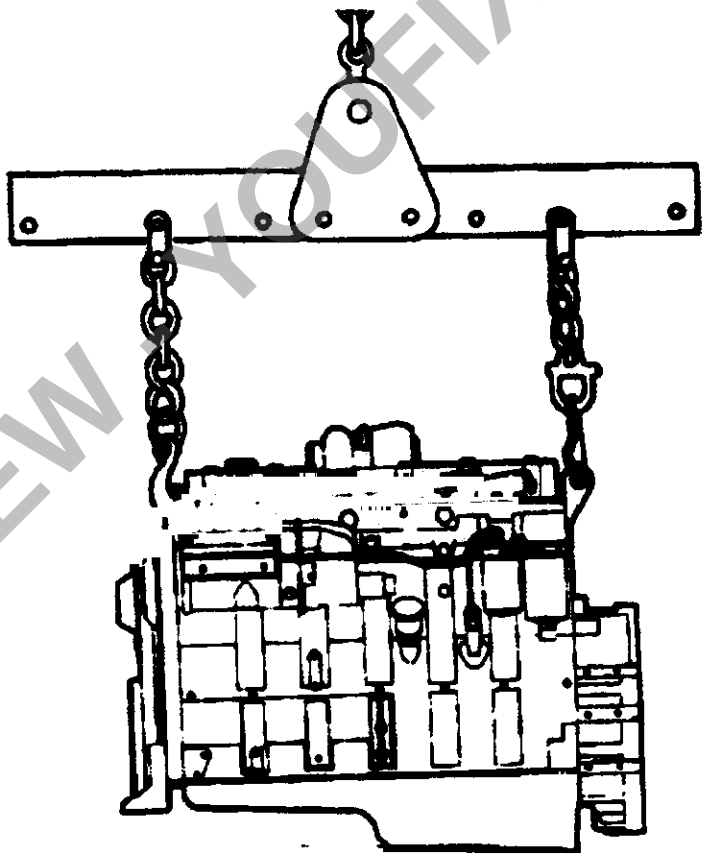


Fig. 1.2 Engine lifting

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3.2 TROUBLE-SHOOTING AND TESTS

Trouble shooting is a systematic procedure to locate noise and vibration that could impair the performance is recommended. If some failure is found in the axle, remove and inspect the magnetic drain plugs. If metal parts are visible, it is an indication of failure of internal components.

In case of noise in the axle, it could be useful to isolate the source, proceeding as follows:
- lift completely from the ground the wheel of the axle, from which the noise appears to originate;
- disconnect the prop-shaft of the axle "still on the ground";
- start the engine and engage a slow speed;
- locate the source of the noise.

⚠ WARNING

Position the machine on a flat surface and block the wheel of the axle "still on the ground".

Be extremely careful to avoid that clothing is caught by turning wheels

TROUBLE & PROBABLE CAUSE	REMEDY
NOISE	
1. Wrong lubricant or lubricant level too low.	Check level, fill with prescribed lubricant. (Refer to Operation and Maintenance Manual).
2. Wheel bearings worn or badly adjusted.	Replace or adjust bearings.
3. Final drive sun gear teeth worn or broken.	Replace sun gear and planetary gears, If necessary, replace gear as well.
4. Differential side gears or idle gears worn or broken,	Replace gears.
5. Bearings loose in seat or worn, screws loose or defective splines.	Replace or tighten.
6. Wrong setting of differential bevel gear set.	Re-adjust.
LUBRICANT LEAKAGES	
1. Leakages of lubricant from final drive covers.	Tighten screws or replace sealing compound on cover.
2. Lubricant level too high (leakages from breather).	Adjust level.
3. Foamy lubricant.	Drain and refill with proper oil.
4. Axle breather clogged or defective.	Replace breather.
5. Seals worn or broken.	Replace seals.
OVERHEATING	
1. Level or type of lubricant incorrect.	Check level, refill with appropriate fluid.
2. Excessive wear of gears	Replace gears.
3. Insufficient backlash between pinion and wheel.	Adjust.

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3.3.3.3 Reassembly

Place the dust cover on the hub.

Press the outer and inner races of the bearing, making sure they are firmly against the shoulder.

Install a new seal. Prior to installing it, smear the outer diameter of the seal with Loctite 573.

Support in a safe manner the support flange and mount it on the hub.



Fig. 3.20

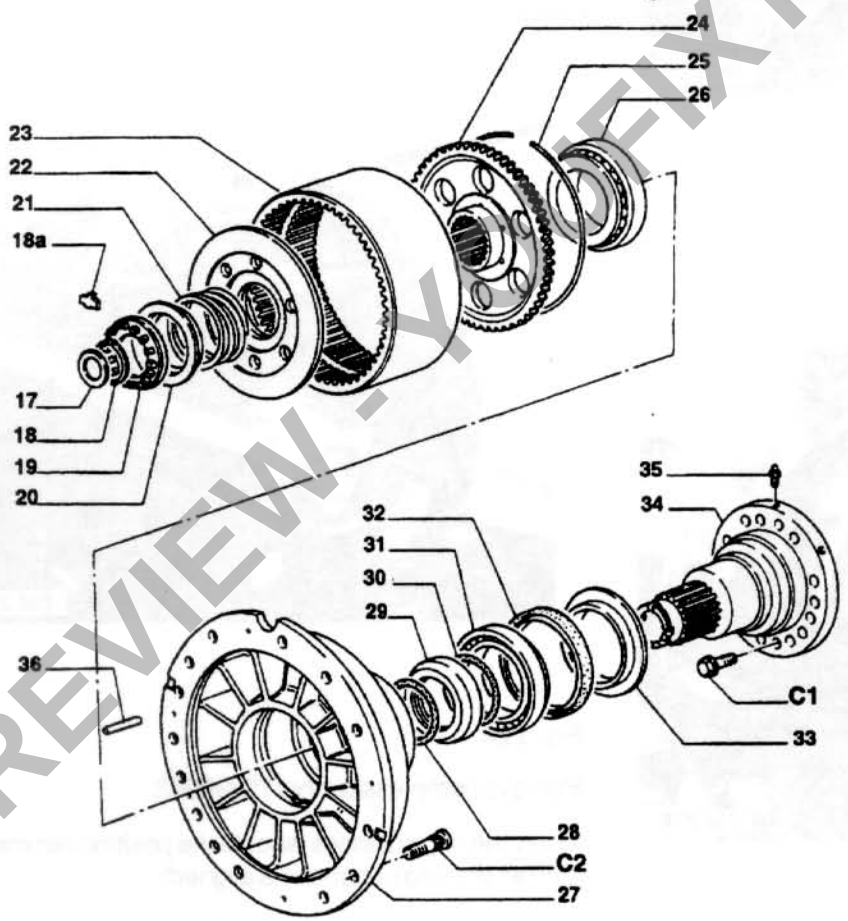


Fig. 3.21 - Final drive: exploded view of components

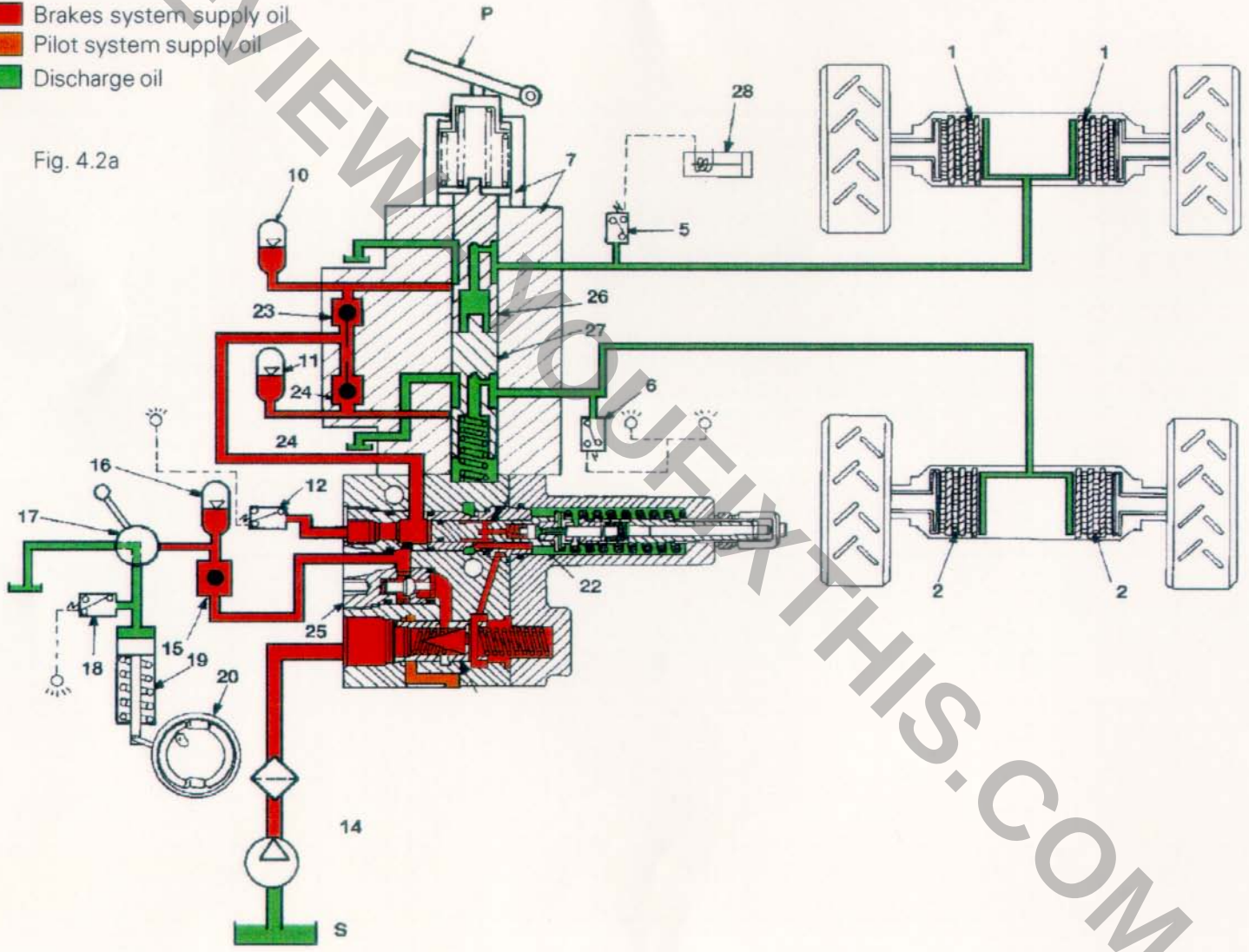
C1. Securing screws, front wheel hub (tightening torque: 85.5 ÷ 94.5 daNm ~ 620 ÷ 685 lb.ft). Securing screws, rear wheel hub (tightening torque: 62 ÷ 68 daNm ~ 450 ÷ 490 lb.ft) - **C2**. Securing screws, planetary carrier (tightening torque: 6.1 ÷ 6.9 daNm ~ 44 ÷ 40 lb.ft) **17**. Thrust ring - **18**. Snap ring - **18a**. Safety plate - **19**. Ring nut - **20**. Spring retaining cup - **21**. Spring **22**. Thrust plate - **23**. Crown - **24**. Support - **25**. Elastic ring - **26**. Bearing - **27**. Wheel support flange - **28**. Piston O-ring - **29**. Piston - **30**. Piston O-ring - **31**. Bearing - **32**. Seal - **33**. Dust seal - **34**. Wheel hub - **35**. Oil bleeding **36**. Pin.

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FR 120.2 BRAKE HYDRAULIC SYSTEM DIAGRAM

Brakes system supply oil
Pilot system supply oil
Discharge oil

Fig. 4.2a



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