

SHOP MANUAL

KOMATSU

GD500R-1

MOTOR GRADER

MACHINE MODEL	SERIAL No.
GD500R-1	10001 and up

FOREWORD

Only through correct operation, maintenance, trouble shooting, and repairs, can the effective performance, prevention of breakdowns and a long useful life of a machine be sustained.

The object of this "Shop Manual" is to furnish the information needed by the serviceman to perform his work well, by giving him the essential details precisely but in an easily understood format.

In performing his work, the serviceman should study the pertinent section of this manual carefully, and work systematically and scientifically by following the outlined work sequence.

This Shop Manual has been prepared with the above in mind, so that each basic part of the machine is dealt with under the headings: "Construction and Function", "Testing and Adjustments", "Trouble shooting", "Specifications" and "Disassembly and Assembly".

Also a section on General Technical Procedures is provided to furnish details on basic operations and procedures common to the serviceman's work on the different parts of the machine.

1. General Instructions

This section presents under one heading the basic information and procedures common to the sections on "Disassembly and Assembly", "Testing and Adjustments", "Trouble shooting", and "Dismounting and Mounting". It is essential for the serviceman to thoroughly understand and know this section till it becomes a part of his common sense.

2. Construction and Function.

This section gives a detailed explanation of the "Construction" with details and drawings of the "Constituent Parts" and "block" or "circuit" diagrams, arranged for the serviceman, but also useful as a textbook for training service personnel. However, in the latter case Training Aids should be used to cover the basic theory not included in this manual.

3. Testing and Adjustments.

Procedures of all the necessary "Tests" and "Adjustments" are described with photographs showing the necessary measuring equipment and the location for making the measurements. This should aid the serviceman in his trouble shooting, checking and adjusting work.

4. Trouble Shooting

Typical common troubles are listed and systematically described; with their causes and the procedures for finding and diagnosing the symptoms.

As it is impossible to list all of the possible troubles, the serviceman should study the sections covering the "Construction and Function" and "Testing and Adjustments" and apply this knowledge to diagnose any non-listed troubles.


5. Specifications

In this section, all standard dimensions and tolerances that are necessary to perform Testing and Adjustments are presented; with drawings together with, appropriate procedures for disassembly and assembly, performing repairs, or trouble shooting. However, basic dimensions and tolerances, for repairs or rebuilding, are limited to those machine parts most commonly worked on.

PRECAUTIONS WHEN PERFORMING THE SERVICE WORK.

Always pay attention to, Safety, before starting any work – this is important.


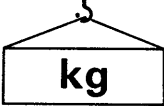

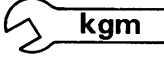
Never attempt any work where danger to yourself or to other persons.

Whenever work requiring safety precautions are described in this manual, a mark  in inserted, always make double sure that safety measures are taken.

Other unmarked work, should always be performed after studying and using your common sense to prevent accidents.

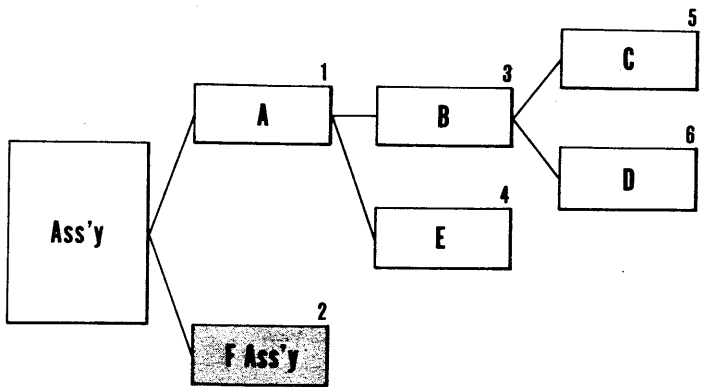
DESCRIPTION OF THE SYMBOLS

The symbols described below are used in this manual for convenience and better understanding.

Symbol	Meaning	Detail
	Safety	Special safety precautions are needed to perform the work.
	Weight	The hoisting wire and equipment must be properly selected to safely bear the designated weight.
	Note	Special technical precautions are needed to perform the work.
	Tightening Torque	Fastening parts that require specified tightening torque for assembling.

NETWORK DIAGRAMS

The standard procedures for disassembly and assembly are described and shown in photographs, according to each part of the machine. The sequence or steps employed in disassembly and assembly are shown in network diagrams as depicted below.



In the network, the sequence of the procedural steps are given in arabic numbers (1, 2, 3) on the top right of each block. For example, when it is necessary to remove part D from the assembly, the steps for removal should be A → B → D. Or, to remove part E the step is A → E. This is an assembly of which the disassembling procedure is described separately. For assembly, the sequence is presented in the same manner, under each section, as for disassembly.

HOW TO READ THE TROUBLE SHOOTING CHART

As shown below, the symptoms related to the particular trouble are described in the line designated "Test results". The cause for the diagnosed trouble is then correlated on the cause column and is shown marked.

Problem No. 1 Decreasing of the tractive power or slow travel speed.

Test results	Problem cause		
	Oil leaks in torqueconverter	Air suction of the hydraulic pump	
Torqueconverter oil pressure gauge shows lower than normal pressure. (normal 2 ~ 6.3 kg/cm ²)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transmission oil pressure gauge shows lower than normal pressure. (normal 20 ~ 23 kg/cm ²)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SERVICE STANDARDS

A sectional drawing of the machine part is prepared and each pertinent part requiring service standards is described by the number in the drawing and in the Table.

No.	Check Item	Criteria				Remedy	
		Basic Size	Tolerance		Standard Clearance		Service Limit
			Shaft	Hole			

MEANING OF SPECIAL WORDS

Standard Clearance	This is range of clearance specified for two new parts assembled together. When the machine has been reconditioned, every clearance must be adjusted to its standard clearance.
Service Limit	This is the limit of the size of a part restricting use of the worn or distorted part in excess of this limit. All parts exceeding the repair limit must be replaced or repaired, whichever is specified.
Clearance Limit	This is the limit of clearance between parts restricting use of the worn parts in excess of this limit. All parts exceeding the clearance limit must be replaced or repaired, whichever is specified.
Turning Limit	This limit is applied only to the track link pitches. As long as any link remains within the turning limit, the link can be reconditioned by turning over its bushing and pin.

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01 GENERAL

GENERAL

10 ENGINE

Refer to Shop Manual

"Komatsu Engine 130-BE1" for detail.

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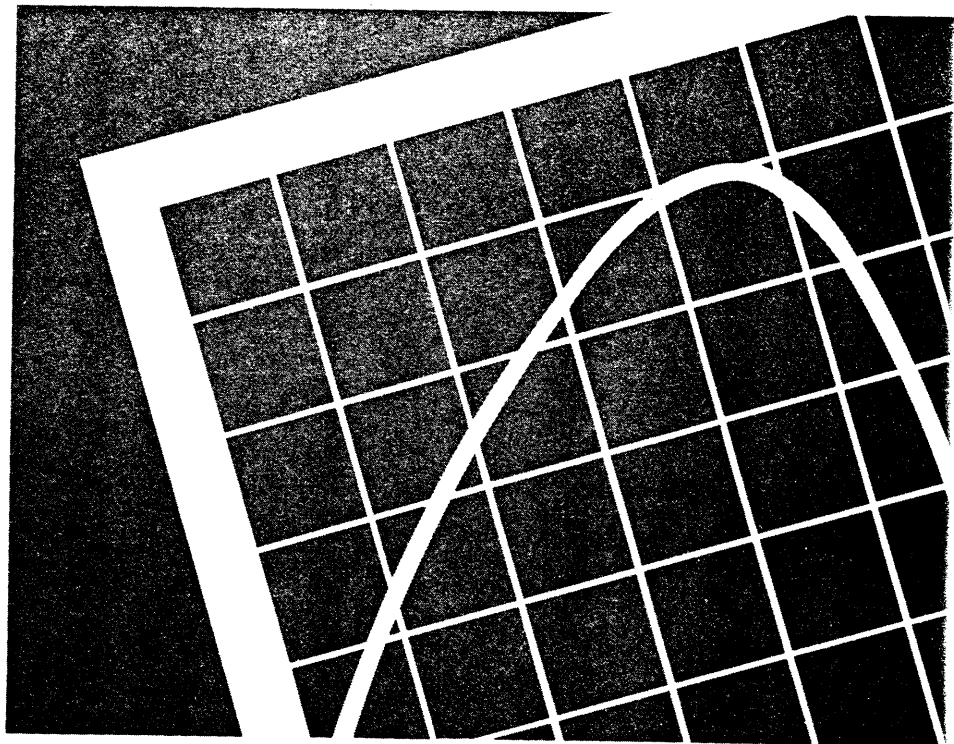
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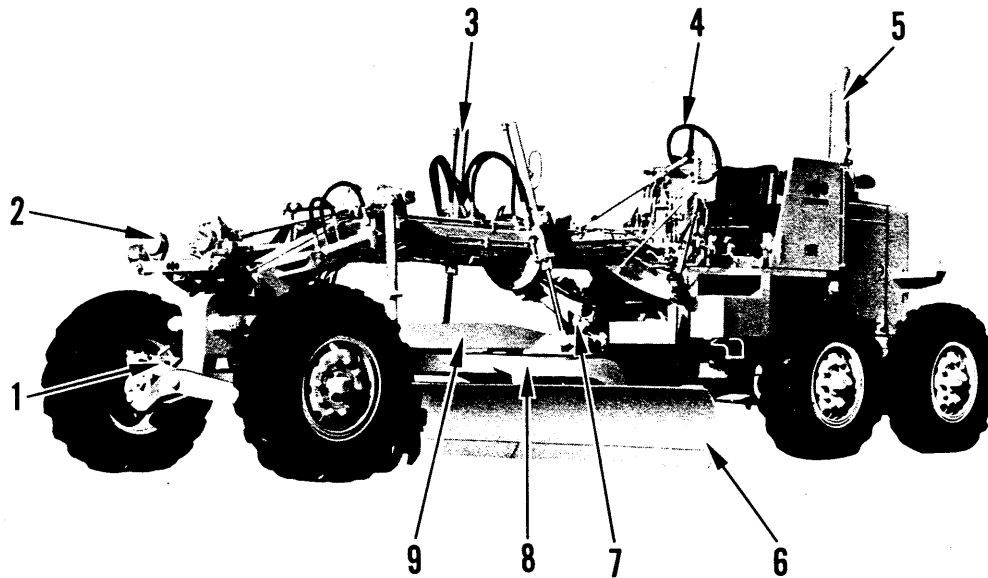
01 GENERAL



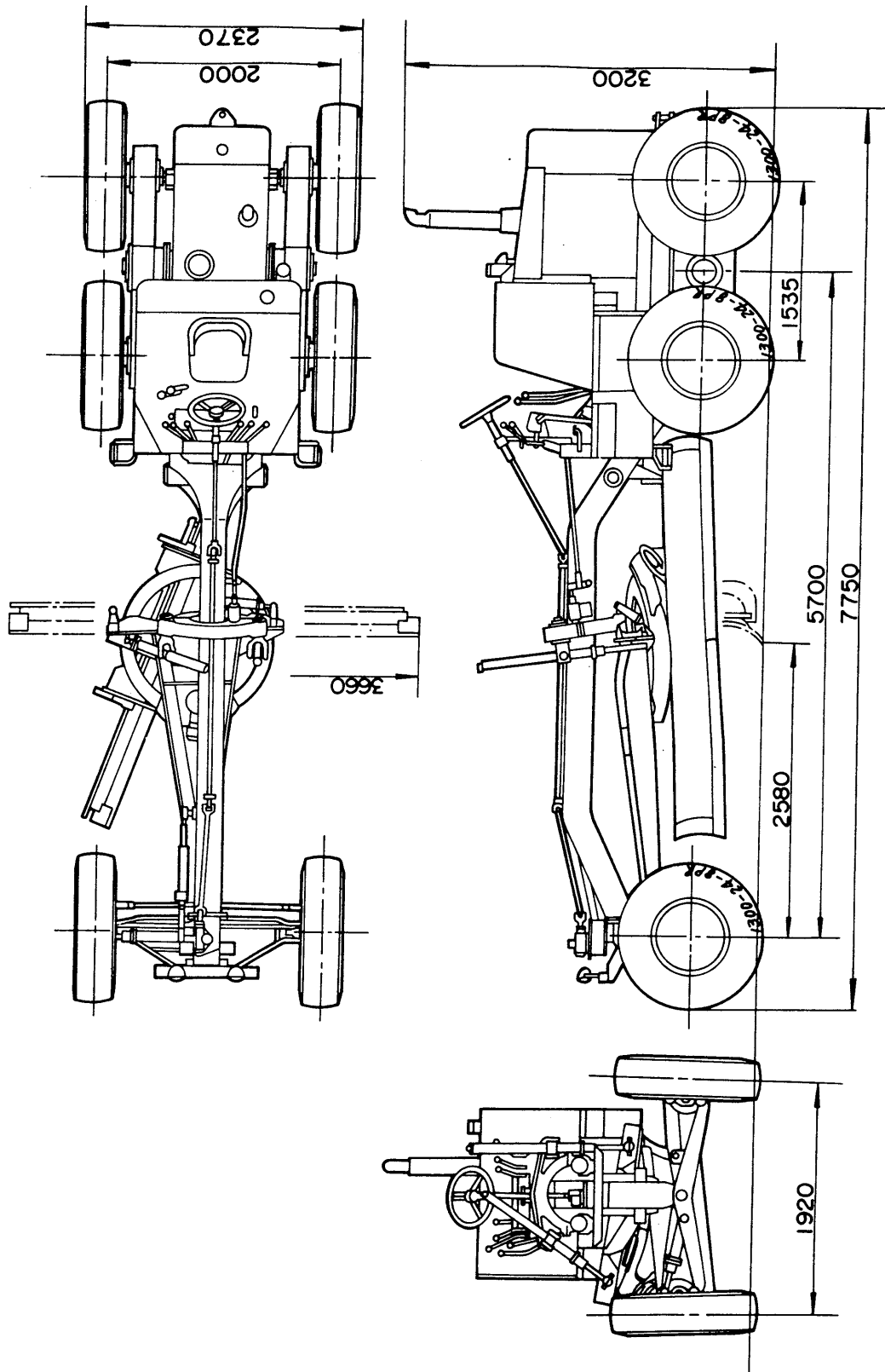
GENERAL

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GENERAL LOCATIONS



1. Wheel leaning cylinder
2. Head lamp
3. Blade lift cylinder
4. Steering wheel
5. Exhaust muffler
6. Blade
7. Drawbar side shift cylinder
8. Circle
9. Drawbar



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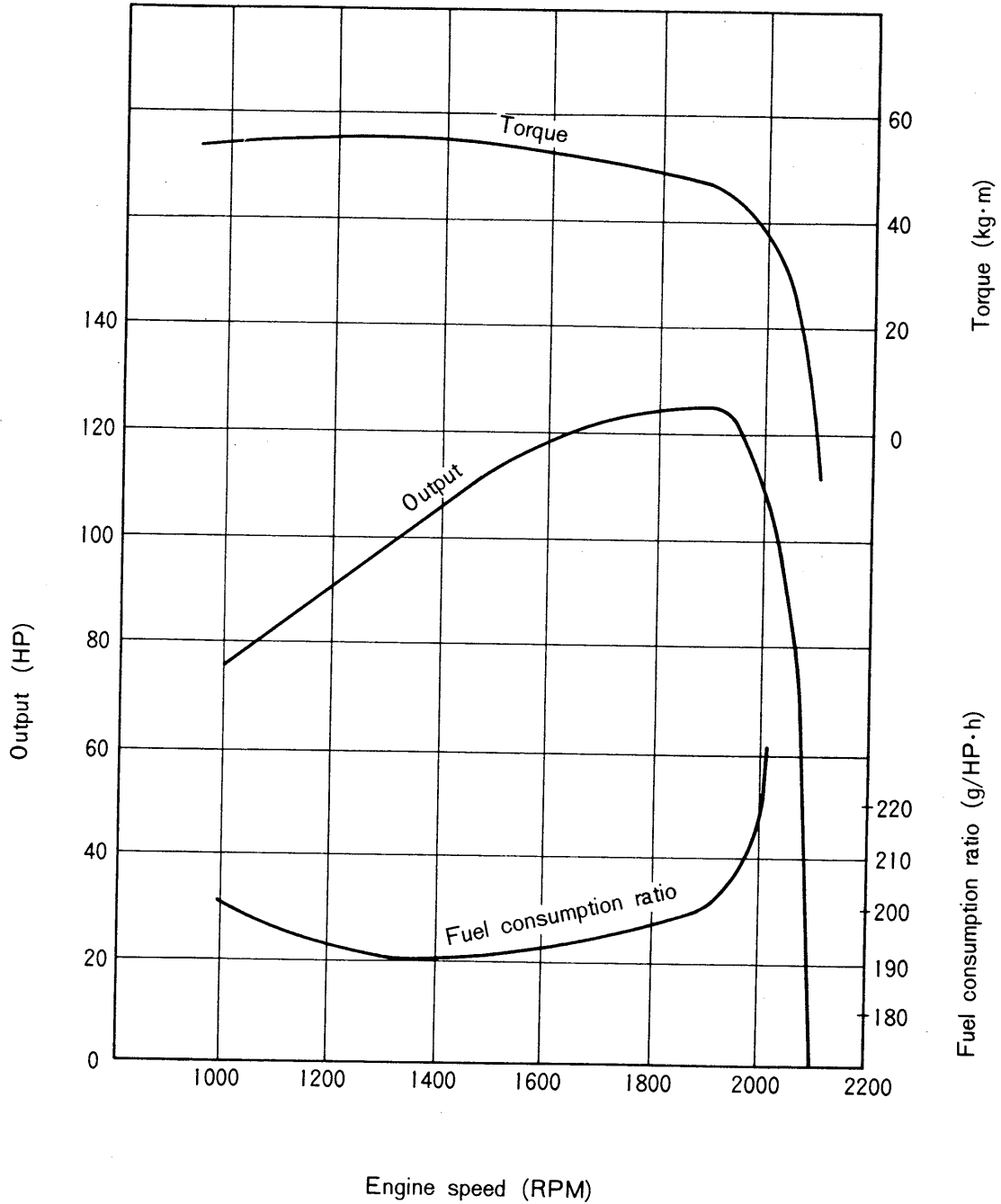
SPECIFICATIONS

Machine Model		GD500R-1	
Serial Numbers		10001 ~	
Weight	Operating weight (kg)	10500	
	On front axle (kg)	2820	
	On rear axle (kg)	7680	
Dimensions	Overall length (mm)	7750	
	Overall width (mm)	2370	
	Overall height		
	To top of exhaust pipe (mm)	3200	
	To top of steering wheel (mm)	2575	
	Wheelbase (mm)	5700	
	Distance between centers of tandem wheels (mm)	1535	
	Tread, front (mm)	1920	
	Tread, rear (mm)	2000	
	Ground clearance (mm)	380	
Performance	Travel speed	Forward 1st (km/h)	4.1
		Forward 2nd (km/h)	6.2
		Forward 3rd (km/h)	10.5
		Forward 4th (km/h)	15.8
		Forward 5th (km/h)	23.0
		Forward 6th (km/h)	34.7
		Reverse 1st (km/h)	7.0
		Reverse 2nd (km/h)	10.5
	Max. drawbar pull (kg)	6150	
	Turning radius (m)	10.5	
Capacity	Engine (ℓ)	35	
	Transmission and clutch (ℓ)	33	
	Final drive case (ℓ)	28	
	Tandem drive case (each) (ℓ)	36	
	Hydraulic system (ℓ)	76	
	Fuel tank (ℓ)	150	
	Coolant (ℓ)	45	

Machine Model		GD500R-1
Serial Numbers		10001 ~
Engine	Model	Komatsu S4D130-1B
	Type	Water cooled, 4-cycle, overhead valve, pre-combustion chamber diesel, turbocharged
	No. of cylinders – bore x stroke	4 – 130mm x 160mm
	Piston displacement	8490 cc
	Flywheel horsepower	125HP/1900 rpm
	Max. torque	55 kg.m/1300 rpm
	Starting motor	24V 7.5 kW
	Alternator	24V 13 A
	Battery	24V (12V x 2) – 150 Ah
	Power train	Clutch
Transmission		Sliding mesh and constant mesh combined type, with high-low change lever 6 forward and 2 reverse speeds
Bevel gear		Spur gear and spiral bevel gear, double reduction
Tandem drive		Roller chain drive
Front axle		Elliot type, hydraulic leaning
Wheels	Tire	13.00 – 24 – 8PR
	Rim	8.00 TG x 23 SDC
	Control valve	7-spool type with safety valve
	Max. oil pressure	140 kg/cm ²
	Oil pump discharge	2 x 35 ℓ/min.
	Oil motor discharge	35 ℓ/min.
Blade length x height x thickness		3660 mm x 530 mm x 12 mm

ENGINE PERFORMANCE CURVE

Flywheel horsepower: 125 HP/1900 rpm
Maximum torque: 55 kg.m/1300 rpm



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WEIGHT TABLE

Unit: kg

Model Serial Numbers	GD500R-1 10001 ~
Engine assembly	950
Radiator assembly	70
Clutch assembly with oil tank	102
Transmission assembly (Sliding mesh type)	335
Bevel gear assembly	608
Tandem drive assembly	840 x 2
Front axle assembly without leaning cylinder	370
Wheel brake assembly	25 x 4
Frame assembly	1600
Operator's seat	35
Body assembly	235
Circle drawbar assembly	300
Blade assembly	600
Lifter bracket assembly	230
Blade circle reverse assembly	65
Leaning cylinder assembly	24
Blade lift cylinder assembly	32
Drawbar shift cylinder assembly	22
Blade shift cylinder assembly	39
Wheel assembly	159 x 6
Hydraulic control valve assembly (3 valves)	30.6
Hydraulic control valve assembly (4 valves)	37.2
Scarifier (Option)	460
Steel cabin (Option)	230

POWER TRANSMITTING SYSTEM

The machine driving system consists mainly of the following components.

★ **Power train**

The engine, clutch transmission and final drive; built-up into one block, is supported on the main frame through a center pin under the transmission and by the left and right side bearings of the final drive cases.

★ **Tandem drive and rear wheels**

The tandem drive is of a roller chain type provided with two front and rear wheels and attached to each final drive case.

★ **Front axle**

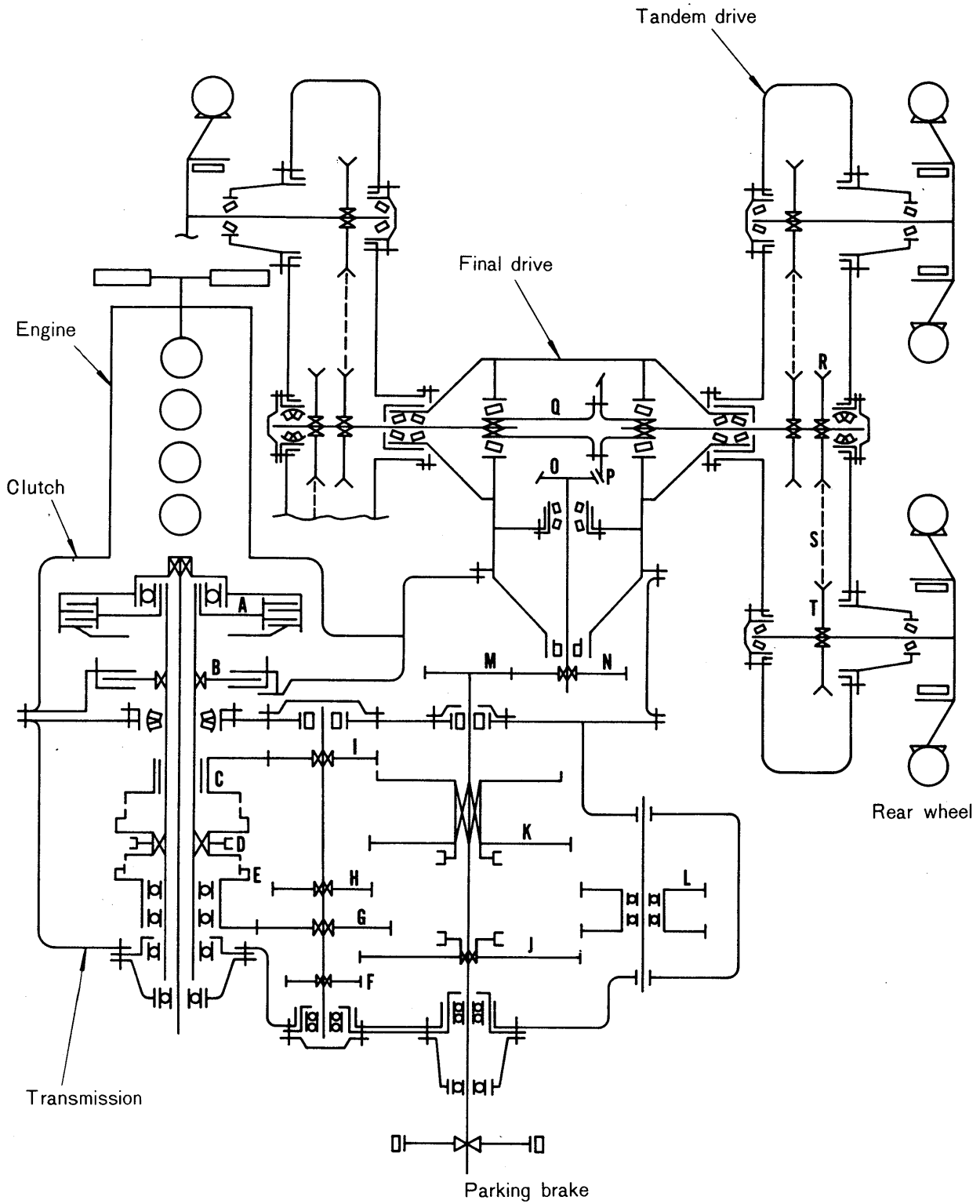
The front axle is provided with the front wheel leaning unit and secured to the frame with center pins.

SPEED STAGES VS. POWER TRANSMISSION ROUTE

Direction	Stage	Gear shift lever position	High/Low speed change lever
Forward	1st	F1	L
	2nd	F1	H
	3rd	F2	L
	4th	F2	H
	5th	F3	L
	6th	F3	H
Reverse	1st	R1	L
	2nd	R1	H

IDENTIFICATION OF TRANSMISSION GEARS

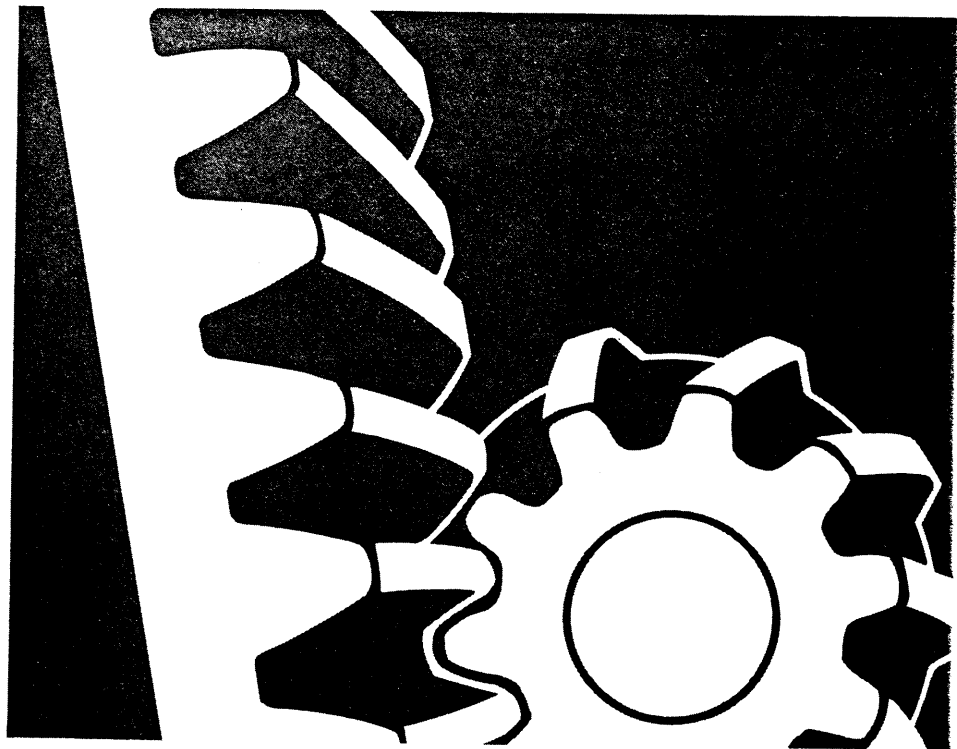
Letter Symbol	Gear Name	Letter Symbol	Gear Name
A	Clutch driven gear	K	2nd and 3rd driven gear
B	Clutch brake disc	L	Reverse gear
C	Low speed gear	M	Reduction drive gear
D	High/Low speed change gear	N	Reduction driven gear
E	High speed gear	O	Bevel pinion
F	1st speed gear	P	Bevel gear
G	Reverse speed gear	Q	Bevel gear shaft
H	2nd speed gear	R	Sprocket (drive)
I	3rd speed gear	S	Chain
J	1st driven gear	T	Sprocket (driven)



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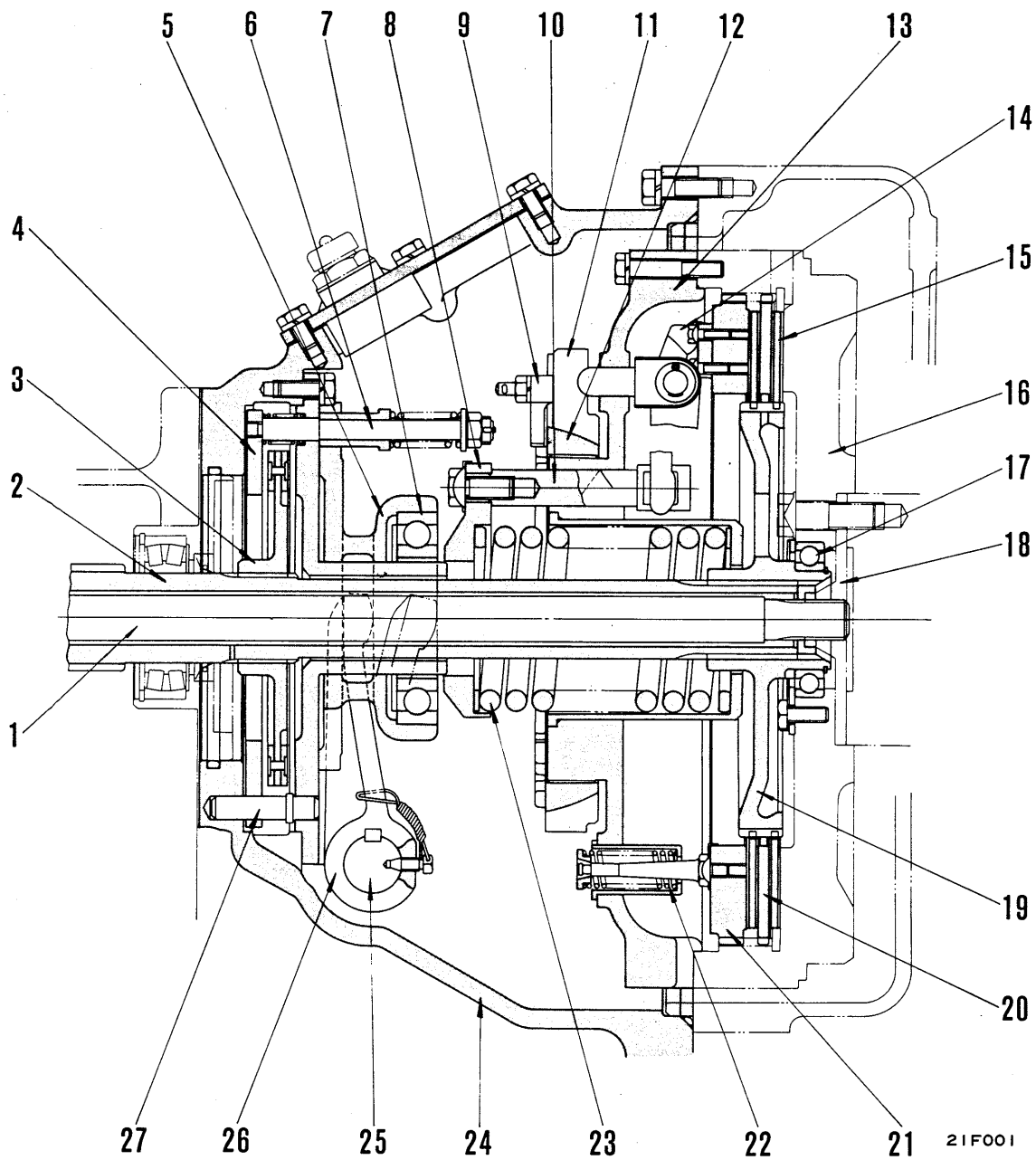
21 POWER TRAIN STRUCTURE AND FUNCTION



STRUCTURE AND FUNCTION

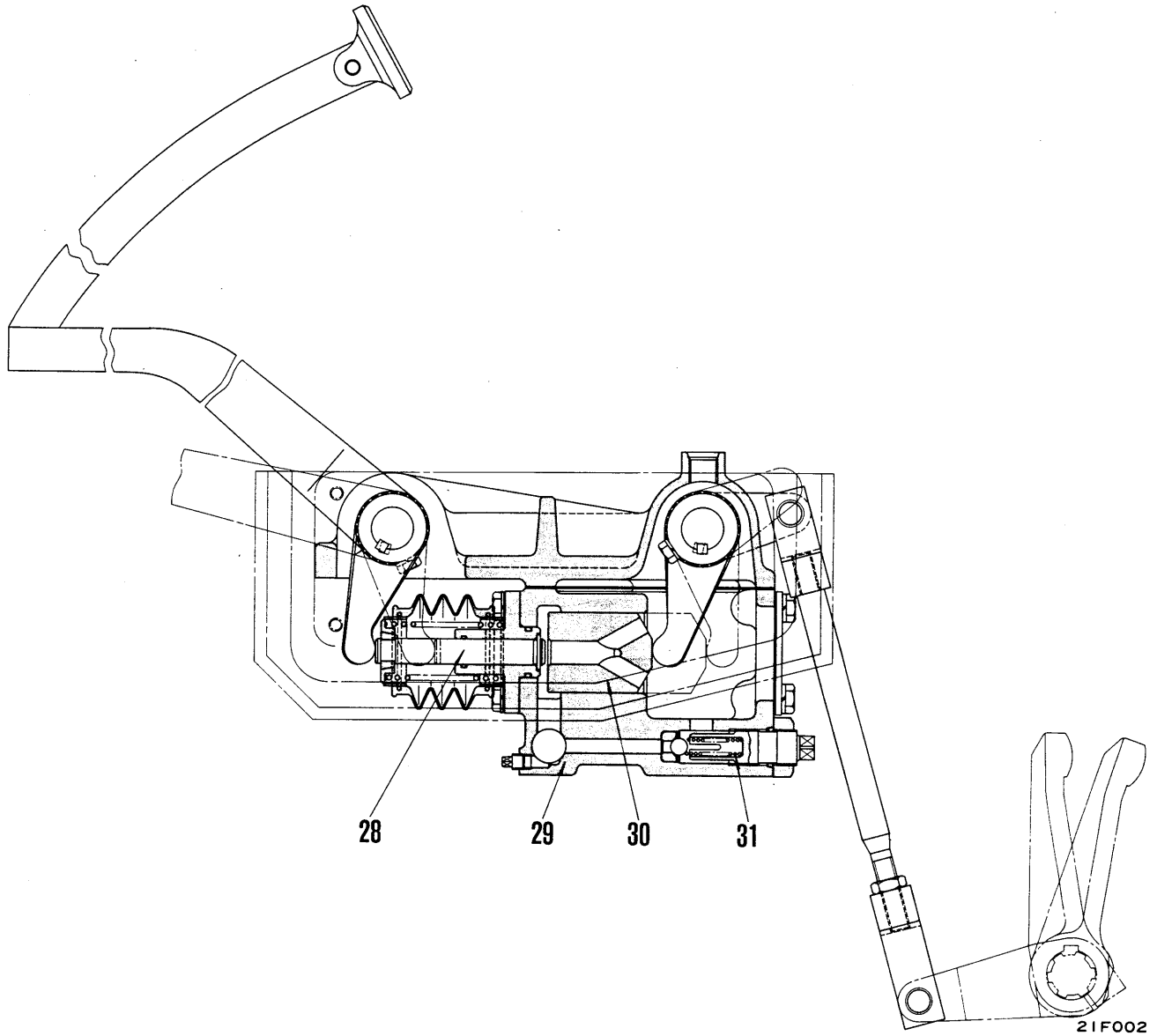
Clutch	21- 2
Clutch booster	21- 3
Transmission	21- 6
Final drive	21-10
Tandem drive	21-12

CLUTCH



- | | | |
|-----------------------|-------------------|-------------------------------|
| 1. P.T.O. shaft | 10. Rod | 19. Gear (driven plate guide) |
| 2. Clutch shaft | 11. Bracket | 20. Drive plate |
| 3. Brake disc | 12. Adjusting nut | 21. Pressure plate |
| 4. Brake plate | 13. Clutch cover | 22. Return spring |
| 5. Shifter seat | 14. Release lever | 23. Clutch spring |
| 6. Rod, Return spring | 15. Driven plate | 24. Clutch case |
| 7. Release bearing | 16. Flywheel | 25. Shifter shaft |
| 8. Release collar | 17. Pilot bearing | 26. Shifter lever |
| 9. Lock | 18. Cuping | 27. Guide |

CLUTCH BOOSTER

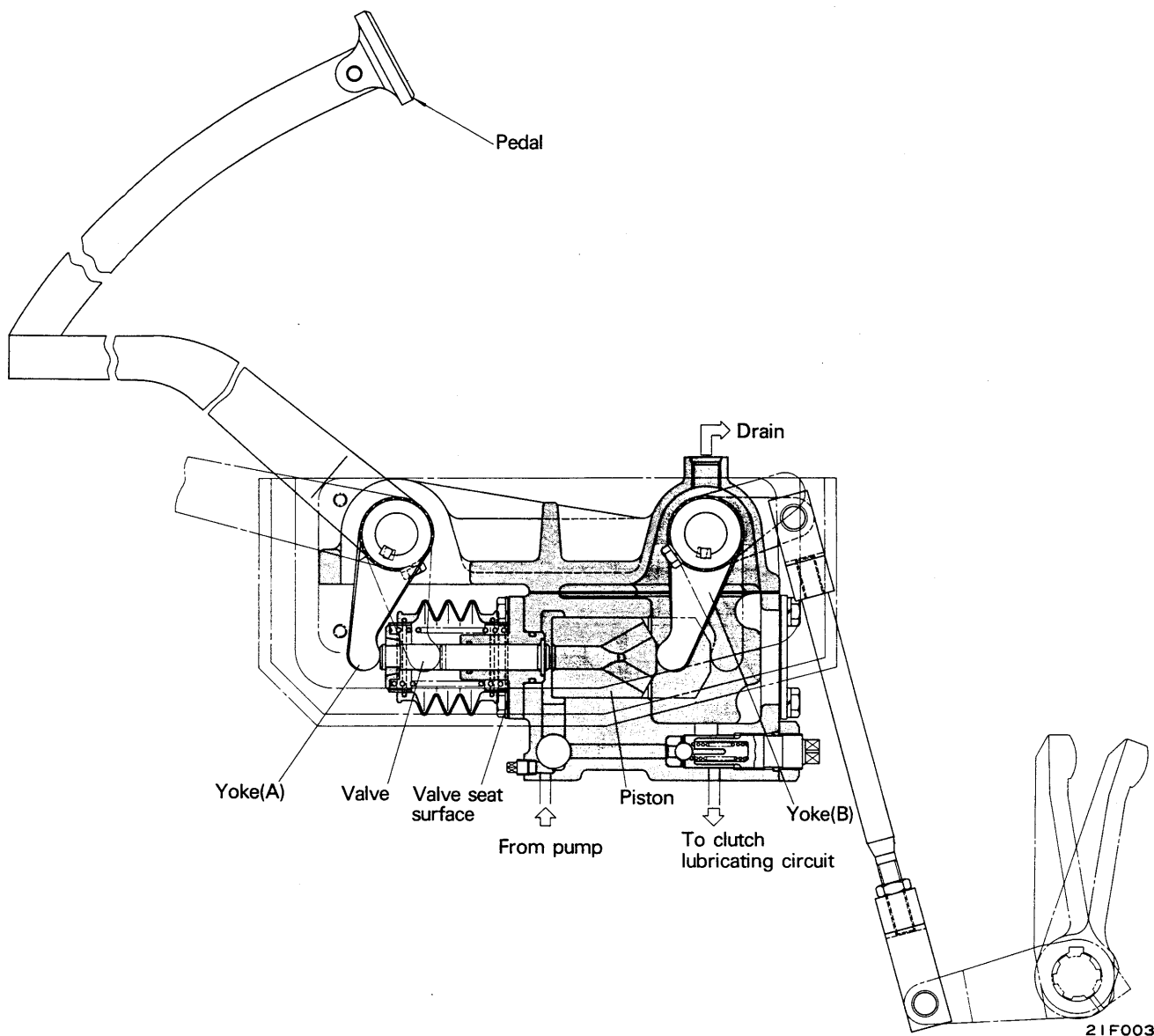


- 28. Brake
- 29. Valve body
- 30. Piston
- 31. Relief valve

● **HYDRAULIC BOOSTER**

(1) Clutch ON

When the clutch pedal is not depressed, the valve is apart from valve seat surface. Oil from the pump flows through the oil passage inside the piston. A part of oil goes to the drain circuit and the remainder goes to the clutch and transmission lubricating circuit.



(2) Clutch OFF

When the clutch pedal is depressed, the yoke (A) pushes the valve right against the valve seat. As oil flow from the pump is blocked, oil pressure acts on the whole of piston back surface, and duplicated pedal force acts on the yoke (B) to disengage the clutch.

INERTIA BRAKE

When the clutch pedal is depressed, first the clutch is disengaged and, then, the inertia brake for braking the clutch shaft is actuated to facilitate gearshifting. The inertia brake is installed in the clutch case.