

SERVICE MANUAL

Powershift Transmission G 421 / G 422
Converter Transmission
G 521 / G 522 / G523

KOMATSU

PREFACE and EXPLANATIONS

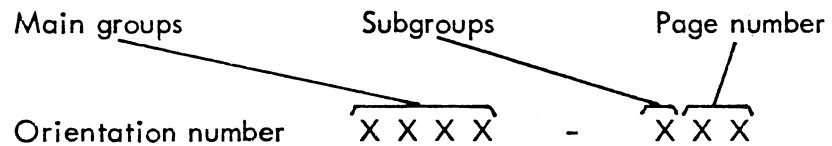
This manual should assist the skilled construction machine mechanic when carrying out repairs and adjustments on our construction machines. The procedures are written in such a style that the dismantling and assembling of the components can be carried out successfully and without difficulty.

To assist in the locating of specific test-repair operations, functional descriptions etc. this manual is divided into main and subgroups.

At the top right hand corner of every page next to the section heading a series of numbers (orientation number) are to be found. These numbers follow in numerical sequence throughout the book.

The section heading applies either to the construction machine type, assembly or component for which the text and illustrations are valid.

Orientation number:



The main group numbers refer to either main assemblies, groups of main assemblies, sub-assemblies or components.

Example: Group 1700 - Steering (mechanical steering, assisted steering, hydro-steering, steering unit)

 Group 2500 - Axles (differential, planetary gear, drive pinion)

The subgroup numbers classify the descriptions and details as follows:

- 0 - General and maintenance
- 1 - Functional descriptions
- 2 - Fault diagnosis and possible remedies
- 3 - Tests and adjustments
- 4 - Repair work
- 5 - Technical data



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POWERSHIFT TRANSMISSION

General description

The powershift transmissions G 421 and G 422 have 5 hydraulically operated multidisc clutches which are arranged on 3 mainshafts, having one clutch each for forward and reverse travel and 3 gear clutches.

The clutches have 10 sintered bronzed lined outer discs (3rd gear, 7 discs) and 10 steel inner discs (3rd gear, 7 discs) enabling powershifting by oil pressure.

Cooling takes place by means of oil coming from the inside of the mainshafts. The oil supply ducts are on the outside at the front face of the free ends of the shafts.

Shifting of the multidisc clutches is done hydraulically via the control unit.

The pressure build up of the shifting oil and the volume distribution of the lubricating oil (cooling oil) takes place in the pressure regulating valve.

The oil is supplied under pressure by the control pump.

The oil is filtered on the pressure side by a paper filter of 20 microns.

The heat exchanger is also connected into the pressure circuit.

With the G 421 gearbox the drive is transmitted to the final drive assembly via a stub shaft. With the G 422 gearbox, the drive is transmitted to the axles via a universal joint shaft.

POWERSHIFT TRANSMISSIONPressure regulator: Functional plan

Figures 1, 2 and 3, page 1900 - 103

- Fig. ① = gear fully connected
Fig. ② = full period after changing gear
Fig. ③ = quench period (retardation)

- 1 Gear oil sump
- 2 Hydraulic pump
- 3 Pipe, hydraulic pump - pressure regulator
- 4 Volume control valve
- 5 Stop for volume control valve
- 6 Throttle for volume control valve
- 7 Pipe, pressure regulator - flushing oil
- 8 Pressure chamber
- 9 Pipe, pressure regulator - control unit
- 10 Control unit
- 11 Pressure pipe, control unit - clutch
- 12 Clutch
- 13 Pressure holding valve
- 14 Flushing oil chamber
- 15 Bore to flushing oil duct
- 16 Throttle bore in flushing oil chamber
- 17 Stop for control piston
- 18 Flushing oil duct
- 19 Control piston
- 20 Outlet for flushing oil
- 21 Safety valve in flushing oil circuit
- 22 Return pipe for excess oil
- 23 Cylinder chamber throttle
- 24 Cylinder chamber
- 25 Compression piston
- 26 Spring, compression piston - valve piston
- 27 Spring chamber, compression piston - valve piston
- 28 Valve piston
- 29 Valve piston seat
- 30 Leak oil duct of spring chamber
- 31 Shifting oil return
- 32 Control bore, cylinder chamber - flushing oil chamber

POWERSHIFT TRANSMISSION

Pressure regulating valve:

D 600 D from serial number 3316 20 485 }
 L 600 D from serial number 3317 20 114 } Part Number 2979 477 M91

Fig. K 289

Components

1 = O-ring	20 = Flow control valve
2 = Restrictor (3) retaining screw	21 = Spring
3 = Flow control restrictor (3.5 mm dia.)	22 = Spring retainer
4 = Large (regulating) spring	23 = Shims
5 = Small (regulating) spring	24 = Spring
6 = Load piston chamber	25 = Cap nut (17 mm)
7 = Top cover	26 = Leak oil gallery from pressure holding valve
8 = Bottom cover	27 = Pressure holding valve piston guide
9 = Outlet port to direction control valve	28 = Pressure holding valve piston
10 = Regulating piston	29 = O-ring
11 = Valve body	30 = Washer
12 = Leak oil gallery from load piston chamber	31 = Outlet port to direction control valve
13 = Load (damping) piston	32 = Lube oil outlet
14 = Lube pressure relief ball valve	33 = Check valve and restrictor assembly
15 = Relief valve spring (6 bar)	34 = Top cover securing screws
16 = Relief valve circlip	35 = Top cover gasket
17 = Dowel	36 = Plug
18 = Oil inlet port	37 = Bottom cover gasket
19 = Flow control valve stop	38 = Bottom cover retaining screws

Pressures:

Pressure holding valve	16 bar max.
Lubrication (cooling oil) relief valve	2.5 ⁺ - 1.5 bar

POWERSHIFT TRANSMISSION

Fault diagnosis

Fault	Probable Cause	Remedy
Machine cannot be driven: No gearshifting pressure	<ol style="list-style-type: none"> 1. Low oil level 2. Cold start valve spring broken 3. Pressure shifting valve, spring broken 	<ol style="list-style-type: none"> 1. Top up oil. 2. Replace cold start valve spring. 3. Replace pressure shifting valve spring.
Machine cannot be driven: Gearshifting pressure available	<ol style="list-style-type: none"> 1. Sticking gear by-pass valve 	<ol style="list-style-type: none"> 1. Check by-pass valve and if necessary replace.
Insufficient gear shifting pressure	<ol style="list-style-type: none"> 1. Poor performance of gearbox pump 2. Defective pressure shifting valve 3. Broken piston ring, i.e. in the travel direction clutch 4. Capacity regulating valve in the pressure regulator stuck in the open position 	<ol style="list-style-type: none"> 1. Replace pump. 2. Check shifting valve and if necessary replace. 3. Replace piston ring. 4. Remove the pressure regulator. Check and clean the regulating valve.
Machine jerks when changing gear	<ol style="list-style-type: none"> 1. Sticking dampening control piston 	<ol style="list-style-type: none"> 1. Remove the pressure regulator. Check and clean the dampening control piston