CASE

REPAIR MANUAL

Mini Excavators

CX16B, CX18B

9-88670

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CX16B and CX18B

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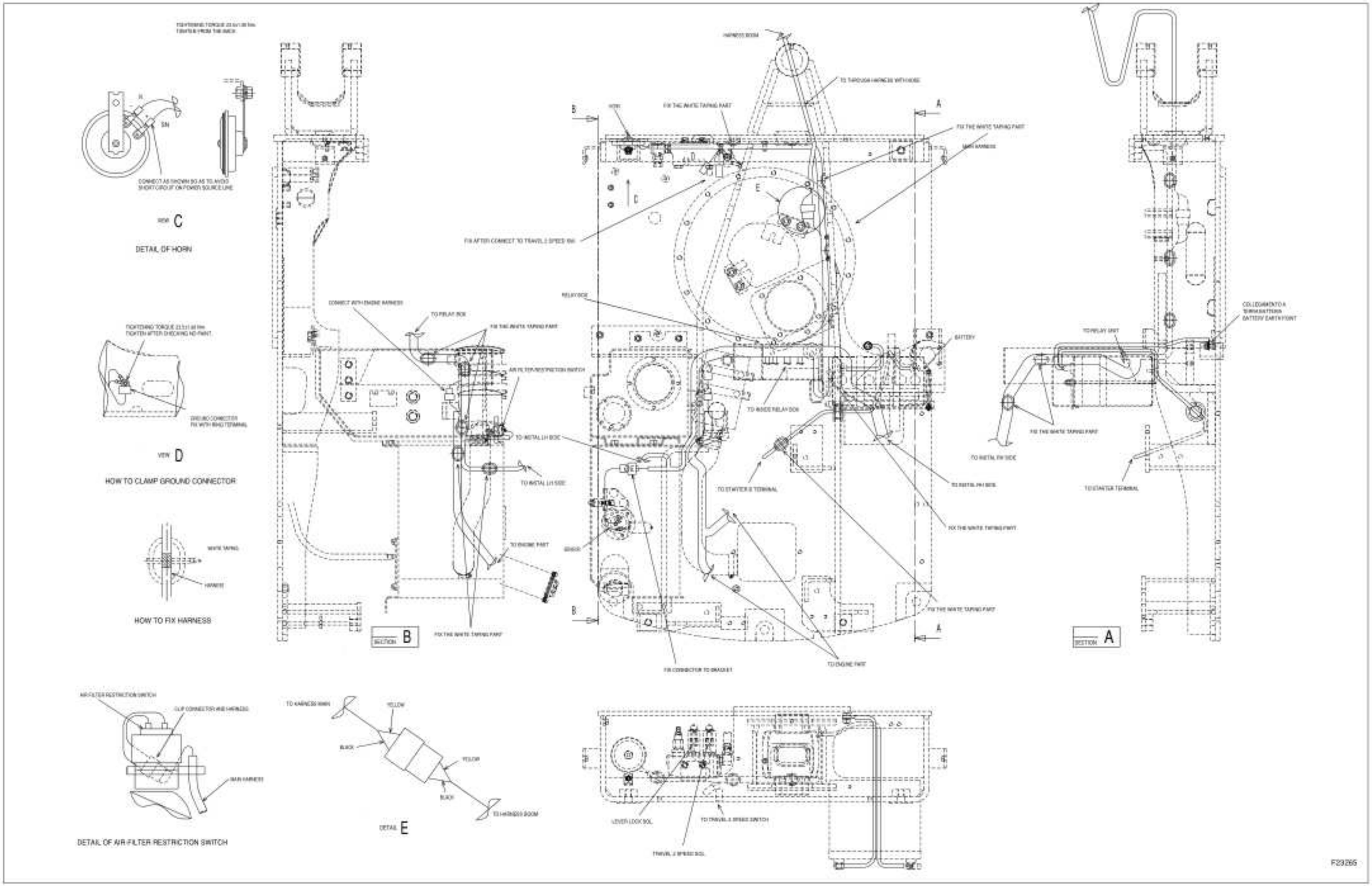
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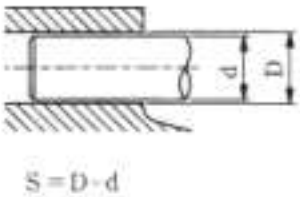
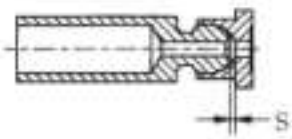
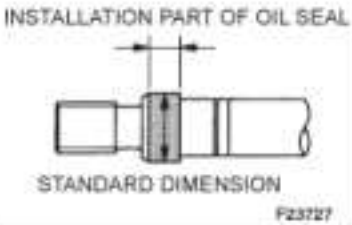
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MAINTENANCE STANDARDS

Item		Replacement Criterion	Remedy
Piston and cylinder barrel assy		• 0.05 mm or more clearance (S) between piston and cylinder barrel • Defects, scratches and abnormal wear on sliding portion	• Replace • Replace
Gap between piston and shoe		• 0.2 mm or more gap (S) between piston and shoe	• Replace
Oil seal installation part on shaft		• 0.025 mm or more wear on shaft at oil seal installation part	• Replace

TROUBLESHOOTING

TROUBLE CONDITIONS	MAJOR POSSIBLE CAUSES	REMEDY
Engine overload	• Over rated engine speed • Over rated pressure • Seizure or damage on pump inside parts	• Adjust to rated speed. • Adjust to rated pressure. • Repair or replace pump.
Pump discharge volume drops abnormally or pressure does not rise	• Insufficient engine speed • Failure on pump coupling • Seizure or damage on inside parts of pump	• Adjust engine speed. • Repair/replace coupling. • Repair/replace pump.
Abnormal noise and vibration (cavitation phenomenon)	• Air/water in hydraulic oil • Clogging suction strainer • Clogging/choking suction pipe • Trouble on additional pump (if any) • Damage on caulked portion of piston shoe • Loosening on installing portion of pump • Coupling failure	• Retighten piping, especially for suction pipe. Change oil if water contained. • Wash/replace suction strainer. • Recondition suction pipe. • Repair/replace additional pump. • Replace piston assy. • Recondition installation of pump. • Replace coupling.
Oil leakage	• Failure on O-ring/seat packing • Loosening/poor tightening of gear coupling • Oil leakage at oil seal edge	• Replace O-ring/seat packing. (Install it correctly with care.) • Retighten with specified torque. • Replace/repair oil seal/shaft.

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4TNE82

*Output conditions : Intake back pressure ≤ 250 mmAq, Exhaust back pressure ≤ 550 mmAq, other conditions complying with JIS D 1005–1986. After minimum 30 hour's run-in.

	Item		Model / Unit	4TNE82												
SPECIFICATIONS	Application		—	CL		VM						CH		VH		
	Type		—	Vertical, 4-cycle water-cooled diesel engine												
	Combustion system		—	Direct injection system												
	No. of cylinders – Bore X Stroke		mm	4 – 82 X 90												
	Displacement		C˙	1.901												
	Firing order		—	1 – 3 – 4 – 2 – 1												
	Revolution speed		rpm	1500	1800	2000	2200	2400	2600	2800	3000	3000	3600	3200	3400	3600
	Output*	Continuous rating	kW(HP)	14.3 (19.2)	17.1 (22.9)	—	—	—	—	—	—	27.7 (37.1)	32.7 (43.9)	—	—	—
		Max. rating	kW(HP)	15.7 (21.1)	18.8 (25.2)	20.6 (27.6)	22.6 (30.3)	24.5 (32.9)	26.5 (35.5)	28.5 (38.2)	30.5 (40.9)	30.5 (40.9)	36.0 (48.3)	32.4 (43.4)	34.2 (45.9)	36.0 (48.3)
	Max. revolution speed at no load		rpm	1575 +50 0	1870 +60 0	2160 +70 0	2375 +80 0	2570 +90 0	2780 +100 0	2970 +110 0	3180 +120 0	3150 +100 0	3745 +120 0	3455 +110 0	3670 +120 0	3890 +130 0
	Min. revolution speed at no load		rpm	≤1200		≤800						≤1500		≤800		
	Direction of rotation		—	Counterclockwise (viewed from flywheel)												
	Power take off		—	Flywheel												
	Compression ratio		—	18.0												
	Fuel injection timing (FID, b.T.D.C.)		deg	10±1		12±1		14±1		16±1		24±1		18±1	20±1	24±1
	Compression pressure		MPa (kgf/cm²)	3.04±0.1 (31±1), at 250 rpm												
	Fuel injection pressure		MPa (kgf/cm²)	19.6 +1.0 0 (200 +10 0)												
	Recommended diesel gas oil		—	ISO 8217 DMA, BS 2869 A1 or A2 (Cetane No. 45 min.)												
	Lubrication system		—	Forced lubrication with trochoid pump												
	Lubricating oil capacity Max/Effective		C˙	5.8/2.3								7.9/2.5				
	Recommended lubricating oil		—	API grade CC class or higher												
	Cooling system		—	Liquid cooling/Radiator												
	Cooling water capacity		C˙	2.7 (for engine only)												
	Cooling fan No. of blade X dia.		mm	Pusher type, 6 X Ø370												
	Crank V-pulley dia./ Fan V-pulley dia.		mm	Ø120/Ø90		Ø110/Ø110										
	Governor		—	Mechanical centrifugal governor (All speed type)												
	Starting system		—	Electrical												
	*1 Dimensions L X W X H		mm	683 X 498.5 X 618		632 X 448.5 X 618 / 658 X 498.5 X 618						658 X 498.5 X 618		650 X 498.5 X 618 / 658 S 498 X 618		
	*1 Dry weight		kg	184		160/170						170		160/170		
PERFORMANCE	Governing perform-ance (full speed range)	Transient speed difference	%	≤10	≤8	≤12						≤10	≤8	≤12		
		Steady state speed band	%	≤5	≤4	≤8		≤7		≤6		≤5	≤4	≤8		
		Recovery time	sec	≤5		≤6						≤5		≤6		
		Fluctuation of revolution	rpm	≤15		≤25						≤30				
	L.O. press.	Rated operation	MPa (kgf/cm²)	0.29±0.05 (3.0±0.5)		0.34±0.05 (3.5±0.5)										
		Idling		≥0.06 (≥0.6)												

*1. Designation of engine dimension and dry weight in numerals.
CL/CH application: engine with flywheel housing
VM/VH application: engine with back plate/with flywheel hausing

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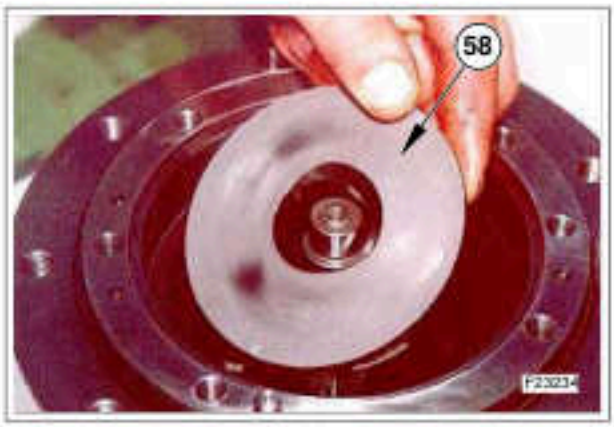
10. Assemble the two speed pistons (**57**) into their seats inside the flanged hub.



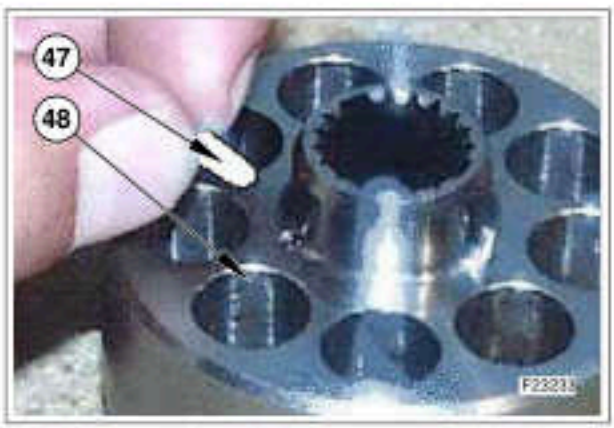
WARNING

Be sure that the pistons can move freely into the seats.

11. Insert the swash plate (**58**) inside the flanged hub being careful that spherical housings matches with the 2 steel balls.



12. Assemble the pins (**47**) in their seats in the cylinder block (**48**).



13. Assemble the spherical retainer holder (**44**) on the cylinder block (**48**).

WARNING

The two splines must be aligned together.



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5. Take out the springs (**20**).



DANGER

*Tighten 2 socket head screws M8x15 and two safety washers into the thread holes of the gearbox housing (**10**) by a male hex head wrench. This step is necessary to prevent that the brake piston (**19**) comes out dangerously during the disassembling procedure indicated at the following step.*



6. Pumping compressed air into the brake port until the brake piston (**19**) comes out.

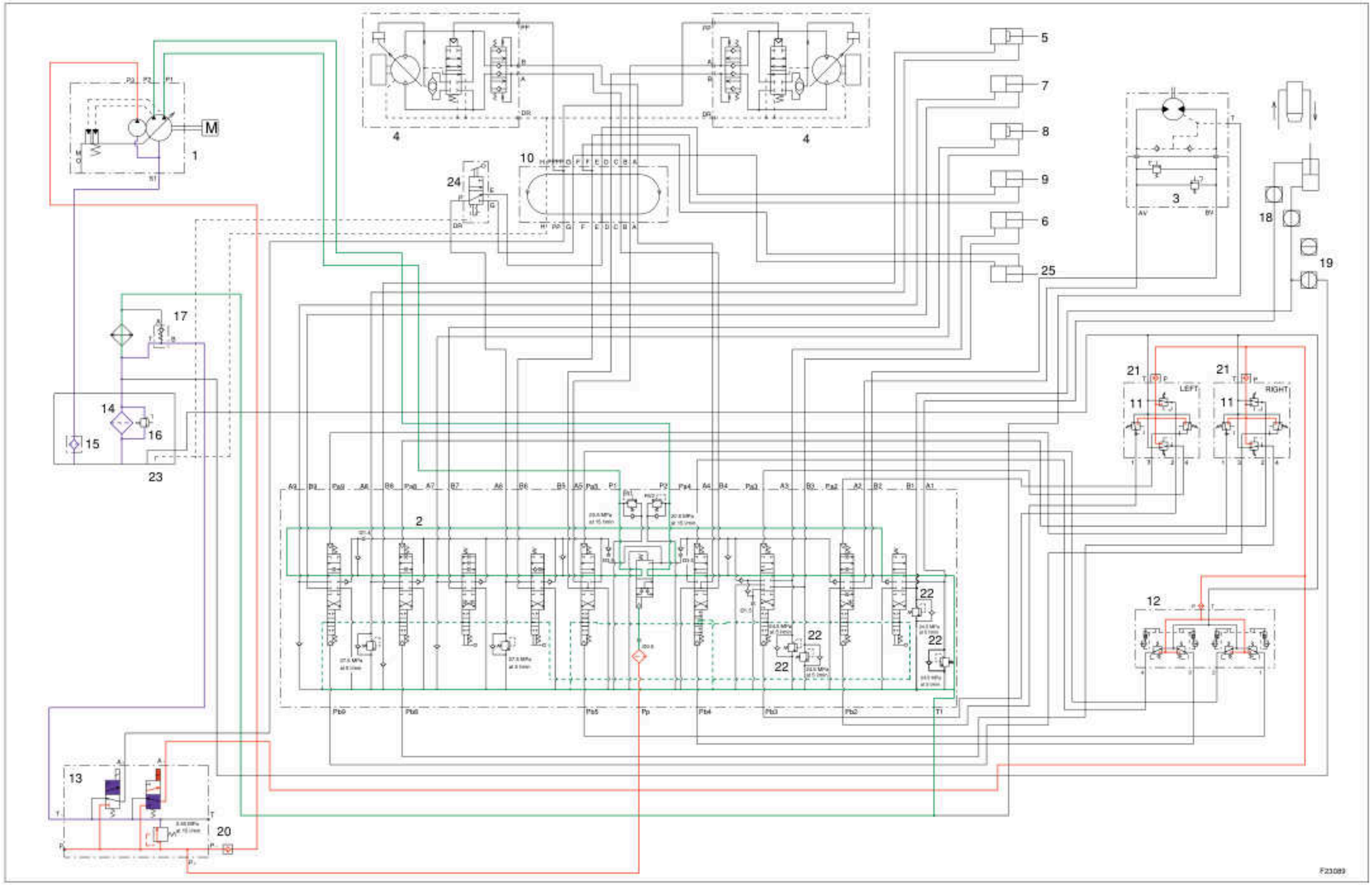


7. Remove the brake piston (**19**).



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NEUTRAL CIRCUIT (ADJUSTABLE CRAWLER FRAME WIDTH)



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