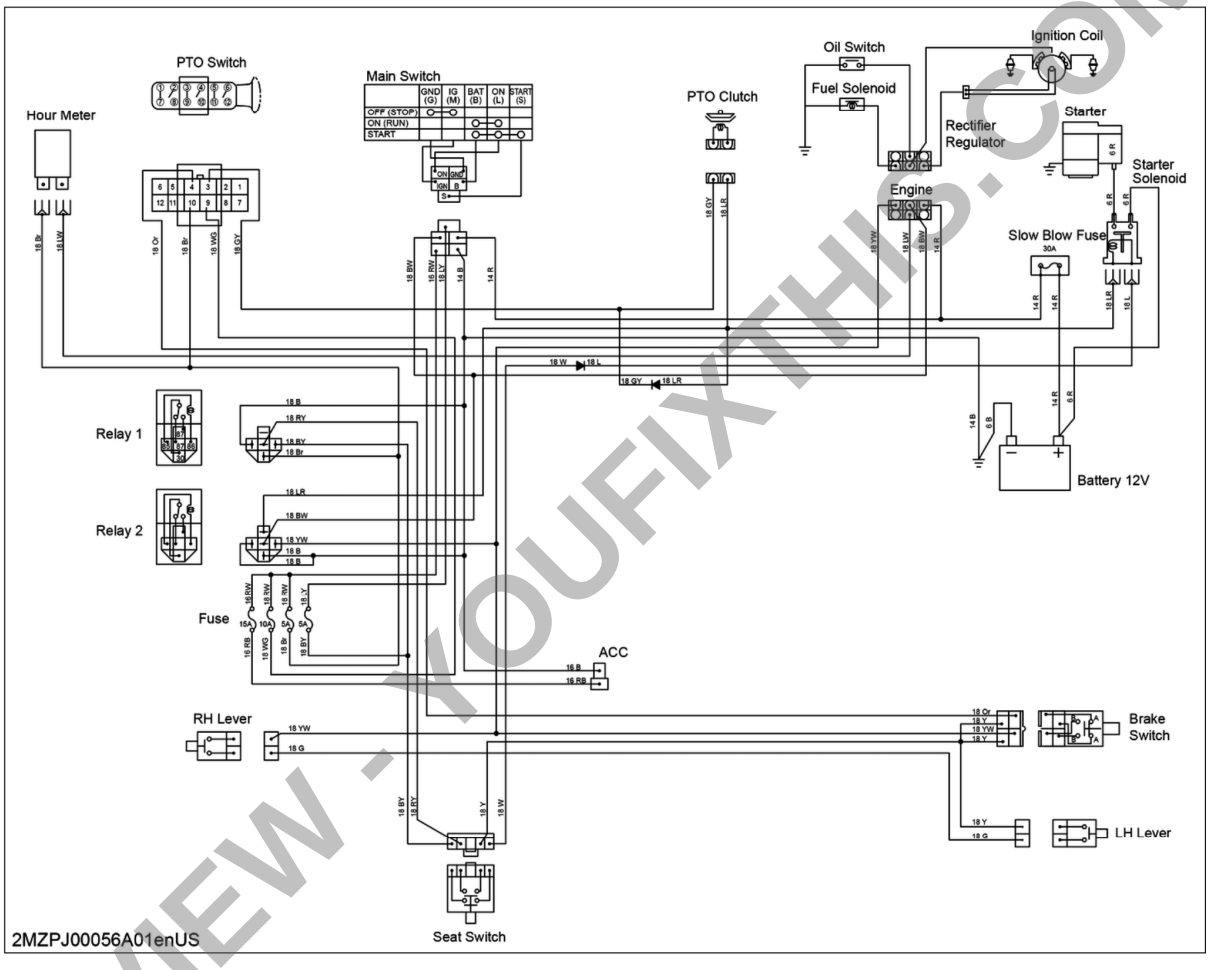
MECHANISM

1. Wiring diagram



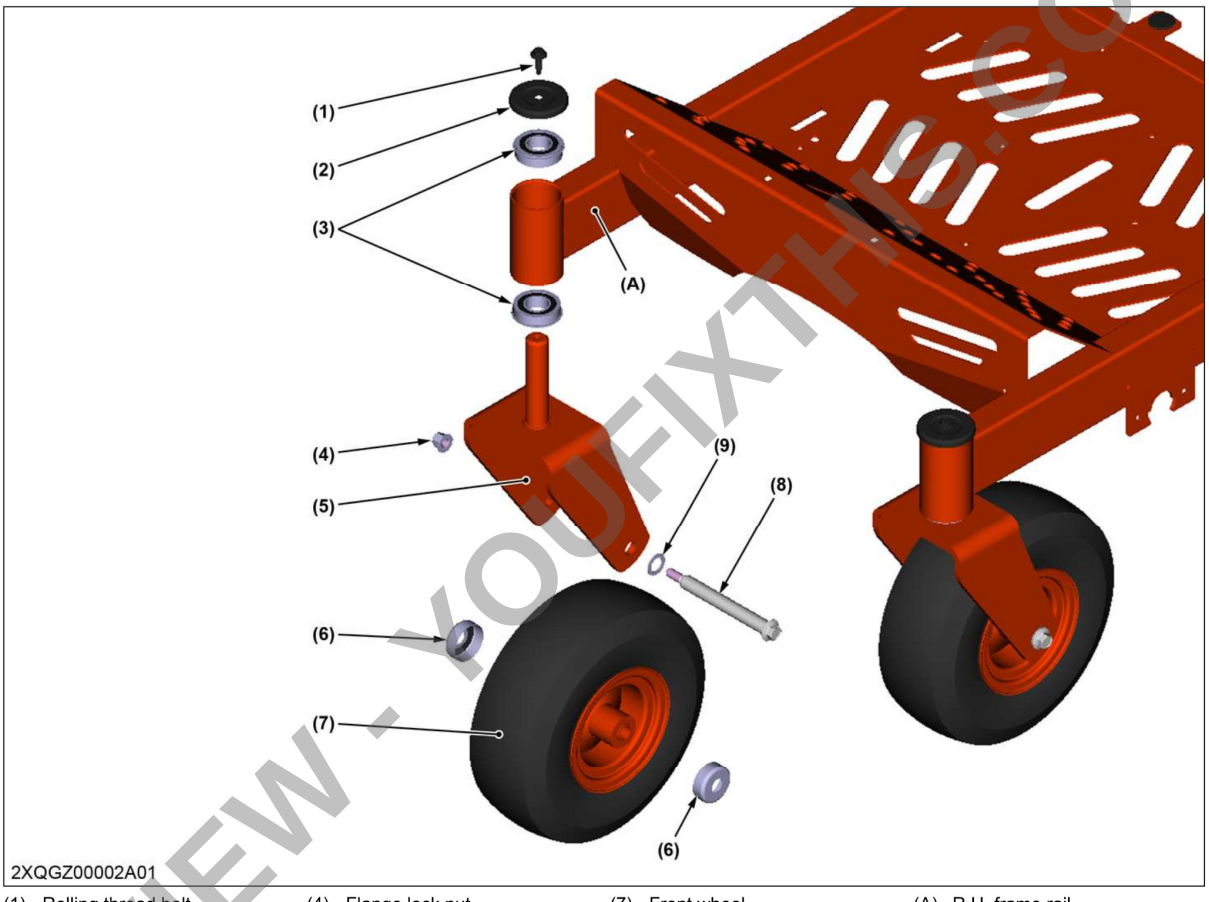
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MECHANISM

1. Structure of front axle

The front wheel assemblies are fixed and are mounted to the R.H. and L.H. frame rails. The bearings (3) support the wheel brackets (5).



(1) Rolling thread bolt
(2) Bearing cover
(3) Bearing
(4) Flange lock nut
(5) Wheel bracket
(6) Wheel cover
(7) Front wheel
(8) Front axle bolt
(9) Washer
(A) R.H. frame rail

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TIGHTENING TORQUES

1. General use screws, bolts, and nuts

Tighten screws, bolts, and nuts whose tightening torques are not specified in the Workshop Manual according to the table below.

Indication on top of bolt	 No-grade or 4T						 7T						9T		
Indication on top of nut	 No-grade or 4T												 6T		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6	7.9 to 9.3	0.80 to 0.95	5.8 to 6.8	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8	18 to 20	1.8 to 2.1	13 to 15	17 to 19	1.7 to 2.0	13 to 14	24 to 27	2.4 to 2.8	18 to 20	18 to 20	1.8 to 2.1	13 to 15	30 to 34	3.0 to 3.5	22 to 25
M10	40 to 45	4.0 to 4.6	29 to 33	32 to 34	3.2 to 3.5	24 to 25	48 to 55	4.9 to 5.7	36 to 41	40 to 44	4.0 to 4.5	29 to 32	61 to 70	6.2 to 7.2	45 to 52
M12	63 to 72	6.4 to 7.4	47 to 53	–	–	–	78 to 90	7.9 to 9.2	58 to 66	63 to 72	6.4 to 7.4	47 to 53	103 to 117	10.5 to 12.0	76.0 to 86.7
M14	108 to 125	11.0 to 12.8	79.6 to 92.5	–	–	–	124 to 147	12.6 to 15.0	91.2 to 108	–	–	–	167 to 196	17.0 to 20.0	123 to 144
M16	167 to 191	17.0 to 19.5	123 to 141	–	–	–	197 to 225	20.0 to 23.0	145 to 166	–	–	–	260 to 304	26.5 to 31.0	192 to 224
M18	246 to 284	25.0 to 29.0	181 to 209	–	–	–	275 to 318	28.0 to 32.5	203 to 235	–	–	–	344 to 402	35.0 to 41.0	254 to 296
M20	334 to 392	34.0 to 40.0	246 to 289	–	–	–	368 to 431	37.5 to 44.0	272 to 318	–	–	–	491 to 568	50.0 to 58.0	362 to 419

2. Stud bolts

Material of opponent part	Ordinariness			Aluminum		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8	12 to 15	1.2 to 1.6	8.7 to 11	8.9 to 11	0.90 to 1.2	6.5 to 8.6
M10	25 to 31	2.5 to 3.2	18 to 23	20 to 25	2.0 to 2.6	15 to 18
M12	30 to 49	3.0 to 5.0	22 to 36	31	3.2	23
M14	62 to 73	6.3 to 7.5	46 to 54	–	–	–
M16	98.1 to 112	10.0 to 11.5	72.4 to 83.1	–	–	–
M18	172 to 201	17.5 to 20.5	127 to 148	–	–	–

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SERVICING

1. Troubleshooting for engine

Refer to the FR651V Kawasaki Engine Service Manual.

Symptom	Probable cause and checking procedure	Solution	Reference page
Engine is difficult to start or will not start	1. No operator on seat	Sit on operator's seat	3-8
	2. Parking brake lever not in the proper position	Apply the parking brake	3-8
	3. PTO switch not in the proper position	Make sure PTO switch is in disengaged (off) position	3-8
	4. Motion control levers not in the proper position	Make sure motion control levers are in neutral lock position	3-8
	5. Main switch is not in the proper position	Make sure main switch is in on position	3-8
	6. No fuel	Fill fuel	3-1
	7. Fuse is blown	Replace fuse	3-19
	8. Air cleaner is clogged	Clean or replace air cleaner	3-16
	9. Over choking or choke is adjusted incorrectly	Check and adjust	3-15
	10. Battery becomes weak	1. Clean battery cables and terminals	3-13
		2. Charge the battery	3-13
		3. In cold weather, always remove the battery from the engine, charge and store it indoors. Install it on the machine only when you use the machine	3-13
	11. Spark plug damaged	1. Check the spark plug wire connection	3-12
		2. Adjust the spark plug gap or replace the spark plug	3-12
	12. Fuel hose or fuel filter clogged or damaged	Clean or replace fuel hose	3-12
	13. Engine oil viscosity is wrong	Use oils of different viscosity, depending on ambient temperature	3-1
	14. Improper or stale fuel (Fuel quality is poor)	Replace fuel and the fuel filter	3-12

(Continued)

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SPECIFICATIONS

1. Specifications for Z231KW-AU

Model			Z231KW-AU
Engine	Model		Kawasaki FR651V (Kubota GH739V)
	Max. engine power (Net)		16.0 kw (21.5 HP)*1*2
	Type		Air-cooled gasoline engine
	Number of cylinders		2 (V-Twin)
	Bore and stroke		78.0 × 76.0 mm (3.07 × 2.99 in.)
	Total displacement		726 cm^3 (44.3 cu.in.)
	Rated revolution		3600 min^{-1} (rpm)
	Fuel		Unleaded gasoline
	Starter		Electric
	Lubrication		Full pressure lubrication
	Cooling		Air cooled
	Battery		U1 (12 V, RC: 45 min, CCA: 300, CA: 410)
Capacities	Fuel tank		13.6 L (3.59 U.S.gals, 2.99 Imp.gals)
	Engine crankcase (with filter)		2.1 L (2.2 U.S.qts, 1.8 Imp.qts)
	Transaxle case		1.513 to1.588 L (1.599 to 1.678 U.S.qts, 1.332 to 1.397 Imp.qts)*3
Dimensions	Overall length		1890 mm (74.41 in.)
	Overall width w/o mower deck		1076 mm (42.36 in.)
	Overall height	With ROPS	1660 mm (65.35 in.)
	Wheelbase		1236 mm (48.66 in.)
	Min. ground clearance		104 mm (4.09 in.)
	Tread	Front	616 mm (24.3 in.)
		Rear	885 mm (34.8 in.)
Weight (without fuel, with mower deck)			282 kg (622 lbs)
Traveling system	Tread	Front	11 × 4 -5 (4PR) Smooth
		Rear	18 × 7.5 -10 (4PR)
	Traveling speeds	Forward	6.5 mph (10.5 km/h)
		Reverse	4.0 mph (6.4 km/h)
	Steering		2 -Hand levers
	Transmission		2 -HST w / Gear
	Parking brake		Hand lever applied, released
	Min. turning radius		0 mm (0 in.)
PTO	Drive system		Belt
	Clutch type		Electric

(Specifications and design subject to change without notice.)

*1 Manufacturer's estimate

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.

DANGER
- **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

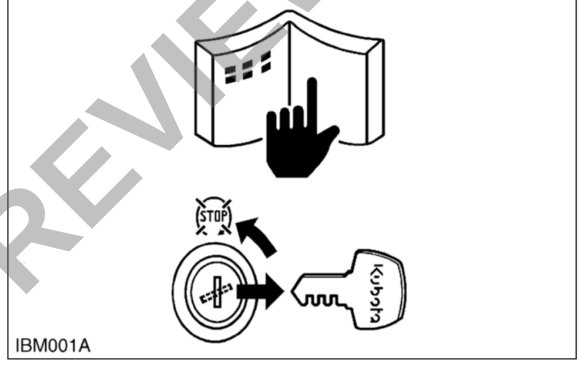
WARNING
- **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

CAUTION
- **Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.**

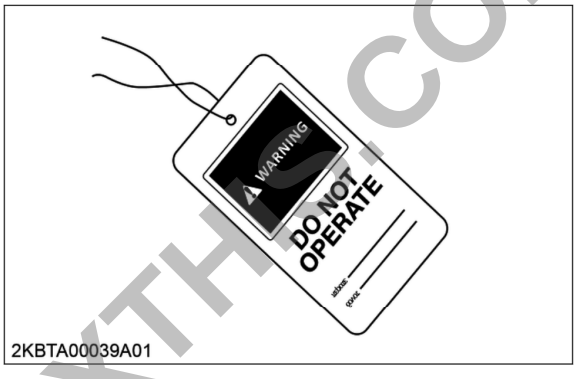
IMPORTANT
- **Indicates that equipment or property damage could result if instructions are not followed.**

NOTE
- **Gives helpful information.**

1. Working precautions



- Understand all safety instructions and safety labels in this manual.
- Park the machine on a stable and level ground then lower the attachment to check the machine safely.
- Stop the engine and remove the key when leaving the operator's seat for cleaning, maintenance, and servicing.



- Hang a DO NOT OPERATE tag near the operator's seat.
- Do not use worn or cracked tools. Use tools in a proper way with enough strength.
- In regards to the facility which is used in the workshop, follow each safety instruction.

2. Preparing for emergencies



- Keep a first aid kit and fire extinguisher ready at all times.
- Keep emergency numbers near your telephone at all times.

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4. Checking and adjusting

Refer to FR651V Kawasaki Engine Service Manual.

5. Disassembling and assembling

5.1 Separating engine

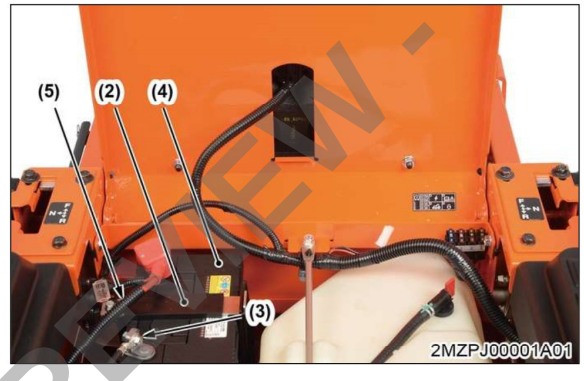
5.1.1 Removing battery

⚠ CAUTION

- **When disconnecting the battery cables, disconnect the negative cable from the battery first.**

1. Remove seat bracket (1), and lift the seat to the raised position.
2. Disconnect the negative and positive cables (3), (5) from the battery (4).





(1) Seat bracket
(2) Battery holder
(3) Negative cable
(4) Battery
(5) Positive cable

3. Remove the battery holder (2).
4. Remove the battery.

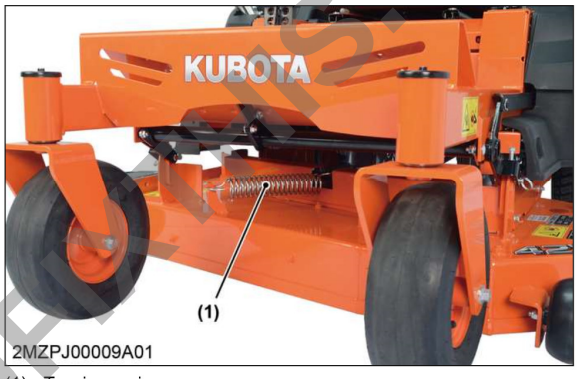
(When reassembling)

■ IMPORTANT

- **When connecting the battery cables, connect the positive cable to the battery first.**

5.1.2 Removing tension spring

1. Turn the mower deck dial cam to the lowest position and lower the mower deck.
2. Disconnect the tension spring (1) from the mower deck with a spring puller and remove the tension spring.



(1) Tension spring

5.1.3 Removing electric clutch

⚠ DANGER

To avoid serious injury or death:

- **Park the machine on a hard and level surface.**
- **Lift up and hold with jack stands or block the rear of the machine. Do not operate the machine during the work.**

1. Remove the air guide (1).

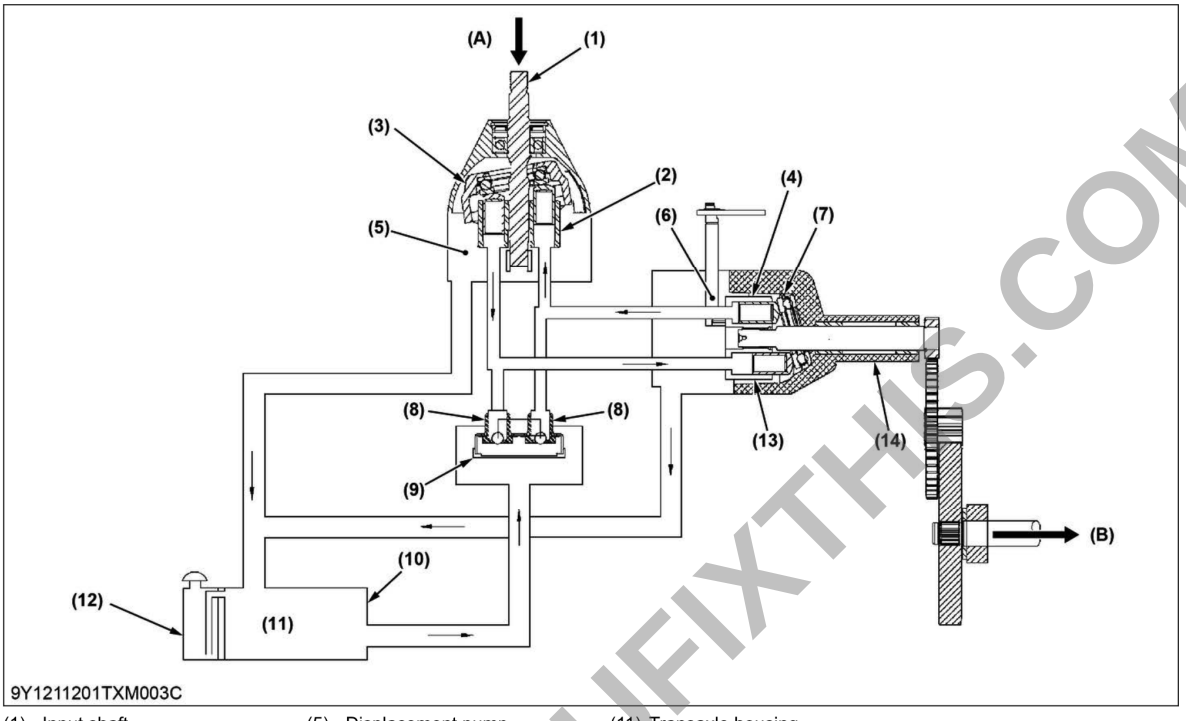


(1) Air guide

2. Disconnect the electric clutch harness (6) from the wire harness.

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3. Structure of transaxle



(1) Input shaft
(2) Cylinder block assembly (Variable displacement pump)
(3) Variable swash plate
(4) Cylinder block assembly (Fixed displacement motor)
(5) Displacement pump
(6) Bypass actuator
(7) Fixed swash plate
(8) Check valve
(9) Filter assembly
(10) Reservoir
(11) Transaxle housing
(12) Siphoning expansion tank
(13) Fixed displacement motor
(14) Motor shaft
(A) From engine
(B) To rear axle

CAUTION

- **Actuating the bypass will result in the loss of hydrostatic braking capacity. The machine must be stationary and on a level surface and in neutral when actuating the bypass.**

The hydrostatic transaxle uses a variable displacement pump (5) with a maximum displacement of 10 cc (0.011 U.S.qts, 0.0090 Imp.qts) per revolution, and a motor (4) with a fixed displacement of 10 cc (0.011 U.S.qts, 0.0090 Imp.qts) per revolution. The variable displacement pump (5) features a trunnion mounted swash plate (variable swash plate) (3) with a direct-proportional displacement control. Reversing the direction of the swash plate reverses the flow of oil from the pump and thus reverses the direction of the motor output rotation. The pump and motor are of the axial piston design, and both use spherical nosed pistons which are held against a thrust race by internal compression springs.
The hydrostatic transaxle has a self-contained fluid supply and an internal filter. The fluid is forced through the filter (9) by a positive *"head"* on the fluid in the housing with an assist by the negative pressure created in the pump pistons as they operate.
Check valves (8) in the center section are used to control the makeup flow of fluid to the low pressure side of the loop.
A cam style, block lifting bypass actuator (6) is used in the hydrostatic transaxle to permit moving the machine for short distance at a maximum of 3.2 km/h (2.0 mph) without starting the engine.

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RECORD OF REVISIONS

For pdf, use search function [Search word] to find all the revised locations.

Last digit of the code No.	Month of revision	Main revised point and corrective measure [Search word]	Reference page
1	2021 June	Revised reassembly procedure for HST tension spring	4-11 5-11
		Added transaxle oil specification to lubricants and fuel table	3-1

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