KOBELCO

SERVICE MANUAL

HYDRAULIC EXCAVATOR

SK160LC

ED190LC

Applicable: SK160LC YM02U0101~
Applicable: ED190LC YL02U0101~

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SHOP MANUAL

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SAFETY

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WARNING

READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND PROCEDURES FOUND IN THIS MANUAL BEFORE ATTEMPTING ANY OPERATION, INSPECTION OR MAINTENANCE OF THIS MACHINE, ATTACHMENT OR SYSTEMS OPERATION. KOBELCO CANNOT ANTICIPATE EVERY POSSIBLE CIRCUMSTANCE THAT MIGHT INVOLVE A POTENTIAL HAZARD. THE WARNINGS IN THIS PUBLICATION AND ON THE PRODUCT ARE THEREFORE NOT ALL INCLUSIVE. IF A TOOL, PROCEDURE, WORK METHOD OR OPERATING TECHNIQUE NOT SPECIFICALLY RECOMMENDED BY KOBELCO IS USED, YOU MUST SATISFY YOURSELF THAT IT IS SAFE FOR YOU AND OTHERS. YOU SHOULD ALSO ENSURE THAT THE PRODUCT WILL NOT BE DAMAGED OR MADE UNSAFE BY THE OPERATION, LUBRICATION, MAINTENANCE AND/OR REPAIR PROCEDURES YOU CHOOSE.

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2. CYLINDER DRIFT

A. Tools & Equipment

The following tools and equipment will be required to perform the cylinder drift test:

1. Measuring tape.
2. Stopwatch.
3. Device for marking starting points.
4. Thermometer for hydraulic oil temperature.

B. Machine Settings & Site Conditions

1. Machine engine "OFF".
2. Hydraulic oil temperature at 45°C to 55°C (113°F to 131°F).
3. Firm, level testing site.

C. Cylinder Drift Test

1. Move the machine to a firm, level test site and allow the hydraulic oil temperature to reach 45°C to 55°C (113°F to 131°F).
2. Operate the arm out control until arm is completely out (retracting cylinder).
3. Operate the bucket out control until bucket is completely out (retracting cylinder).
4. Adjust the boom up or down with control until bucket is 1.5m (4'-11") from ground level to tip of teeth. See Figure 3.10.
5. Turn engine "OFF" and allow machine to sit for three minutes.
6. After three minutes, measure the distances the Boom, Arm and Bucket Cylinders have moved. Record the distances.
7. Repeat steps 4 through 6 two more times and average the measurements. Compare the average to the Cylinder Drift Specification Chart.
8. Start the engine.
9. Operate the bucket in control until bucket is completely in (cylinder extended).
10. Adjust the boom until the tip of the bucket teeth are 1.5m (4'-11") from ground level. See figure 3.11.
11. Turn engine "OFF" and allow machine to set for minutes.
12. Measure the distance from the tip of the bucket teeth to ground level and record the reading.
13. Repeat steps 8 through 12 two more times and record the readings.
14. Average the readings and compare to the Cylinder Drift Specification Chart, (BUCKET FALL–TOP END).

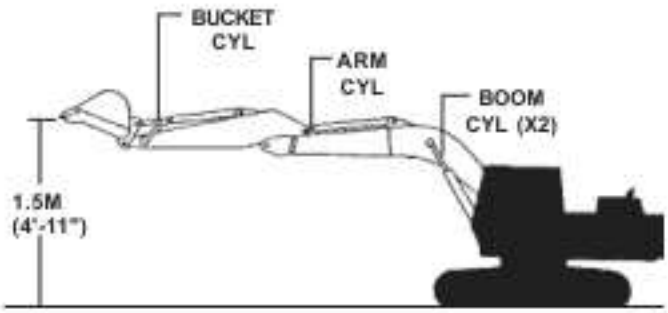


FIGURE 3.10

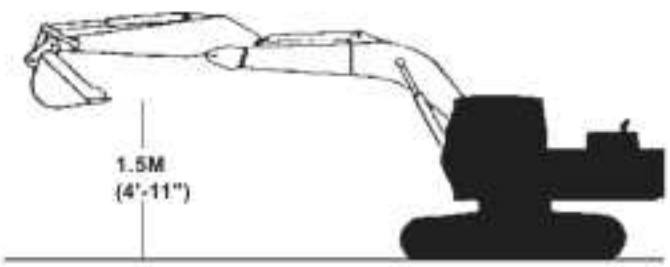


FIGURE 3.11

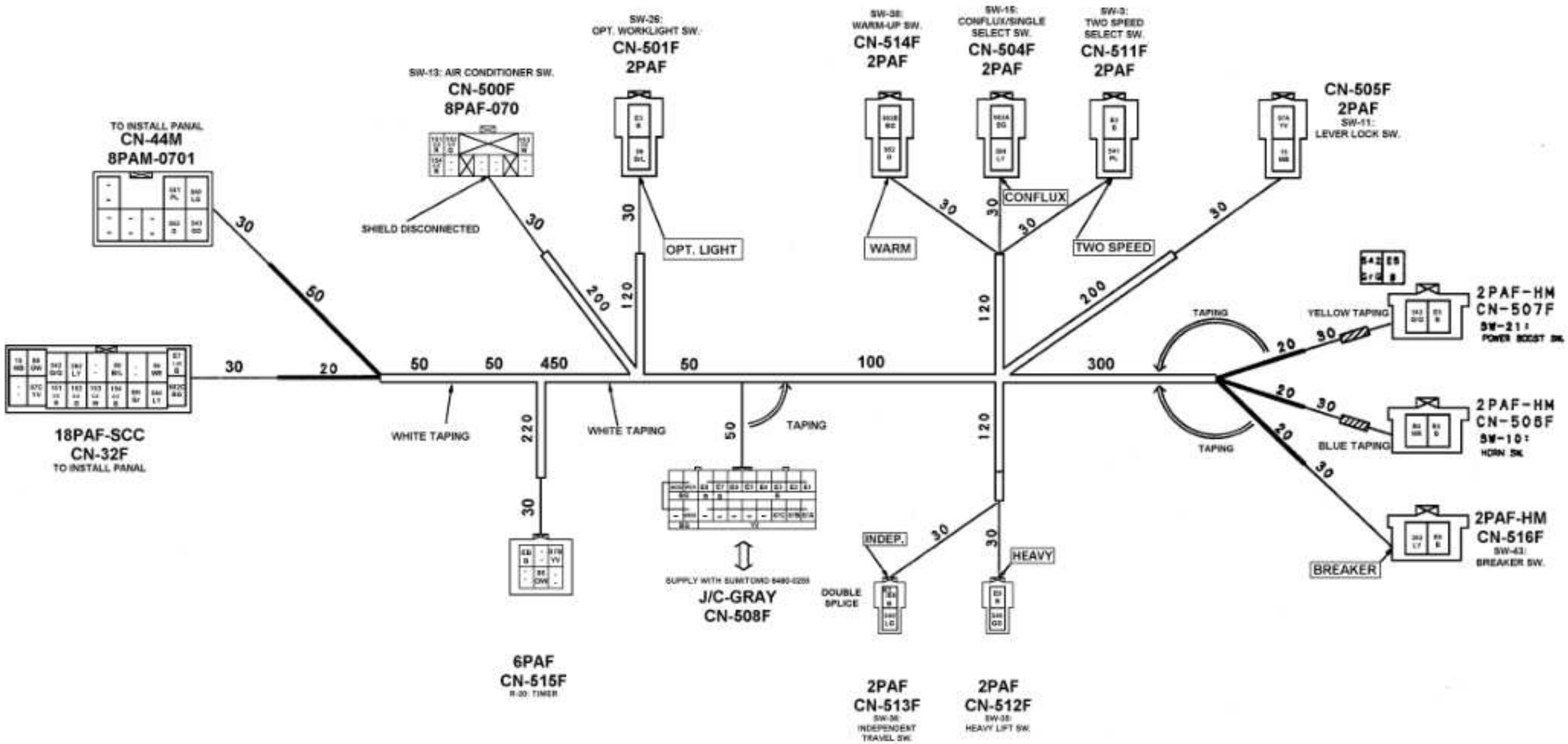
CYLINDER DRIFT SPECIFICATION CHART

MODEL	BOOM DOWN (RETRACT)	ARM DOWN (EXTEND)	BUCKET IN (EXTEND)	BUCKET FALL (TOP END)
SK160	MAXIMUM	MAXIMUM	MAXIMUM	MAX./10MIN
SK160	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")
ED190	MAXIMUM	MAXIMUM	MAXIMUM	MAX./10MIN
ED190	14mm(0.55")	12mm(0.47")	15mm(0.6")	300mm(12")

Unit: mm(inches)

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3.8 HARNESS ASSEMBLY



INST PANEL-L YN13E01166P2

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Symptom	Cause	Remedy
Negative brake is released but the motor is late to start.	The viscosity of hydraulic oil is too high.	Raise the oil temperature.
Negative brake is released but the motor starts feebly.	1. Negative brake is not released completely. (The orifice in the release pressure path is clogged with dirt.)	1. Investigate to see if orifice is not clogged.
	2. Dirt is included in relief valve.	2. Clean relief valve. Inspect seat surface or replace relief valve.
	3. Sliding surfaces are seized.	3. Inspect and repair sliding surface or replace relief valve.

(3) Revolution does not reach a set value.

Symptom	Cause	Remedy
Pressure does not reach a set value.	1. Oil flow is insufficient.	1. Inspect pump, delivery rate and the oil path to motor.
	2. Shoe, cylinder block and valve plate are worn off or scratched much.	2. Inspect and repair faulty parts or replace faulty parts.

(4) Brake does not work.

Symptom	Cause	Remedy
Brake does not work.	Negative brake malfunctions.	Inspect and repair or replace brake piston, friction plate and spring.
	1. Friction plate is worn off.	
	2. Spring is broken.	
Reverse brake works.	Spool malfunctions	Correct or replace
	1. Spool and the body are stuck together.	
	2. Check valve is stuck or includes dirt.	
	3. The hole in the restrictor valve is clogged.	

(5) Oil leaks.

Symptom	Cause	Remedy
Oil leaks.	1. Bolts and plugs are loosen.	1. Tighten bolts or plugs to a specified torque.
	2. O rings are galled.	2. Replace O ring.
	3. Oil is leaking into gear casing.	3. Replace oil seal.

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E. SOME CONVERSION UNITS

Units of weight:

From	Into	Multiply by
Kg	lb	2.2
Lb	Kg	0.454

Units of length:

From	Into	Multiply by	Divide by
meters	feet	3.28	
mm	inches		25.4
inches	mm	25.4	

Units of power:

From	Into	Multiply by
Hp	KW	0.7457
KW	Hp	1.341

Units of flow:

From	Into	Multiply by
Gal/min (US liq.)	Lit/min	3.79
	Lit/sec	0.0631
	cm^3/min	3785.4
	ft^3/min	0.1337
Lit/min	ft^3/min	0.0353
	Gal/min	0.264
	Gal/sec	0.004403
	$yard^3$/min	0.001308

Units of torque:

From	Into	Multiply by
N-m	Lbf-ft	0.738
	Kgf-m	0.1019716
	Lbf-ft	0.737561
	Lbf-in	8.85075
Lbf-ft	Kgf-m	0.1382552
	N-m	1.35582
	Lbf-in	12

Units of pressure:

From	Into	Multiply by
Kg/cm^2	psi	14.223
	Pa (Pascal)	9.807
psi	Atm	0.06805
	Bars	0.06895
	Kg/cm^2	0.0703
	Pa (Pascal)	6894.76
MPa (MegaPascal)	psi	145.04

Units of volume:

From	Into	Multiply by
Liters	Gal (US liq)	0.264
	in^3	61.02
	$yard^3$	0.00131
	quarts	1.0567
	ounces (US)	33.81
$Yard^3$	m^3	0.765
	in^3	46656
	ft^3	27
	cm^3	764554.9
	liters	764.555

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C. Location of Main Relief for Dozer Circuit

1. The dozer control valve is a multi stack pilot controlled unit located in the right-hand side of the main revolving frame near the fuel tank. See Figure 10.1.
2. The dozer control circuit utilizes the existing pilot system and incorporates a six position joystick located on the left-hand console of the operators cab. See Figure 10.2.
3. The control valve has its own dedicated gear pump which is located behind the P3 pilot gear pump. See illustration below.

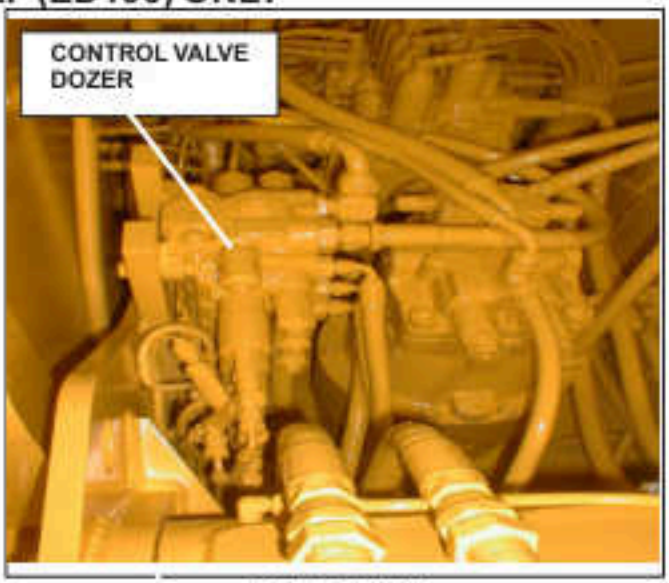


FIGURE 10.1

D. Location of Main Relief for Dozer Circuit

1. Locate Dozer Main Relief Valve (DRV1) on the dozer control valve. See Figure10.1.
2. Loosen locknut with 32mm wrench See Figure 10.3.
3. With engine at full RPM, raise dozer blade up and over relief. Adjust dozer releif valve with 6mm wrench, until proper pressure is achieved at dozer pump (P4) test port. 700kg/cm² (10,000 psi) pressure gauge.
4. After correct pressure is obtained tighten adjusting screw locknut to 2.8 ~3.2 kgfm² (20~30 ft.lb). Verify pressure after tightening locknut.

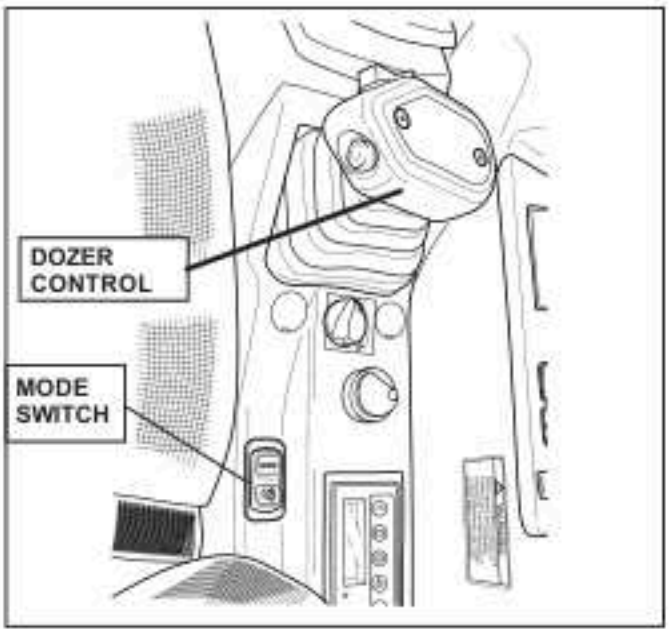
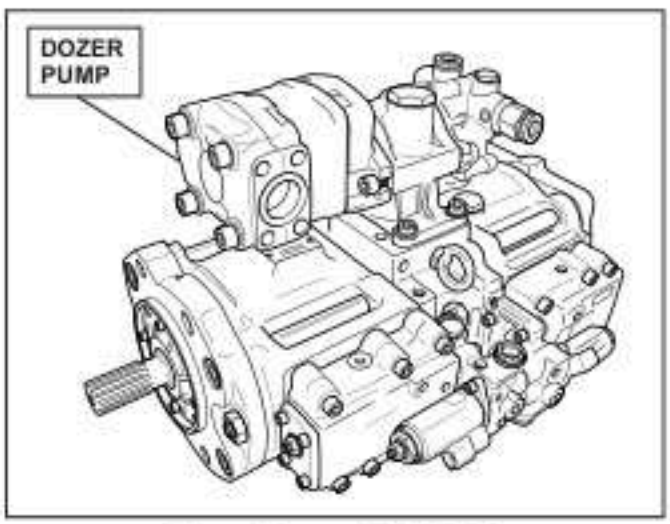


FIGURE 10.2



Pump Assembly ED190

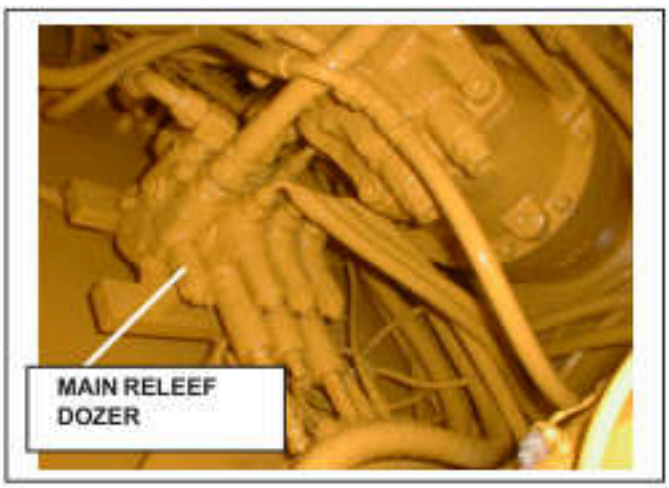
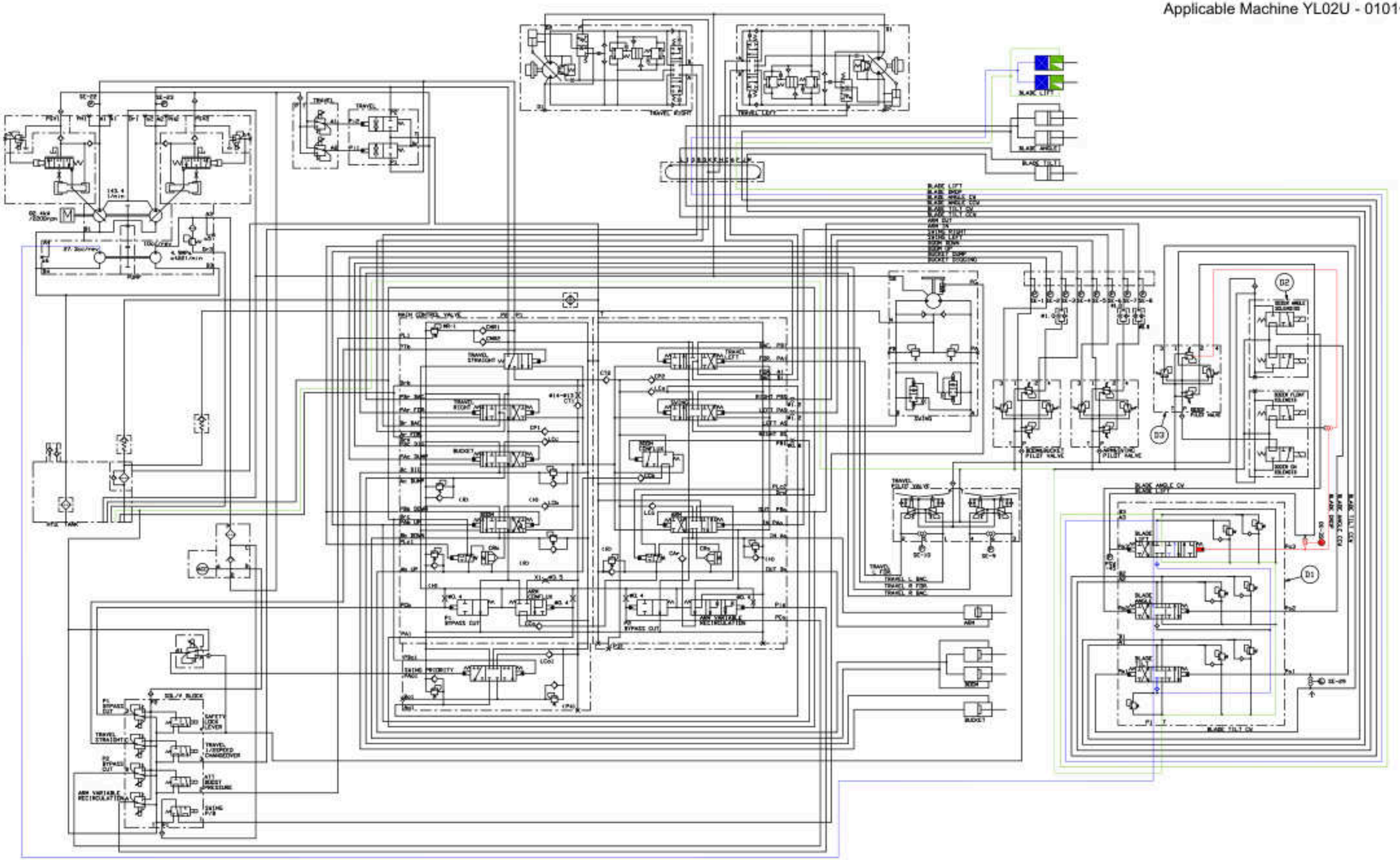


FIGURE 10.3

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BLADE DOWN MODEL

H-0-2

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