2.3 TRUCK DATA - CUSHION TIRE LIFT TRUCKS (INDOOR)

	FG35ST-8	FG35BCS-8	FG45ST-8
GENERAL			
Power Type	Gasoline	LPG	Gasoline
Operation Type	Sit Down	Sit Down	Sit Down
Capacity @ 24 in. (600 mm) Load Center * lbs. (kg)	8,000 (3,630)	8,000 (3,630)	10,000 (4,535)
Load Distance from Center Axle (2-Stage) in. (mm)	17.9 (455)	17.9 (455)	17.9 (455)
Load Distance from Center Axle (3-Stage) in. (mm)	20.2 (515)	20.2 (515)	20.2 (515)
Wheelbase in. (mm)	63.0 (1,600)	63.0 (1,600)	63.0 (1,600)
WEIGHT			
Service Weight (inc. 2-Stage STD Mast/Forks lbs. (kg)	12,960 (5,880)	13,340 (6,050)	14,780 (6,705)
TIRES			
Tire Type	Cushion	Cushion	Cushion
Tire Size - Front	22 x 9 x 16	22 x 9 x 16	22 x 6 x 16 Dual
Tire Size - Rear	18 x 7 x 12 1/8	18 x 7 x 12 1/8	18 x 7 x 12 1/8
Number of Wheels - Front / Rear x = Driven	2x / 2	2x / 2	4x / 2
Tread (Center of Tires) - Front / Rear in. (mm)	38.8 (985) / 39.8 (1,010)		41.9 (1,065) / 39.8 (1,010)
DIMENSIONS			
Tilting Angle, 2-Stage (FV) Masts, Forward / Backward °	6 / 6	6 / 6	6 / 6
Tilting Angle, 3-Stage (TFV) Masts, Forward / Backward °	6 / 6	6 / 6	6 / 6
Mast Height - Lowered - 2-Stage Std. Mast in. (mm)	91.0 (2,310)	91.0 (2,310)	95.0 (2,410)
Mast Height - Extended - 2-Stage Mast † in. (mm)	179.0 (4,445)	179.0 (4,445)	178.0 (4,520)
Maximum Fork Height - 2-Stage STD Mast ** in. (mm)	131.0 (3,330)	131.0 (3,330)	130.0 (3,300)
Free Lift Height - 2-Stage STD Mast in. (mm)	7.0 (180)	7.0 (180)	7.0 (180)
Height Overhead Guard in. (mm)	83.7 (2,125)	83.7 (2,125)	83.7 (2,125)
Length to Fork Face - 2-Stage Mast in. (mm)	104.1 (2,645)	95.9 (2,435)	108.3 (2,750)
Length to Fork Face - 3-Stage Mast in. (mm)	106.4 (2,705)	98.2 (2,495)	110.6 (2,810)
Overall Width at Drive Tires in. (mm)	48.0 (1,120)	48.0 (1,120)	53.9 (1,370)
Forks - Thickness x Width x Length in. (mm)	2.0 x 6.0 x 42.0 (50 x 150 x 1,070)		
Carriage Width / ITA Class in. (mm)	46.9 (1,190) / III	41.0 (1,040) / III	41.0 (1,040) / III
Ground Clearance under Mast in. (mm)	4.0 (100)	4.0 (100)	4.0 (100)
Ground Clearance - Center of Wheelbase in. (mm)	4.9 (125)	4.9 (125)	4.9 (125)
Right Angle Stacking Aisle (2-Stage Mast) †† in. (mm)	107.9 (2,740)	100.4 (2,550)	111.6 (2,835)

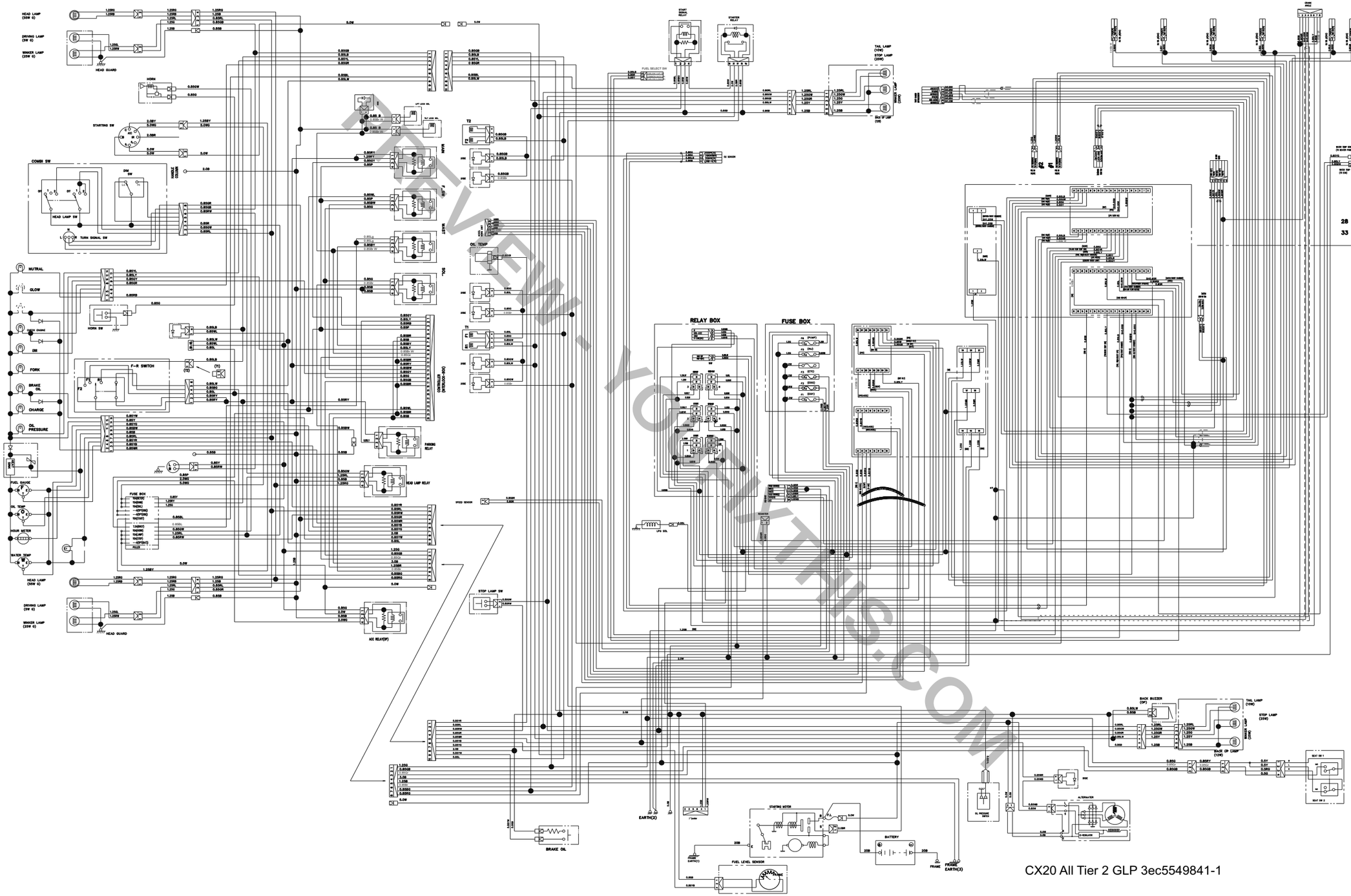
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Problem	Major Cause	Corrective Action
ENGINE		
OIL PRESSURE WARNING LIGHT STAYS ON	OIL LEVEL IN OIL PAN TOO LOW	ADD OIL AS NECESSARY
	CLOGGED OIL FILTER ELEMENT	REPLACE THE FILTER
	OIL LEAKAGE DUE TO LOOSE OR WORN OIL PIPE JOINT	CHECK AND REPAIR LEAKAGE
STEAM FORCED OUT OF RADIATOR PRESSURE VALVE	LOW COOLANT OR COOLANT LEAKAGE	REPAIR LEAKAGE, ADD COOLANT
	LOOSE FAN BELT	ADJUST BELT TENSION
	DIRT OR SCALE IN COOLING SYSTEM	CLEAN/FLUSH COOLING SYSTEM, REPLACE COOLANT
WATER TEMPERATURE GAUGE IN BLACK AREA TO RIGHT	CLOGGED/BROKEN RADIATOR FIN	CLEAN, REPAIR OR REPLACE
	FAILED THERMOSTAT OR TEMP GAUGE	REPLACE DEFECTIVE UNIT
	LOOSE RADIATOR CAP	TIGHTEN CAP OR REPLACE PACKING
WATER TEMPERATURE GAUGE IN BLACK AREA ON LEFT	FAILED THERMOSTAT	REPLACE UNIT
	FAILED WATER TEMP GAUGE	REPLACE UNIT
ENGINE CRANKS OVER BUT WILL NOT START	INSUFFICIENT FUEL	ADD PROPER FUEL
	AIR ENTERING FUEL SYSTEM	REPAIR AIR LEAKAGE
	FAILED INJECTION PUMP OR NOZZLE	REPLACE PARTS AS NECESSARY
	DRAGGING/SLOW STARTER MOTOR	TEST, REPAIR OR REPLACE
	INSUFFICIENT ENGINE COMPRESSION	CHECK COMPRESSION
	IMPROPER VALVE ADJUSTMENT	ADJUST VALVE CLEARANCES
WHITE OR BLUE EXHAUST SMOKE	EXCESSIVE OIL IN OIL PAN	ADJUST OIL TO PROPER LEVEL
	INCORRECT FUEL TYPE	REPLACE FUEL WITH CORRECT TYPE
BLACK EXHAUST SMOKE	CLOGGED AIR CLEANER ELEMENT	REPLACE ELEMENT
IRREGULAR FUEL NOISE	FAILED FUEL PUMP	REPLACE PUMP
NOISE, SPARK KNOCK	INCORRECT FUEL USED	USE SPECIFIED FUEL
	OVERHEATING CONDITION	CHECK COOLANT LEVEL, BELTS
	BROKEN MUFFLER	REPAIR EXHAUST SYSTEM
	EXCESSIVE VALVE CLEARANCE	ADJUST VALVE CLEARANCE

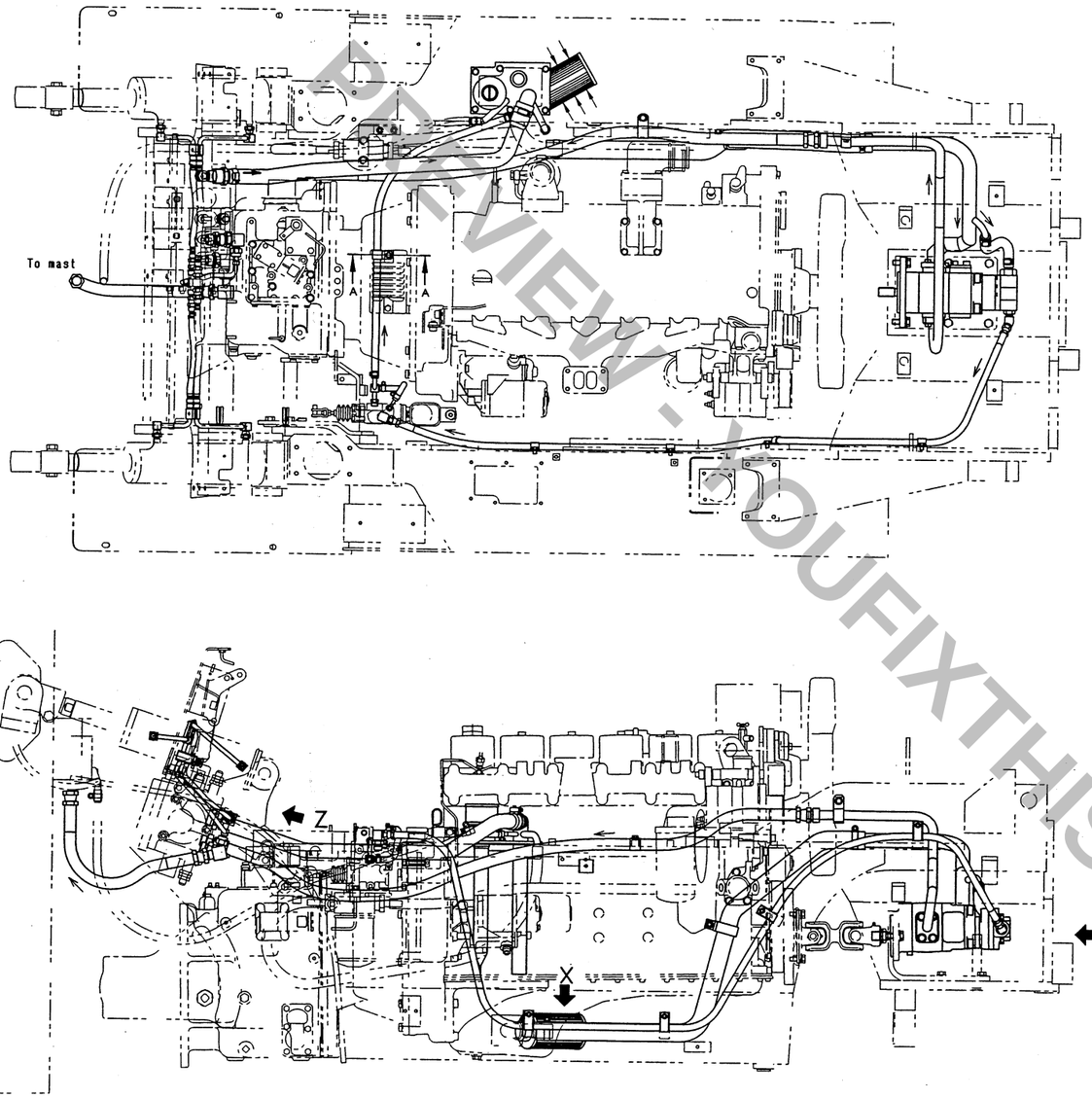
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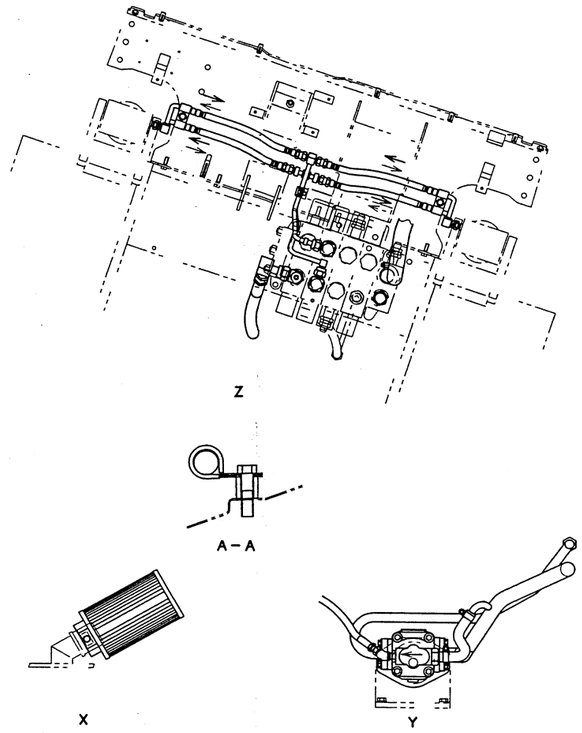
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CX20 All Tier 2 GLP 3ec5549841-1

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1. Tightening torque for high pressure rubber hose and pipe sleeve nut shall conform to the table below.

Series	02	03	05
Tightening torque (N·m)	19.6-.29.4	29.4-68.6	107.9-166.7

2. Tightening torque for elbow nipples other than KES shall conform to the table below.

Port size (inch)	3/4-16UNF
Tightening torque (N·m)	68.6-73.6

3. Insertion length of low pressure hose into pipe shall conform to the table below.

Nominal No.	14	20	26	32
Length (mm)	31	35	38	42

4. Use HO32R for working oil.
5. Total oil capacityin the hydraulic circuit is 55ℓ
6. Coat O-ring with KES07.881 lithium grease (G2-LI) during assembly.
7. Unless otherwise specified, tightening torque to conform to mark A in attached figure 1 of KES 04.123.1.

HWZ02062

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7.4 MAST

For mast maintenance see the suitable mast manual included in this manual.

7.4.1 MAST REMOVAL - TYPICAL

1. Place blocks under front and rear tires.
2. Lift fork carriage with crane so that hydraulic piping can be removed.
3. Remove forks.
4. Place block under fork carriage.
5. Operate work equipment control levers several times to release remaining pressure in hydraulic piping.
6. Disconnect mast piping.
7. Plug the openings to prevent spillage of hydraulic fluid and possible entry of dirt and foreign matter into the hydraulic system.
8. Raise fork carriage slightly with crane and remove the block set in place in step 4.
9. Lower the fork carriage.
10. Attach crane to the mast.
11. Remove the tilt pins.
12. Tilt the mast slightly forward from the vertical position.
13. Remove the cap bolts from the front axle.

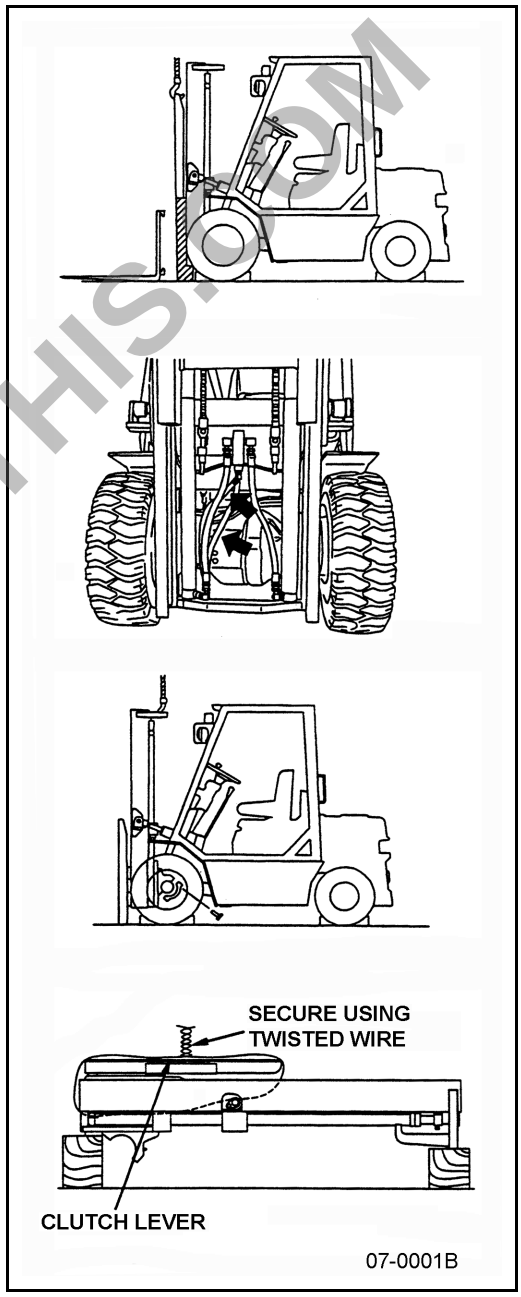
⚠ WARNING

If the mast cap is removed with the mast tilted back there is danger that the mast may fall over.

14. Lift the mast enough that the mast support comes off of the axle and move the mast towards the front of the truck to remove it.

NOTE: When carrying the removed mast horizontally, secure the lower stay and the finger bar with wire or straps.

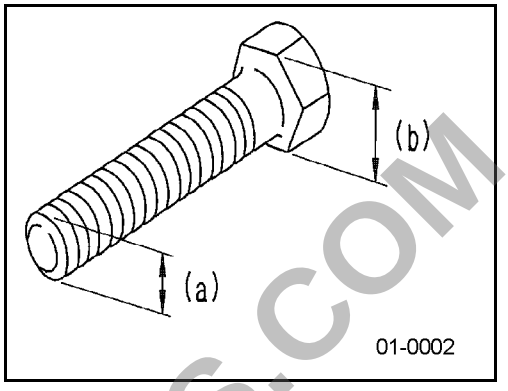
15. Place blocks under the bottom of the mast.
16. Lay the mast assembly horizontally so that the fork carriage faces upwards.



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2.7 STANDARD TIGHTENING TORQUE FOR BOLTS



Thread diameter of bolt - in. (mm) (a)	Width across flat - in. (mm) (b)	Tightening Torque		
		lb./ft	Nm	kgfm
.236 (6)	.394 (10)	9.73 ± 1.03	13.2 ± 1.4	1.35 ± 0.15
.315 (8)	.512 (13)	23.2 ± 2.10	31.4 ± 2.9	3.20 ± 0.30
.394 (10)	.669 (17)	48.5 ± 5.00	65.7 ± 6.8	6.70 ± 0.70
.472 (12)	.748 (19)	82.6 ± 7.20	112 ± 9.8	11.5 ± 1.00
.551 (14)	.866 (22)	131 ± 14.0	177 ± 19	18.0 ± 2.00
.630 (16)	.945 (24)	206 ± 21	279 ± 29	28.5 ± 3.00
.709 (18)	1.06 (27)	282 ± 29	383 ± 39	39.0 ± 3.00
.787 (20)	1.18 (30)	405 ± 43	549 ± 58	56.0 ± 6.00
.866 (22)	1.26 (32)	549 ± 58	745 ± 78	76.0 ± 8.00
.945 (24)	1.42 (36)	684 ± 72	927 ± 98	94.5 ± 10.0
1.06 (27)	1.61 (41)	973 ± 100	1,320 ± 140	135 ± 15
1.18 (30)	1.81 (46)	1,270 ± 140	1,720 ± 190	175 ± 20
1.30 (33)	1.97 (50)	1,630 ± 180	2,210 ± 240	225 ± 25
1.42 (36)	2.16 (55)	2,030 ± 210	2,750 ± 290	280 ± 30
1.54 (39)	2.36 (60)	2,420 ± 250	3,280 ± 340	335 ± 35

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⚠ WARNING

FOLLOW THE INSTRUCTIONS IN THE OPERATION AND MAINTENANCE MANUAL AS WELL AS ON THE SAFETY LABELS

- Read the instructions in this manual and the safety labels attached to various parts of the lift truck, and make sure that you understand and follow them. If you do not understand or do not follow the instructions, this will lead to improper operation which may result in personal injury or damage.
- Be sure that you understand the proper method of using the lift truck and the procedure for carrying out an inspection, and ensure that they are carried out safely.
- Read this manual and safety labels again from time to time. If the Operation and Maintenance Manual or safety labels have been lost or have become dirty and cannot be read, obtain replacements from your Komatsu Forklift dealer and attach the safety labels in the specified positions.

⚠ WARNING

MAKE SAFETY PLANS BEFOREHAND

- Before operation, establish an operating plan and hold a meeting to discuss operating safety.
- In confined areas, position a signal person and carry out operations in accordance with his/her instructions.

⚠ WARNING

FOLLOW THE SAFETY RULES IN PLACE

- Do not operate the lift truck if you are fatigued, or when you have been drinking or have taken any medication which can make you sleepy.
- When carrying out operation, inspection, or maintenance of the lift truck, always follow all work shop rules, safety regulations and precautions.
- During operation, always pay attention to safety and be careful of pedestrians and other surrounding conditions.

⚠ WARNING

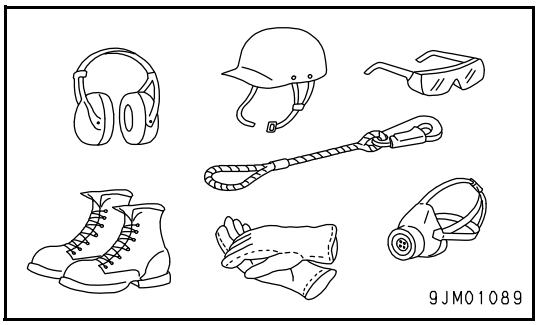
ENSURE SAFETY AT THE WORKING AREA

- Always work on level surfaces and wipe up all oil or grease from the ground.
- When working on quays, platforms, or docks, or other places where there is danger of falling, set up blocks to prevent the lift truck from going over the edge.
- Put warning signs up in dangerous places to warn the operator not to approach.
- Mark the travel areas clearly and maintain the road surface in good condition.
- Put up signs to prevent unauthorized lift trucks from entering areas where lift trucks are being operated.
- Ensure that there is adequate lighting to enable safe operations to be performed.

⚠ WARNING

WEAR SAFETY CLOTHES WHILE IN OPERATION

- Avoid loose clothing, jewelry, and loose long hair, which can catch on controls or in moving parts and cause serious injury or death.
- Always wear a hard hat and safety boots.
- Depending on the working conditions, wear other safety equipment in addition to the hard hat and safety boots.



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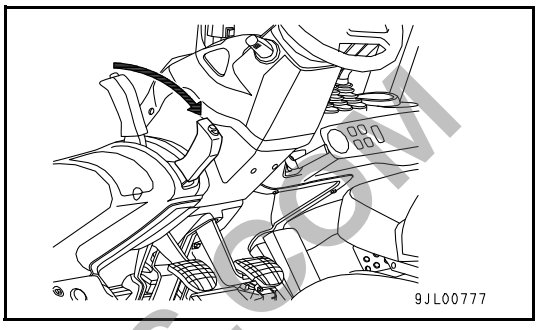
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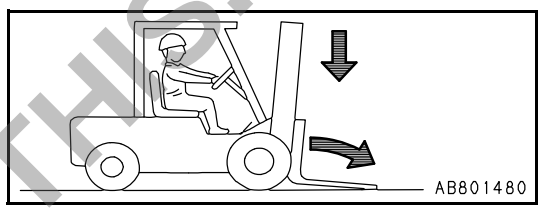
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⚠ WARNING

FOLLOW THESE STEPS FOR PARKING

1. Stop the lift truck on level ground.
2. Apply the parking brake securely to make sure that the lift truck cannot move.
3. Set the directional lever and speed lever to neutral.
4. Tilt the mast forward and lower the fork to the floor.
5. Turn the starting switch to the OFF position.
6. Pull out the starting switch key and leave the lift truck.
7. LPG trucks: close fuel valve on fuel tank after parking the lift truck.





⚠ WARNING

PARK THE LIFT TRUCK IN A SAFE PLACE

- Park the lift truck in the specified place.
- Park the lift truck on a firm surface.
- Do not park near any emergency exit, stairway, fire extinguisher, or other safety equipment. Park the lift truck in a place where it will not obstruct pedestrians or other vehicles.
- Never park the lift truck near heat, ignition sources, or any flammable object.
- If there is no way to avoid parking on a slope, immobilize the lift truck by putting blocks under the tires in addition to normal parking procedures.
- LPG trucks: LPG is heavier than air and will sink to the lowest area possible. Avoid parking near areas near floor drains or lubrication pits where escaped fuel may collect.

⚠ WARNING

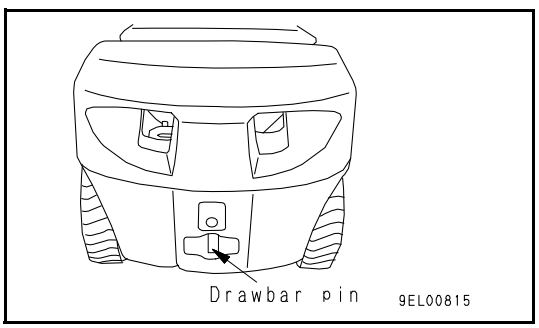
SHOULD THE LIFT TRUCK BECOME INOPERATIVE IN A DANGEROUS PLACE LIKE A RAILROAD CROSSING, LET ALL PEOPLE AROUND KNOW IMMEDIATELY

- If engine trouble occurs on a railroad crossing and the lift truck does not move, it is impossible to use the starting motor as can be done on a standard-shift automobile. (This is because a neutral safety switch is installed.)
- In such an emergency, light a flare or smoke candle to warn approaching trains and people in the area that there is a broken-down truck on the tracks.

⚠ WARNING

DON'T USE THE DRAWBAR PIN FOR OTHER THAN IT'S INTENDED PURPOSE

- Do not use the drawbar pin for any other towing purpose than to bail out a stuck lift truck, or to be towed by another lift truck or to be hoisted.
- The towing pin at the back of the counterweight is provided to pull out the lift truck when it has gotten stuck in dirt or a ditch as well as when it is being loaded on a truck.



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TRUCK DATA - CUSHION TIRE LIFT TRUCKS (CONT'D)

	FG45BCS-8
GENERAL	
Power Type	LPG
Operation Type	Sit Down
Capacity @ 24 in. (600 mm) Load Center * lbs. (kg)	10,000 (4,535)
Load Distance from Center Axle (2-Stage) in. (mm)	17.9 (455)
Load Distance from Center Axle (3-Stage) in. (mm)	20.2 (515)
Wheelbase in. (mm)	63.0 (1,600)
WEIGHT	
Service Weight (inc. 2-Stage STD Mast/Forks lbs. (kg)	15,070 (6,835)
TIRES	
Tire Type	Cushion
Tire Size - Front	22 x 6 x 16
Tire Size - Rear	18 x 7 X 12 1/8
Number of Wheels - Front / Rear x = Driven	4x / 2
Tread (Center of Tires) - Front / Rear in. (mm)	41.9 (1,065) / 39.8 (1,010)
DIMENSIONS	
Tilting Angle, 2-Stage (FV) Masts, Forward / Backward °	6 / 6
Tilting Angle, 3-Stage (TFV) Masts, Forward / Backward °	6 / 6
Mast Height - Lowered - 2-Stage Mast in. (mm)	95.0 (2,410)
Mast Height - Extended - 2-Stage Mast † in. (mm)	178.0 (4,520)
Maximum Fork Height - 2-Stage STD Mast ** in. (mm)	130.0 (3,300)
Free Lift Height - 2-Stage STD Mast in. (mm)	7.0 (180)
Height Overhead Guard in. (mm)	83.7 (2,125)
Length to Fork Face - 2-Stage Mast in. (mm)	99.6 (2,530)
Length to Fork Face - 3-Stage Mast in. (mm)	102.3 (2,605)
Overall Width at Drive Tires in. (mm)	53.9 (1,370)
Forks - Thickness x Width x Length in. (mm)	2.0 x 6.0 x 42.0 (50 x 150 x 1,070)
Carriage Width / ITA Class in. (mm)	46.9 (1,190) / III
Ground Clearance under Mast in. (mm)	4.0 (100)
Ground Clearance - Center of Wheelbase in. (mm)	4.9 (125)
Right Angle Stacking Aisle (2-Stage Mast) †† in. (mm)	105.7 (2,685)
Right Angle Stacking Aisle (3-Stage Mast) †† in. (mm)	108.0 (2,745)
Turning Radius - Outside in. (mm)	87.8 (2,230)
PERFORMANCE	
Travel Speed, Forward - Loaded / Unloaded mph (k/hr.)	9.6 (15.5) / 9.6 (15.5)
Lifting Speed - Loaded / Unloaded (2-Stage) fpm (mm/s)	93 (470) / 95 (480)
Lifting Speed - Loaded / Unloaded (3-Stage) fpm (mm/s)	89 (450) / 91 (460)
Lowering Speed - Loaded / Unloaded (2-Stg) fpm (mm/s)	95 (480) / 85 (430)
Lowering Speed - Loaded / Unloaded (3-Stg) fpm (mm/s)	91 (460) / 81 (410)
Maximum Drawbar Pull - Loaded lbs. (kN)	7,500 (33.3)

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IMPORTANT

The compression pressure differences between cylinders must not exceed 14.5 psi @ 200 rpm. If any cylinder produces an extremely low compression pressure reading, put a small amount of oil into the cylinder through the spark plug hole and remeasure.

- If the pressure rises after adding oil to the cylinder, the piston ring is worn or damaged.
- If the pressure remains unchanged after adding oil, the valve is stuck or is not sealing correctly. Ensure that valves are adjusted properly and recheck compression.
- If low compression pressure is observed in two adjacent cylinders and the pressure is not restored after adding oil to those cylinders, the head gasket is leaking. In this case, oil and water may enter into the combustion chamber.
- If the engine RPM is not in the specified range (200 rpm), check the battery specific gravity and recheck compression under normal cranking conditions.

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5.17 INSPECT FRONT AXLE AND RE-TORQUE MOUNTING BOLTS

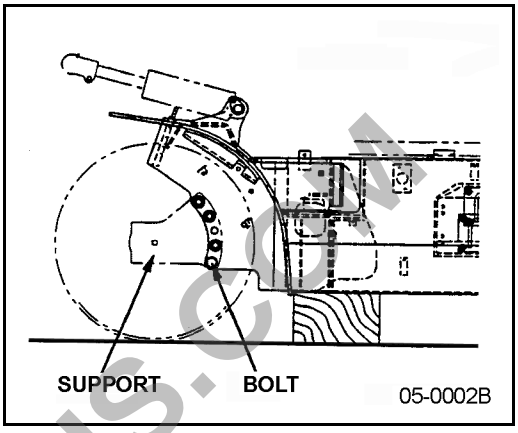
1. Check for deformation, cracks or damage.

NOTE: Check visually or use an appropriate crack detection method.

NOTE: Pay special attention to the welds and the area around the main frame mounting bolts.

2. Check for loose or missing mounting bolts.
3. Replace parts as necessary.
4. Torque to specified values.

Torque values for frame mounting bolts	488 - 611 lbs/ft (662 - 829 Nm) (67.5 - 84.5 kgfm)



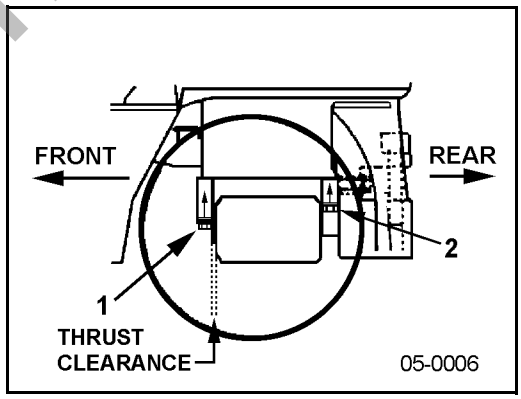
5.18 INSPECT REAR AXLE AND RE-TORQUE MOUNTING BOLTS

1. Check for deformation, cracks or damage.
2. Check center pin play.
3. Check thrust clearance.

NOTE: Maximum allowable clearance is **0.27 in. (0.7mm).**

4. Check for loose cap mounting bolts.

Torque value for BOLT #1	180 - 228 lbs./ft (245 - 309 Nm)
Torque value for BOLT #2	361 - 448 lbs./ft (490 - 608 Nm)



5.19 INSPECT WHEELS

1. Check wheels for deformation, cracks (all wheels) or cracks in side ring (pneumatic tire only).

NOTE: Check visually or with an adequate crack detection method.

2. Inspect for missing or loose hub (lug) nuts or rim mating nuts (pneumatic tire only).
3. Replace any missing nuts.
4. Torque all nuts to specified values shown in table below.

Wheel Torque Values	
Hub (lug) nuts - FRONT WHEELS	217 - 361.6 lbs./ft (294 - 490 Nm) (30 - 50 kgfm)
Hub (lug) nuts - REAR WHEEL(S)	217 - 361.6 lbs./ft (294 - 490 Nm) (30 - 50 kgfm)
Rim mating nuts - REAR WHEELS(S)	144.6 - 217 lbs./ft (196 - 294 Nm) (20 - 30 kgfm)

5.20 INSPECT RIM SIDE RING

Inspect wheel rim side rings for deformation or cracking.

NOTE: Check visually and use a crack detection method.

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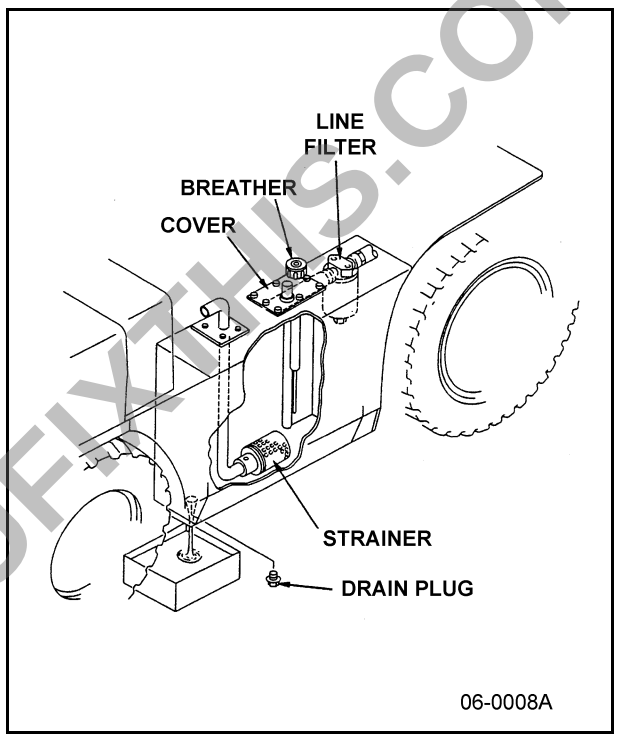
6.8 CHANGE OIL IN HYDRAULIC TANK

Change oil in hydraulic tank every 6 months of 1200 hours.

⚠ CAUTION

The oil is at high temperature immediately after operating the forklift. Wait until the oil temperature cools down before starting this operation.

1. Place a suitable container beneath the hydraulic tank.
2. Remove the drain plug at the bottom of the tank
3. Drain the oil.
4. Remove the tank cover.
5. Remove the strainer.
6. Clean the strainer with suitable flushing oil.
7. Put on adequate eye protection.
8. Blow dry the strainer with compressed air from the inside to the outside.
9. Visually inspect the strainer.
10. Install the strainer or replace it as necessary.
11. Clean the inside of the tank thoroughly.
12. Install the drain plug and tighten.
13. Replace the line filter.
14. Reinstall the hydraulic tank cover and tighten.
15. Fill the hydraulic tank with the specified volume of ISO # 32 hydraulic oil through the dipstick opening.
16. Check the hydraulic oil level using the dipstick.
17. Adjust oil level as necessary.



Hydraulic Tank Oil Refill Volume (Hydraulic Oil ISO #32)	
Pneumatic tire trucks	14.53 gal (55 L)
Cushion tire trucks	14.27 gal (54 L)

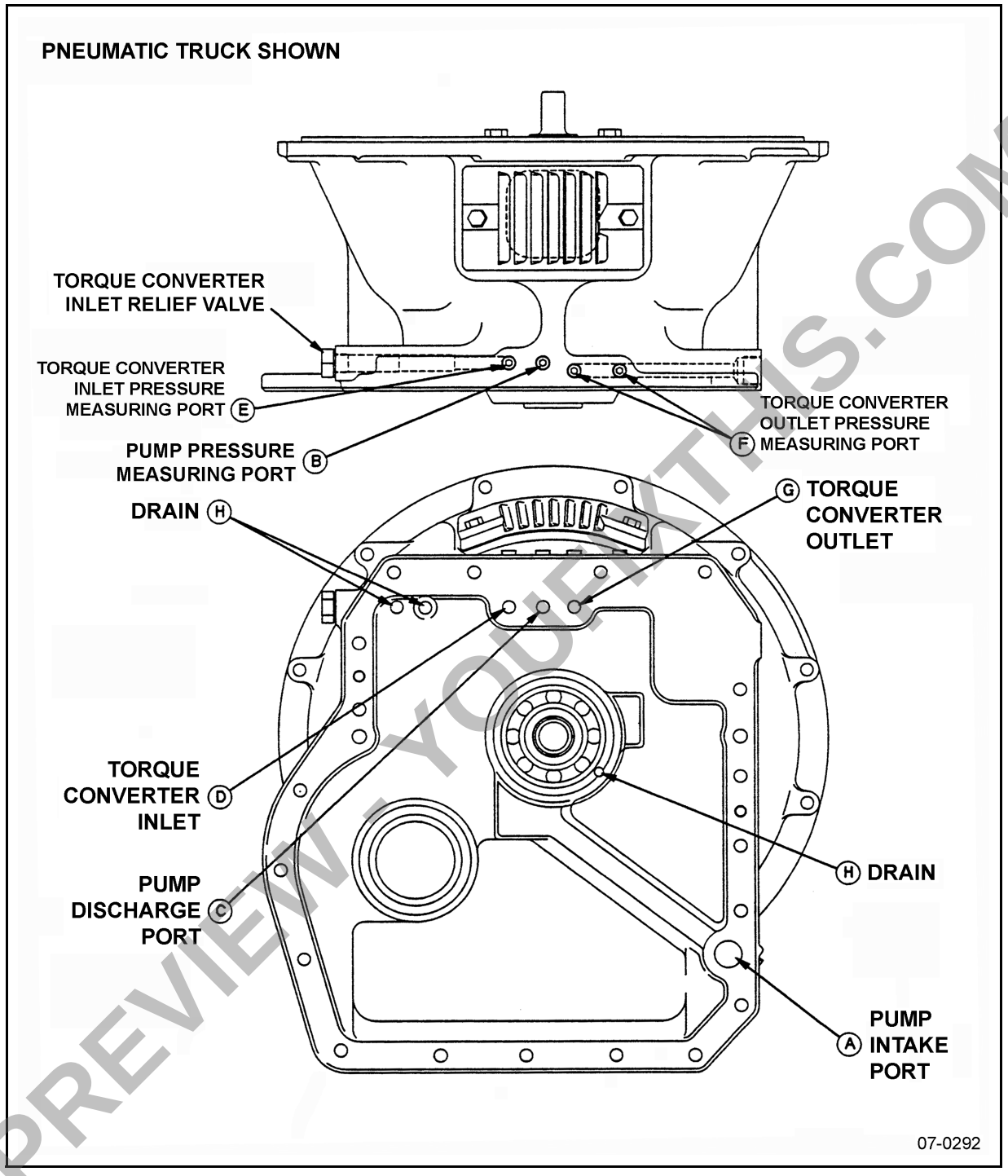
18. Bleed air from the lift and tilt cylinder lines as follows:
    a. Start the engine and run at low idle until warmed up.
    b. Raise and lower the mast.
    c. Stop the mast elevation at about 4 in. (100mm) before the maximum height is reached.
    d. Lower the mast to its lowest position.
    e. Repeat steps b-d four or five times.
    f. Raise the mast to its highest position.
    g. Lower the mast again to its lowest position.
    h. Repeat steps f & g four or five times.

NOTE: At this point, the lines should be clear of any trapped air.

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7.7.14 POSITION OF TORQUE CONVERTER HOUSING HYDRAULIC PORTS



INLET PORT PRESSURE	72.5 - 101.5 psi (0.5 - 0.7 MPa)	PORT POSITION “E”

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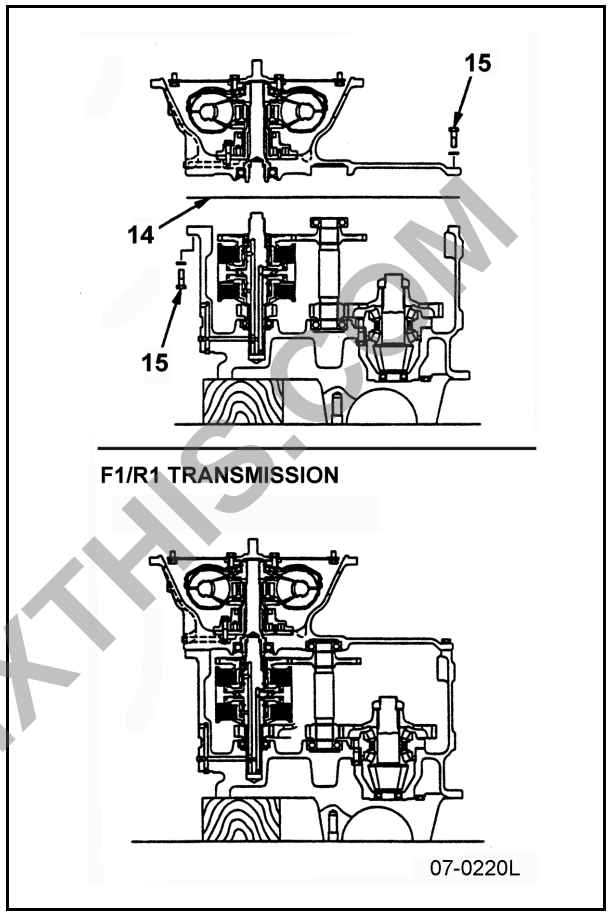
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17. Set gasket (14) on the transmission case.
18. Align the torque converter assembly with the transmission case dowel pin and slowly join the parts.

torque
Tighten bolts (15) to **43.4 - 53.8 lbf./ft (59 - 73 Nm)**.

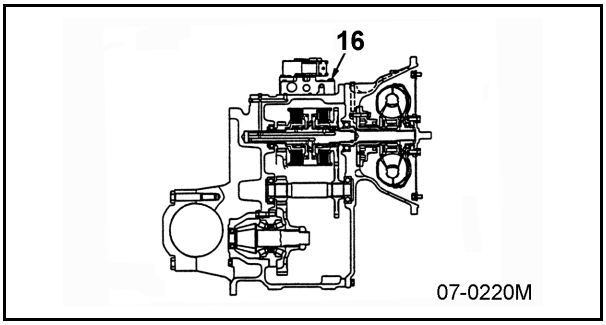
CAUTION

If the transmission case and torque converter housing do not fit together easily and smoothly due to slight dislocation of, or interference from, the input shaft spring or the intermediate shaft bearing, DO NOT force the sections together by tightening the bolts down.
Lightly tap the housing with a wooden, rubber or plastic hammer until the sections fit together smoothly and then tighten the bolts (15).



19. Install the solenoid valve using bolts (16) and gaskets.
20. Tighten two of the eight bolts together with inching change brackets.

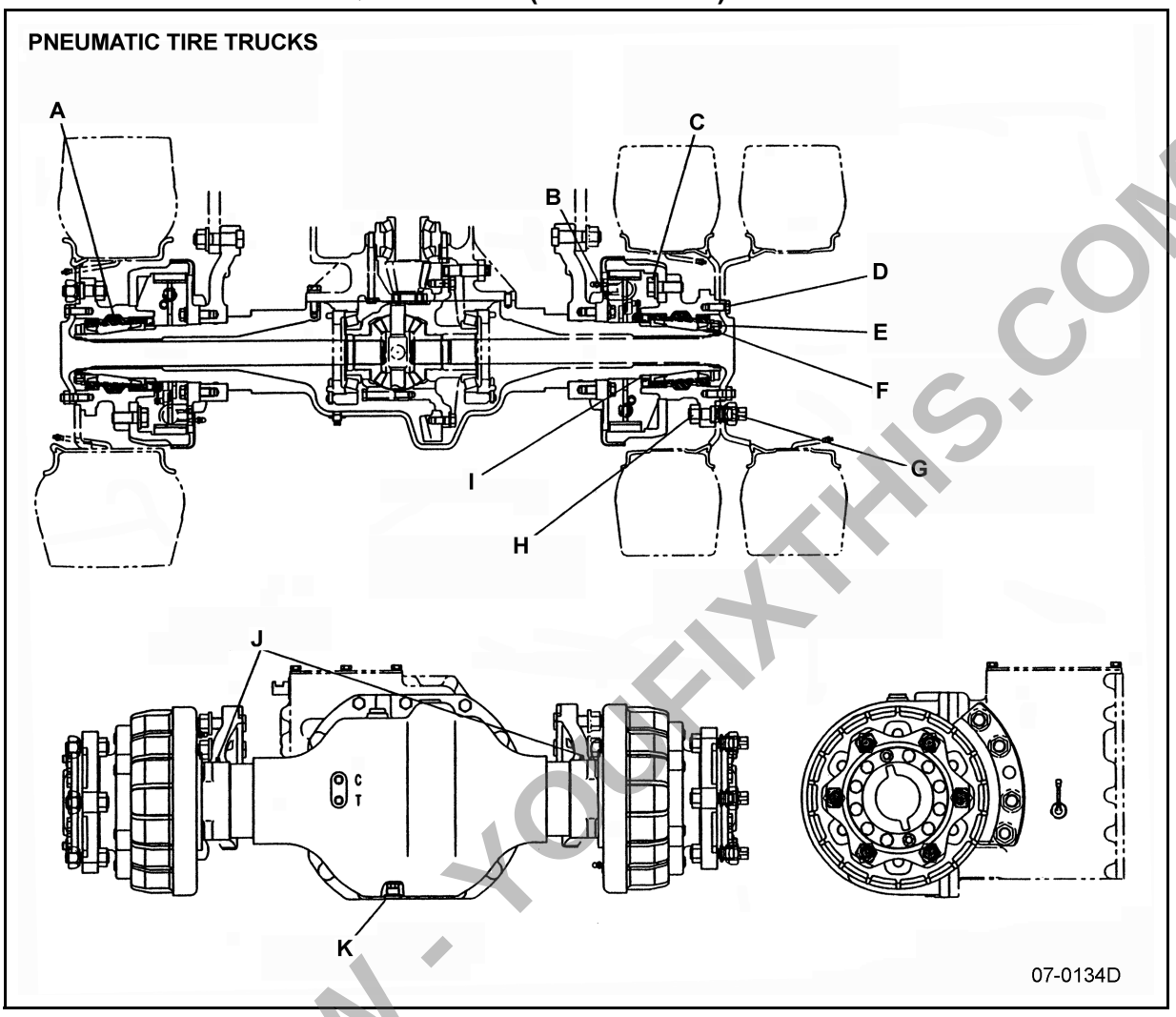
torque
Tighten bolts to **19.9 - 25.1 lbf./ft (27 - 34 Nm)**.



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7.9.2 DRIVE AXLE - TORQUE CHART (PNEUMATIC)



No.	Description	No.	Description
A	Fill cavity 1/2 to 2/3 full with Lithium Grease on both sides	G	Torque: 216.8 - 361.4 lbf./ft (294 - 490 Nm)
B	Torque: (Apply Loctite to bolt threads) 800P(G/D): 115.8 - 144.6 lbf./ft (157 - 196 Nm) 900/1000/1100P(G/D): 180.7 - 227.9 lbf./ft (245 - 309 Nm)	H	Torque: 325.3 - 433.7 lbf./ft (441 - 588 Nm) Cross-Caulk this item
C	Torque: (Apply Loctite to bolt threads) 325.3 - 433.7 lbf./ft (441 - 588 Nm)	I	Use Liquid Gasket here
D	Torque: 117.3 - 144.6 lbf./ft (159 - 196 Nm)	J	Apply Lithium Grease here
E	Lock Bolt: Apply Loctite to screw	K	Torque: 43.5 - 57.5 lbf./ft (59 - 78 Nm)
F	Front Hub Starting Torque: 7.23 - 18.07 lbf./ft (9.8 - 24.5 Nm) Fill cavity 1/2 to 2/3 full with Lithium Grease on both sides	—	

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7.13.6 STEERING AXLE AND POWER STEERING CYLINDER INSTALLATION

The steering axle assembly can be installed into the lift truck chassis by reversing the steps utilized during removal. Pay particular attention to the following details.

Power Steering Cylinder Mounting Bolts

torque

Torque the power steering cylinder mounting bolts to **361.4 - 447.7 lbs./ft (490 - 607 Nm) (50 - 62.5 kgfm).**

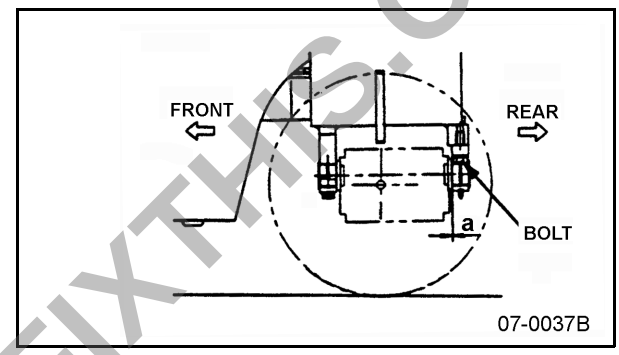
Steering Linkage

torque

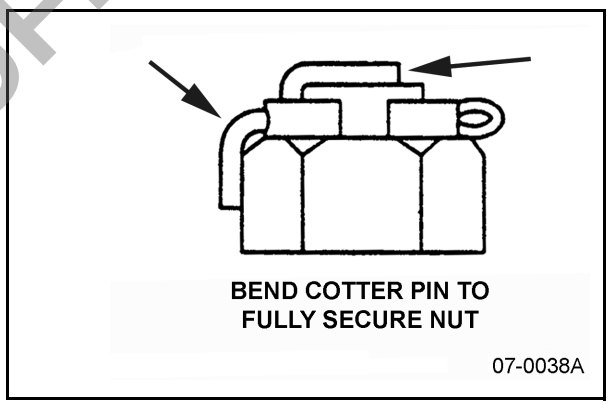
Torque the steering linkage bolt to **180 - 288 lbs./ft (245 - 309 Nm) (25 - 31.5 kgfm).**

1. Adjust shims so that clearance (a) is less than **0.02 in. (0.5mm).**

NOTE: Install the bushing so that the hole is facing up.



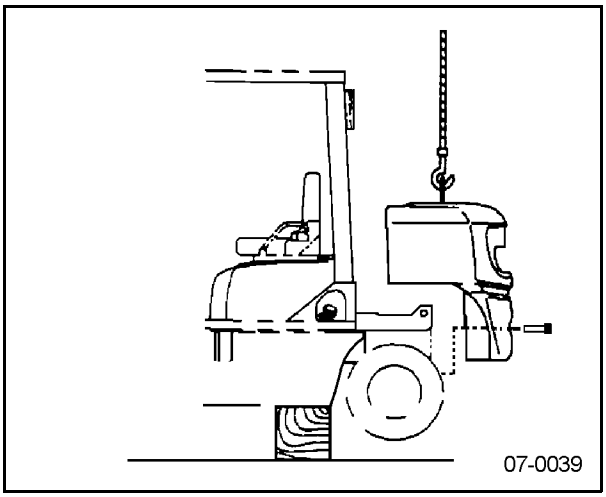
2. Tighten so that the bell crank steering angle is equal to the specified dimensions.
   a. Fully tighten the lock nut.
   b. Bend the cotter pin to fully secure the nut.



3. Install counterweight on the lift truck.
4. Coat the retaining bolts with molybdenum disulfide.

torque

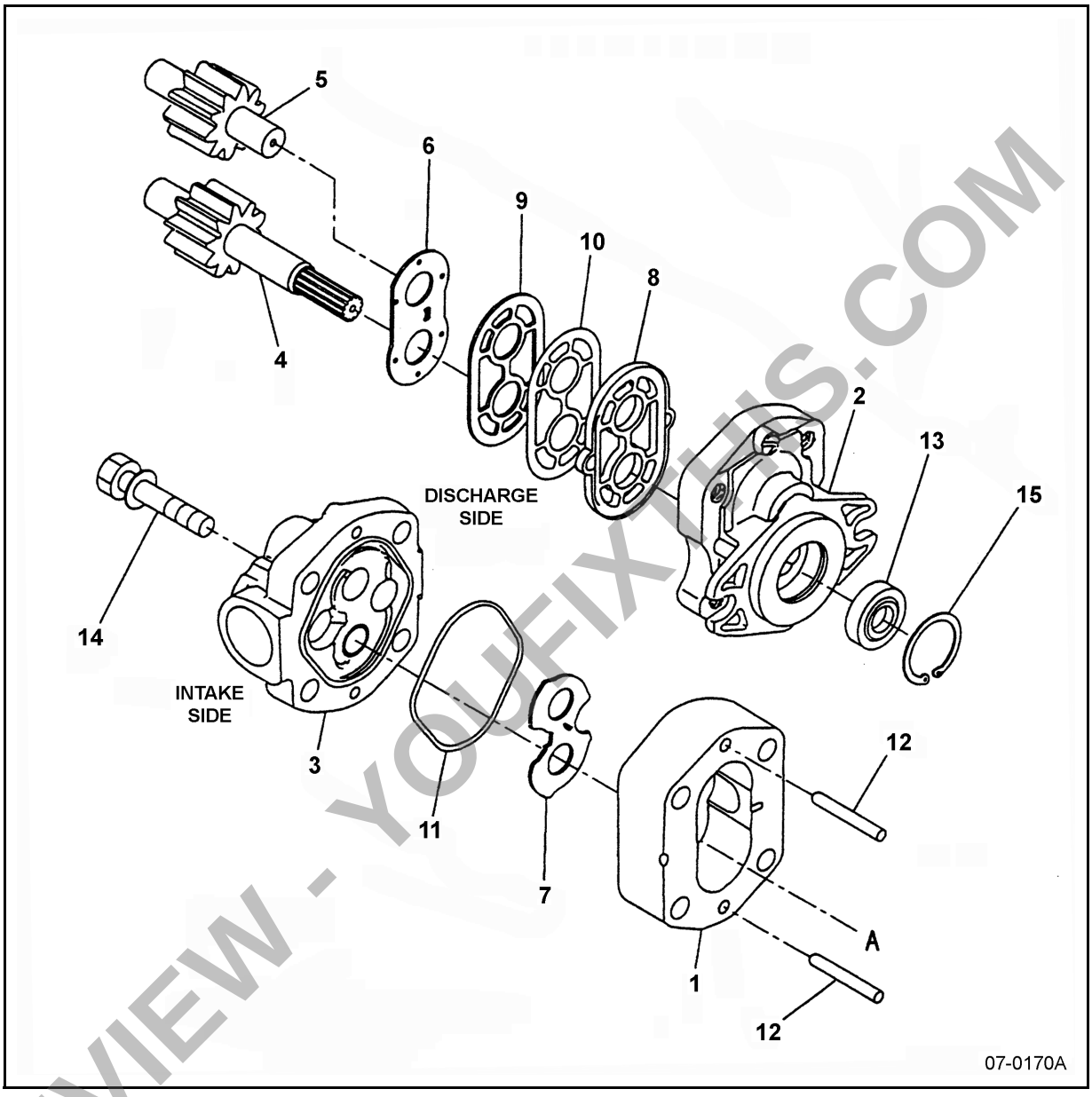
Torque bolts to **361 - 448 lbs./ft (490 - 607 Nm) (50 - 62 kgfm)**.



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7.15.6 HYDRAULIC PUMP - REAR UNIT - DIESEL - PARTS BREAKDOWN



No.	Description	No.	Description
1	GEAR PLATE	9	GASKET “A”
2	MOUNTING FLANGE	10	GASKET “B”
3	COVER	11	O-RING
4	DRIVE GEAR	12	DOWEL PIN
5	DRIVEN GEAR	13	OIL SEAL
6	SIDE PLATE “A”	14	BOLT WITH WASHER
7	SIDE PLATE “B”	15	SNAP RING
8	BALANCE SEAL	—	

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Problem	Major Cause	Corrective Action
BRAKE SYSTEM		
INSUFFICIENT BRAKING FORCE	OIL LEAKAGE IN HYDRAULIC SYSTEM	REPAIR LEAK AND ADD FLUID
	AIR ENTERING HYDRAULIC SYSTEM	CORRECT LEAK AND BLEED AIR
	WATER OR OIL ON LINING SURFACES	CLEAN OR REPLACE LININGS
	HARDENED LINING SURFACE/ IMPROPER ENGAGEMENT	RESURFACE OR REPLACE LININGS
	WORN LININGS	REPLACE LININGS
	BRAKE VALVE/WHEEL CYLINDER MALFUNCTION	REPAIR OR REPLACE PARTS
	CLOGGED HYDRAULIC SYSTEM	CLEAN AND FLUSH SYSTEM
BRAKES PULL (STEERING WHEEL UNCONTROLLABLE)	IMPROPER TIRE PRESSURE	ADJUST TIRE AIR PRESSURE
	IMPROPER BRAKE ADJUSTMENT	ADJUST BRAKES PROPERLY
	WATER OR OIL ON LINING	CLEAN OR REPLACE LININGS
	DIRT OR SAND IN BRAKE DRUM	CLEAN DRUM AND BRAKE PARTS
	HARDENED LINING SURFACE	RESURFACE OR REPLACE LININGS
	INCORRECT LINING ENGAGEMENT	RESURFACE OR REPLACE LININGS
	WORN LININGS	REPLACE LININGS
	PARTIALLY WORN/DISTORTED/BROKEN BRAKE DRUM	REPLACE DRUM(S)
	WHEEL OR CYLINDER MALFUNCTION	REPAIR OR REPLACE PARTS
	BRAKE SHOES NOT SLIDING PROPERLY	ADJUST PROPERLY
	LOOSE BACKING PLATE MOUNTING BOLTS	RETIGHTEN OR REPLACE BOLTS
	DEFORMED BACKING PLATE	REPLACE BACKING PLATE
	IMPROPER WHEEL BEARING ADJUSTMENT	ADJUST OR REPLACE BEARINGS
	CLOGGED HYDRAULIC SYSTEM	CLEAN AND FLUSH SYSTEM
EXCESSIVE BRAKE PEDAL STROKE	IMPROPER BRAKE ADJUSTMENT	ADJUST BRAKES
	AIR ENTERING BRAKE HYDRAULIC SYSTEM	CORRECT LEAK/ADJUST BRAKES
	BRAKE FLUID LEVEL LOW OR FLUID LEAKAGE	CORRECT LEAK/ADD FLUID
	WORN LININGS	REPLACE LININGS
	IMPROPER SHOE RETURN AFTER BRAKING	REPAIR/LUBE CONTACT AREA WITH BACKING PLATE
	IMPROPER BRAKE LINING CONTACT	REPAIR OR REPLACE LININGS

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Section 5 Service

5.6-2 Measuring Chain Stretch

Regular inspection and lubrication of the chains will increase their service life and reduce downtime.

If the chains stretch beyond the recommended amount, they should be replaced in pairs. Chain stretch can be measured with chain wear scale. Measure the chains according to the instructions printed on the chain wear scale, without a load on the carriage.

*To check the free lift chains, raise the carriage 1 ft. (30 cm) off the ground to put tension on the chains.

*To check the main lift chains, raise the mast until the inner upright starts to extend putting tension on the chains.

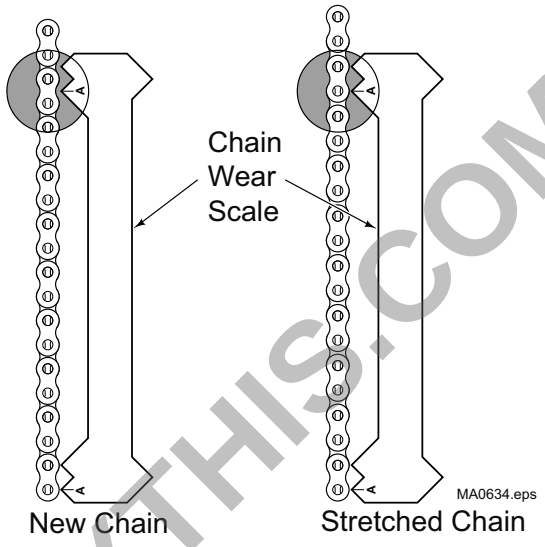


Figure 37.Measuring Chain Stretch.

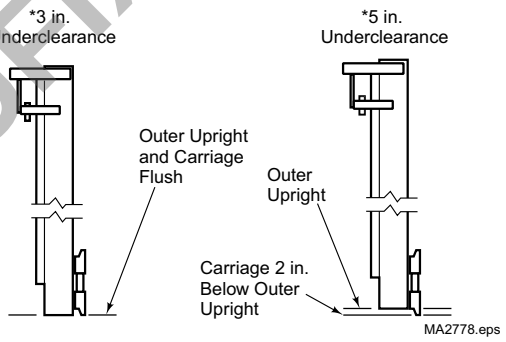
5.6-3 Main Lift Chain Adjustment

The main lift chains should be adjusted so that when the unloaded mast is fully lowered, the uprights are positioned as shown in figure 38.

1. Adjust one chain to achieve the correct upright position when fully lowered. See Figure 39.

2. Adjust the other chain to achieve equal chain tension. Tighten the nuts together to a torque of 50-70 ft.-lbs. (98-96 Nm).

3. Raise and lower the mast several times to confirm the adjustments.



***NOTE:** Underclearance is based on mast production series, actual mast underclearance may vary by truck model.

Figure 38.Upright and Carriage Position.

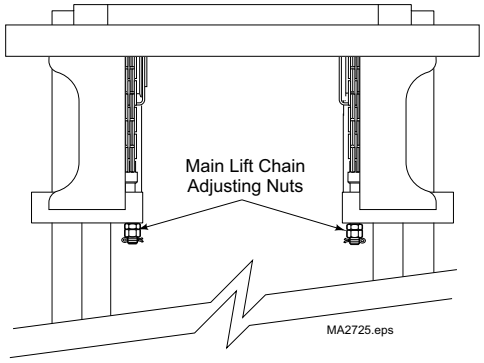


Figure 39.Main Lift Chains.

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Section 5 Service

5.2-10 Piston Removal

1. Remove the plunger/piston assembly from the cylinder shell as described in Section 5.2-8 or 5.2-9.
2. **Use** a strap wrench and 400 grit emery cloth to secure the plunger while turning the piston with a pin type spanner wrench
3. Turn the piston until the snap wire end is visible through the hole. Use a screwdriver to start the wire end out the hole. Turn the piston to feed the wire out.
4. Pull the piston from the plunger.
5. For reassembly, reverse the above procedures except as follows:
   *Install a new snap wire when installing the piston.

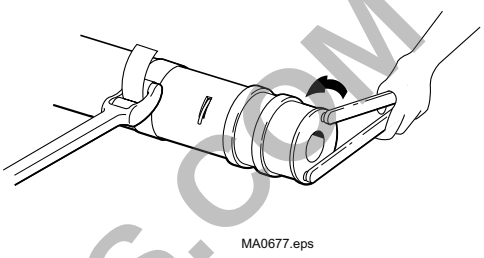


Figure 35. Piston Removal.

5.2-11 Cylinder Bleeding

WARNING: The cylinders must be bled to remove air. Air in the cylinders will compress on the first extension which could rupture the cylinders causing serious bodily injury and property damage.

After repair, the cylinders may have air trapped in them that must removed. To bleed air do the following:

1. **Without a load** extend the free lift cylinder and continue to extend the main lift cylinders to 90% of full stroke. Retract all cylinders completely. Repeat **three** times.

2. Extend the cylinders **without a load** at 50% full engine speed then build to full system pressure at the end of the main lift cylinder stroke. Electric trucks - limit the control valve movement to achieve 50% speed. Retract all cylinders. Repeat **four** times.

3. Cycle the mast with a half load (50% mast rated capacity) through full cylinder extension several times. The cylinders should extend smoothly. Repeat the steps if cylinder extension is not smooth.

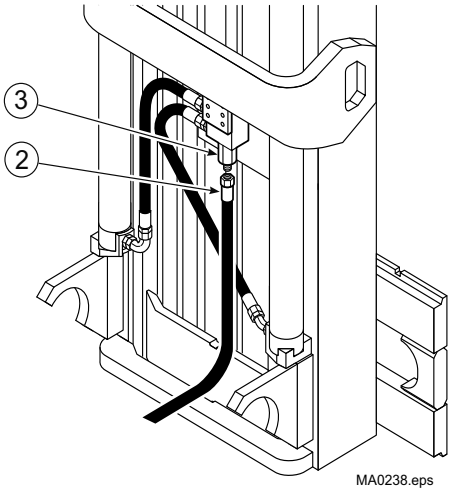


Figure 36. Valve Cartridge Service.

5.3 Valve

5.3-1 Valve Cartridge Service

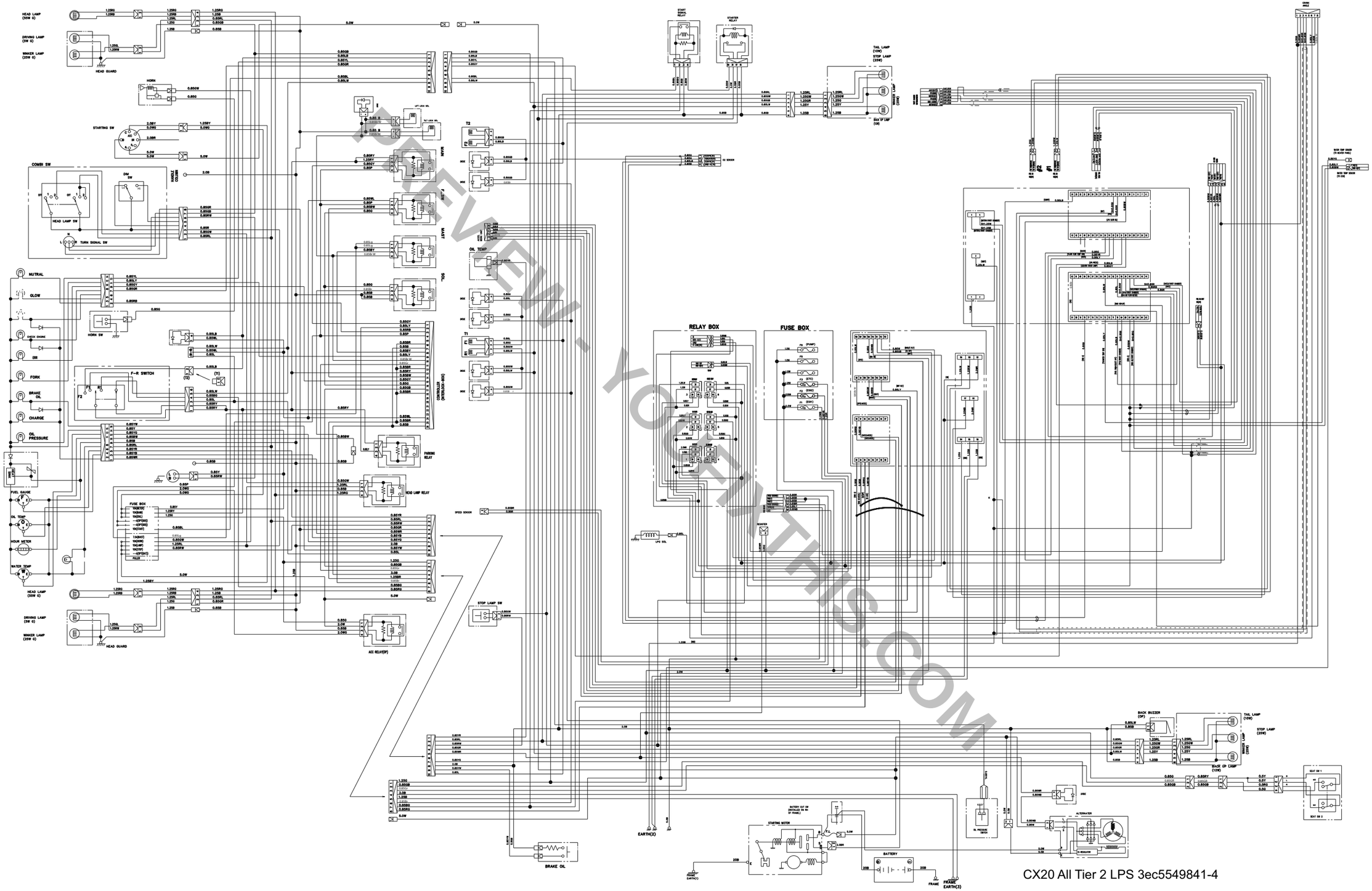
1. Completely lower the mast.
2. Remove the truck supply hose from the valve cartridge. See Figure 36. Plug the hose.
3. Remove the valve cartridge from the valve. Note the stamped part no. on the Cartridge for ordering a replacement.

WARNING: Replacing the valve cartridge with a different part no. cartridge may cause the mast to malfunction.

4. For reassembly, reverse the above procedures.

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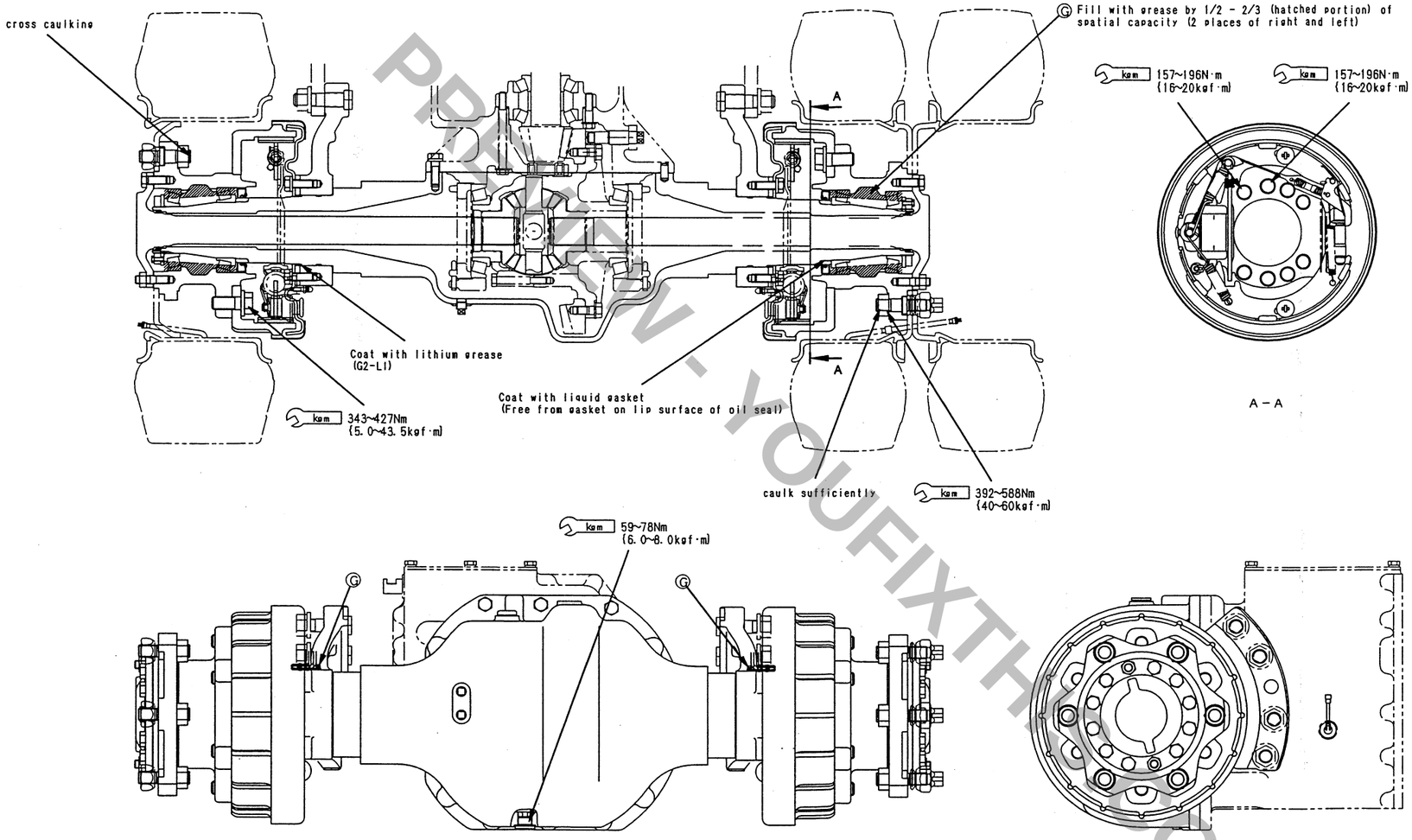
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CX20 All Tier 2 LPS 3ec5549841-4



1. Fill of coat Ⓖ 3 and gap between 3EC-21-15140 or 3EC-21-36250 seal lips with KES07.881 lithium grease (G2-LI).

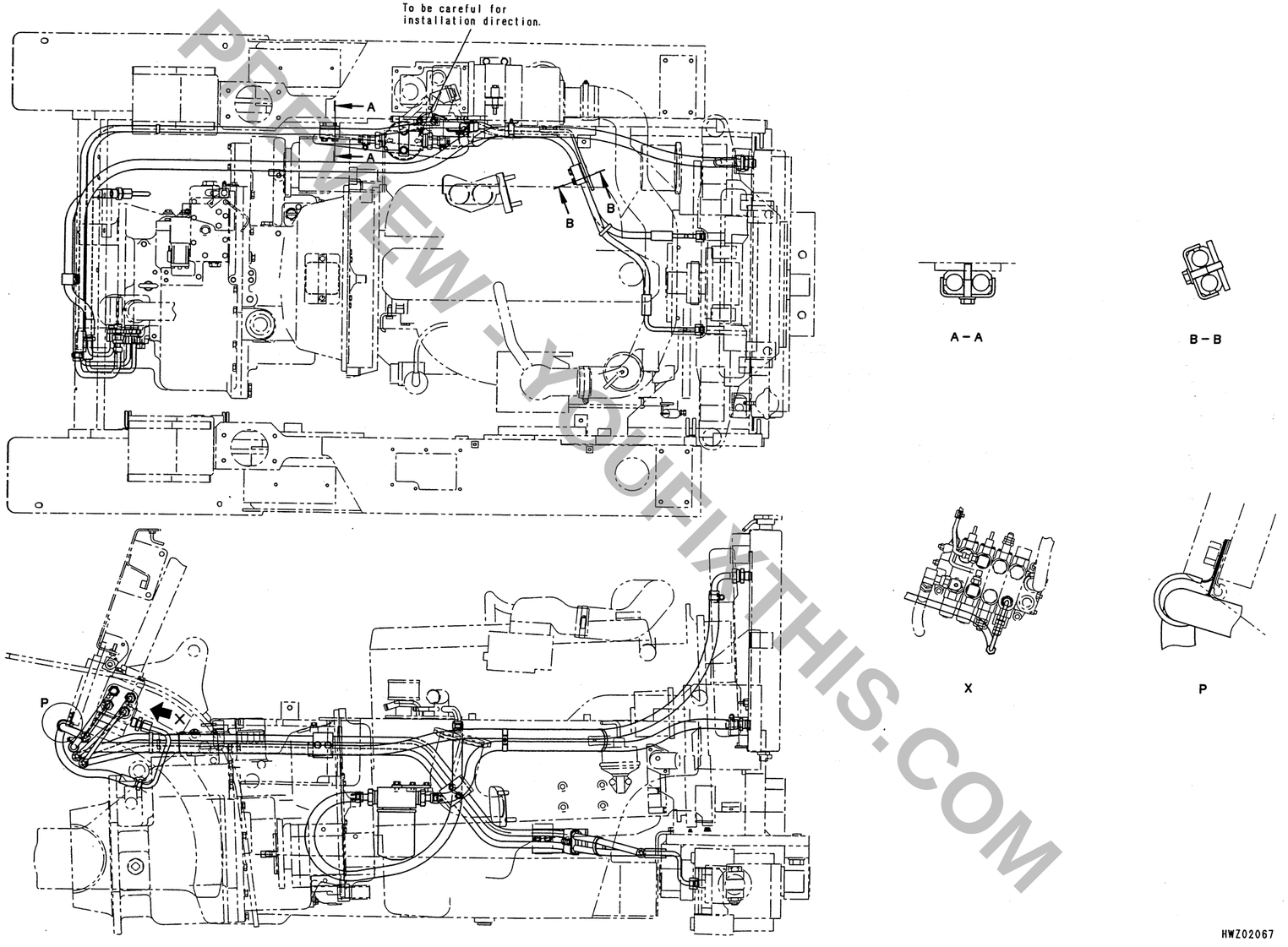
   Be careful not to fill gap between seal lips with too much grease.

2. Adjust bearing pressure by means of 3EC-21-36131 so that 3EC-21-36220 hub (single unit) starting torque is within range of 9.8 - 24.3N.m(100 - 250kg - cm)

3. Use KES07-861.Go 90 gear oil
   Torq. flow type 13L
   Clutch type 25L (differential 15L + transmission 10L)

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