HANGCHA

# 1t-3.5t R Series Internal Combustion Counterbalanced Forklift Truck

# SERVICE MANUAL

CE

HANGCHA GROUP CO., LTD.

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# Foreword

The manual is the introduction of structure, working principle and serving of 1t-3.5t R series internal combustion counterbalance forklift truck.

For safety and performance of truck, all in charge of operation, maintenance and management must read and comprehend this manual well.

The manual also applies to container fork-lift trucks.

It is forbidden anybody without training and qualification to maintain.

Our product design will update and perform better, so the content in this manual may be not the same as the forklift you owned.

If you have any questions please keep touches with HANGCHA GROUP CO., LTD. sales department or let the agents know.

# Content

# Ⅰ. Power System

## 1. Engine for Forklift

| Engine / Parameter | Gasoline | |
|---|---|---|
| | **K21(Japan)** | **K25(Japan)** |
| Rated output kW | 37 | 44 |
| Rated rotate speed r/min | 2300 | 2500 |
| Max. torque N·m / Speed r/min | 142/1600 | 179/1600 |
| Service weight kg | 158 | 161 |
| Forklift truck model | CPQ10/15/18N- RW21<br>CPQD10/15/18N- RW21 | CPQ20/25/30/35N -RW22<br>CPQD20/25/30/35N -RW22<br>CPQD20/25/30/35N - RW22A<br>CPQD20/25/30/35N- RW22B |

| Engine / Parameter | Diesel | |
|---|---|---|
| | C240PKJ-20 | C240PKJ-30 |
| Rated output kW | 35 | 35 |
| Rated rotate speed r/min | 2500 | 2500 |
| Max. torque N·m / Speed r/min | 139/1800 | 139/1800 |
| Service weight kg | 252 | 252 |
| Forklift truck model | CPC10/15/18N -RW9<br>CPCD10/15/18N -RW9<br>CPC20/25/30/35N -RW9<br>CPCD20/25/30/35N-RW9<br>CPC20/25/30/35N-RW9B<br>CPCD20/25/30/35N-RW9B | CPC10/15/18N-RW10<br>CPCD10/15/18N-RW10<br>CPC20/25/30/35N-RW10<br>CPCD20/25/30/35N-RW10<br>CPC20/25/30/35N-RW10B<br>CPCD20/25/30/355N-RW10B |

| Engine / Parameter | Gasoline | LPG single fuel | Diesel |
|---|---|---|---|
| | BY491GP（Baiyang） | IMPCO GM3.0L | A498BT1-1 |
| Rated output kW | 38 | 50 | 36.8 |
| Rated rotate speed r/min | 2600 | 2500 | 2400 |
| Max. torque N·m / Speed r/min | 161/1800-2200 | 189 /1600 | 186/1600～1800 |
| Forklift truck model | CPQ(D)10/15/18N-RW7<br>CPQ(D)20/25/30N-RW7 | CPQD20/25N-RW26-Y<br>CPQD30/35N-RW26-Y | CPCD20/25N-RW27<br>CPCD30/35N-RW27 |

| Engine / Parameter | Diesel | Diesel (YANMAR) | |
|---|---|---|---|
| | TD27AA（NiSSAN） | 4TNE92-HRJ | 4TNE98-BQFLC |
| Rated output kW | 38.5 | 32.8KW | 44.3KW |
| Rated rotate speed r/min | 2300 | 2450 | 2300 |
| Max. torque N·m / Speed r/min | 160/2300 | 149.4 / 1600 | 206 /1700 |
| Service weight kg | 243 | 194 | 194 |
| Forklift truck model | CPCD20/25N-RW15A<br>CPCD30/35N-RW15A | CPCD10/15/18N-RW32<br>CPCD20/25N-RW32<br>CPCD30/35N-RW32 | CPCD20/25N-RW33<br>CPCD20/25N-RW33B<br>CPCD20/25N-RW33M<br>CPCD30/35N-RW33<br>CPCD30/35N-RW33B<br>CPCD30/35N-RW33M |

Specifications, structure and maintenance methods for engine see ENGINE MAINTENANCE MANUAL.
Specifications, structure and maintenance methods for model TD27AA engine see 《KEY COMPONENTS IMPORTED FROM NISSAN SERVICE MANUAL》.

Check value of end gas after maintaining engine, and the value must be according to following figure:

| **Engine power (kW)** | CO (g/kW•h) | HC (g/kW•h) | $NO_2$ (g/kW•h) | PT(particle) (g/kW•h) |
|---|---|---|---|---|
| 18≦P<37 | 5.5 | 1.5 | 8 | 0.8 |
| 37≦P<75 | 5 | 1.3 | 7 | 0.4 |

# 2. NISSAN K21、K25 gasoline

## 2.1 Specification

| Specification | | | | Gasoline | |
|---|---|---|---|---|---|
| Model | | | | K21 | K25 |
| Type | | | | Water cooled, four cycle, in-line overhead valve type | |
| Cylinder: No. —stroke mm | | | | 4 — 89 | 4 — 89 |
| Displacement L | | | | 1.982 | 2.472 |
| Direction of rotation | | | | Clockwise cooling fan | |
| Firing order | | | | 1-3-4-2 | |
| Valve clearance mm | | | Intake(Hot) | 0.38 | |
| | | | Exhaust(Hot) | 0.38 | |
| Cooling System | | | | Water-cooled, forced circulation | |
| Lubrication System | | | | Forced Lubrication | |
| Main component | | Carburetor model | | 210030-41 | 210030-42 |
| | | Fuel pump | | Film-type | |
| | | Air clear | | Paper element | |
| | | Oil pump | | Gear type | |
| | | Oil filter | | Paper element | |
| | | Water pump | | Centrifugal | |
| | | Thermostat | | Wax-pellet type | |
| | | Standard clearance of switchboard | | 0．35-0．45 | |
| | | Spark plug | Type | FR2A-D | |
| | | | Plug gap(mm) | 0.8～0.9 | |
| | Generator | | Type | A7T03371 | |
| | | | Voltage V | 12 | |
| | | | current A | 35 | |
| | Starter | | Type | M000T65381 (Planetary gear type) | |
| | | | Voltage V | 12 | |
| | | | Output power kW | 1.2 | |
| | Governor | | Type | Pneumatic | |
| | | | Speed control system | By controlling mix. tare amount | |
| | | | Operation of control mechanizing | By suction negative pressure | |
| | | | Max. Engine speed under no-laden | 3600 r/min | |
| | | | Max. Engine speed under laden | 3000 r/min | |
| | Battery | | Type | / | |
| | | | Capacity V-A·h | 12-60 | |
| | | | Full charge specific gravity at $20^0$C | 1.28 | |
| Reference data | Engine oil capacity L | | | 3.7 | |
| | Coolant volume L | | | 3.5 | |

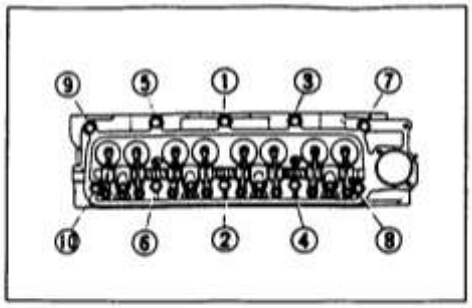
## 2.2K21/K25 Maintenance

### 2.2.1 Retighten cylinder head bolts

When the engine is cold, retighten should be made in the sequence shown.

·T: 68.6 N·m

·In two steps.




### 2.2.2 Adjusting intake and exhaust valve clearance

1） Start engines and warm it up sufficiently.

Then turn off engine.

2） Remove valve rocker cover.

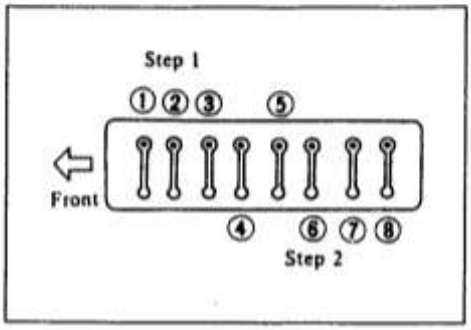
3） Rotate crankshaft.

Set No.1 cylinder in top dead center on its compression stroke and then adjust valve clearance.

① ② ③ ⑤

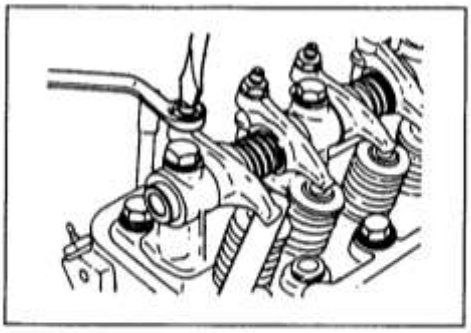
Set NO.4 cylinder in top dead center on its compression stroke, and adjust valve clearance.

④ ⑥ ⑦ ⑧




Valve clearance (Hot)

Intake & exhaust: 0.38mm



### 2.2.3. Checking and Adjusting Fan Belt for Tension

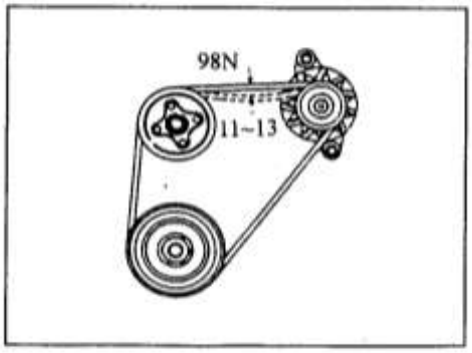
1） Visually inspect for cracks, fraying, wear or lubricity.

The belt should not touch the bottom of the pulley groove.

2） Check belt deflection by pushing midway between pulleys.

Fan belt deflection:11mm～13mm

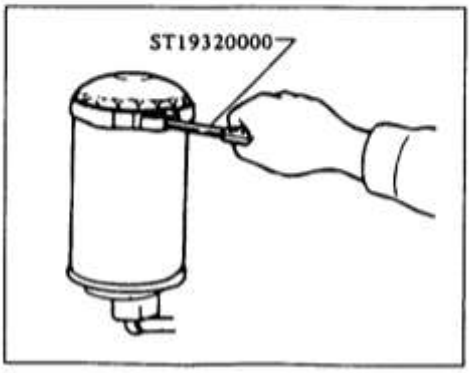
Pushing force:：98N




### 2.2.4. Changing engine oil and oil filter

1) Start engine and warm up engine sufficiently, then stop engine.

2) Remove oil filler cap and oil pan drain plug, and allow oil to drain.



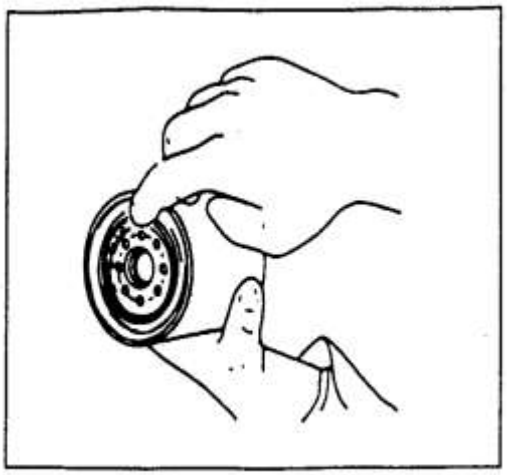

**⚠ WARNING:**

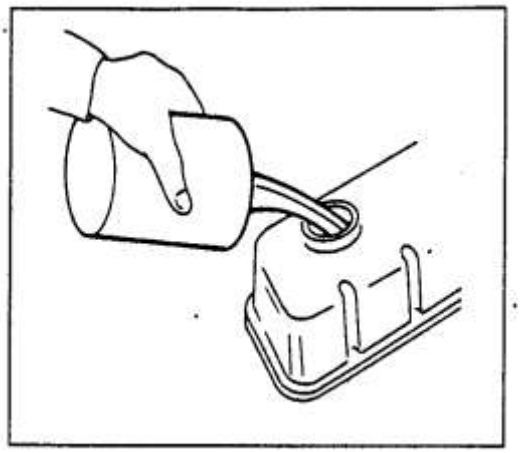
Be careful not to burn yourself, as the engine oil may be hot.

• Milky oil indicates the presence of cooling water and finds the cause, takes corrective measure.

• Oil with extremely low viscosity indicates dilution with gasoline.

3) Clean and install oil pan drain plug with washer.
Oil pan drain plug: 29N·m～39N·m
4) Using tool remove oil filter.
5) Wipe oil filter mounting surface with a clean rag.
6) Smear a little engine oil on rubber gasket of new oil filter.
7) Install new oil filter. Hand-tighten ONLY.
Don't use a wrench to tighten the filter.
8) Refill engine with new recommended engine oil, referring to Recommended Lubricants.
Check oil level with dipstick.
Oil capacity: 3.6 L。
9) Start engine, check area around drain plug and oil filter for any sign of oil leakage.
If any Leakage is evident, these parts have not been properly installed.
10) Warm up engine sufficiently.
Then stop engine and wait a few minutes. Check oil level. If necessary, add engine oil.
When checking oil level, park the forklift on a level surface.

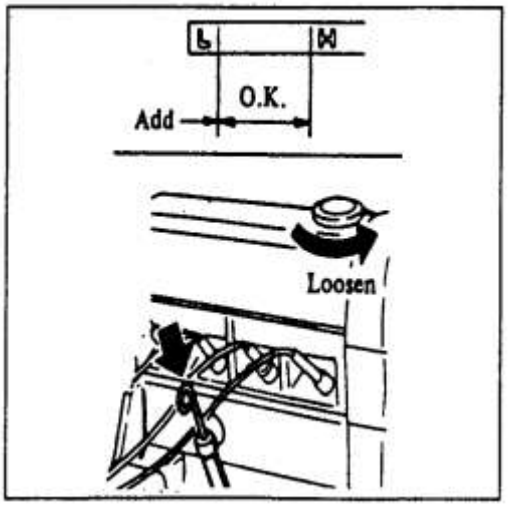




### 2.2.5. Changing Engine Coolant

**⚠ WARNING:**

To avoid the danger of being scalded, never attempt to change the coolant when the engine is hot. When using anti-freeze coolant, mix the anti-freeze coolant with water.




### 2.2.6. Cleaning Radiator Outside

Clean outside of radiator with dry compressed air.

### 2.2.7. Checking cooling System, Hoses and Connections.

Check hoses and fittings for Lose connections or deterioration.
Retighten or replace if necessary.