

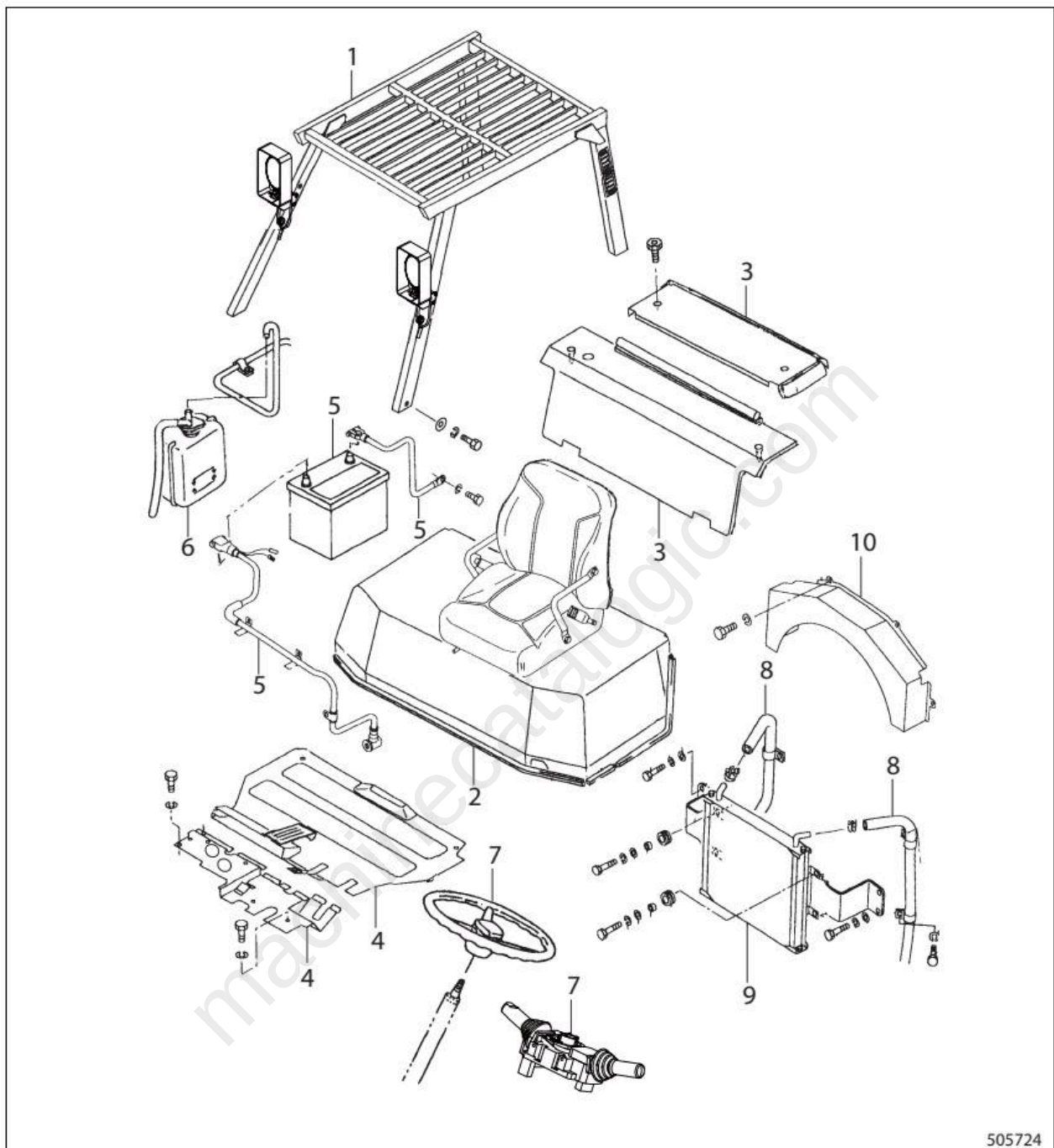


# Service Manual

## Chassis & Mast

|                  |                |
|------------------|----------------|
| <b>GC35K</b>     | AT87B-00001-up |
| <b>GC40K</b>     | AT87B-00001-up |
| <b>GC40K STR</b> | AT87B-00001-up |
| <b>GC45K SWB</b> | AT87B-00001-up |
| <b>GC45K STR</b> | AT87B-00001-up |
| <b>GC55K</b>     | AT88B-00001-up |
| <b>GC55K STR</b> | AT88B-00001-up |
| <b>GC60K</b>     | AT89B-00001-up |
| <b>GC70K</b>     | AT89B-00001-up |
| <b>GC70K STR</b> | AT89B-00001-up |

## 4.2 Removal Sequence (1)



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- |                                    |                                                   |
|------------------------------------|---------------------------------------------------|
| 1. Light harnesses, Overhead guard | 6. Reserve tank                                   |
| 2. Engine cover, Seat              | 7. Steering wheel, Forward/reverse lever assembly |
| 3. Radiator cover                  | 8. Transmission oil hoses                         |
| 4. Floor plate                     | 9. Transmission oil cooler, Bracket               |
| 5. Battery cable, Battery          | 10. Cowl                                          |

## 10. Inspection and Repair After Disassembling Wheel Brake

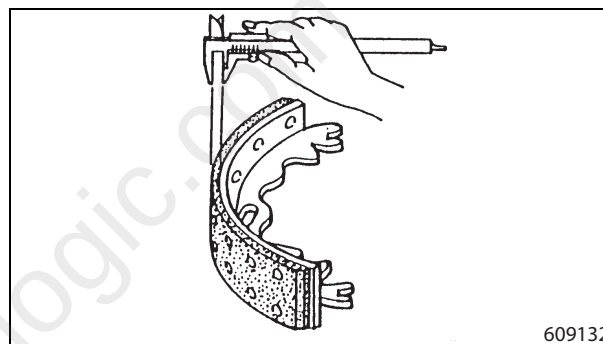
### 10.1 Backing Plate

- (1) Check the backing plate for cracks.
- (2) Check the tightening torque of mounting bolts.

| Item                     | Tightening torque                                                   |
|--------------------------|---------------------------------------------------------------------|
| Check the mounting bolts | 238.3 to 284.3 N·m<br>(24.3 to 29.3 kgf·m)<br>[53.5 to 63.9 lbf·ft] |

### 10.2 Shoe and Lining Assembly

- (1) Check the lining and shoe for cracks or breakage.
- (2) Replace the lining if severely stained with oil, burned, or deteriorated.
- (3) Check the lining thickness. If the thickness exceeds the service limit, replace the lining.



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| Item             | Standard value   | Repair limit      |
|------------------|------------------|-------------------|
| Lining thickness | 10 mm (0.39 in.) | 4.2 mm (0.16 in.) |

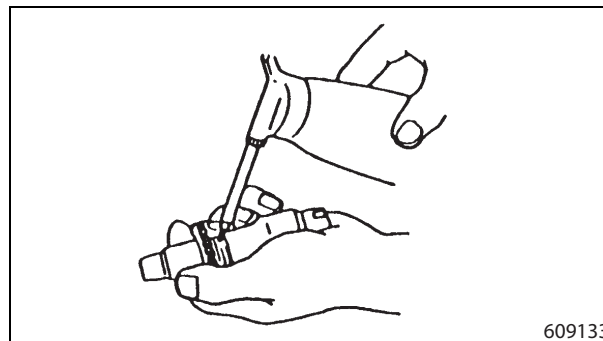
### 10.3 Brake Drums

If uneven wear or damage is found inside each brake drum, grind, and repair.

| Item                         | Standard value                                 | Repair limit or Service limit |
|------------------------------|------------------------------------------------|-------------------------------|
| Brake drum internal diameter | $317.5^{+0.2}_0$ mm ( $12.500^{+0.008}_0$ in.) | 318.5 mm (12.539 in.)         |

### 10.4 Adjusting Screw

Check for wear on wheel teeth. Also check if the wheel rotates smoothly.

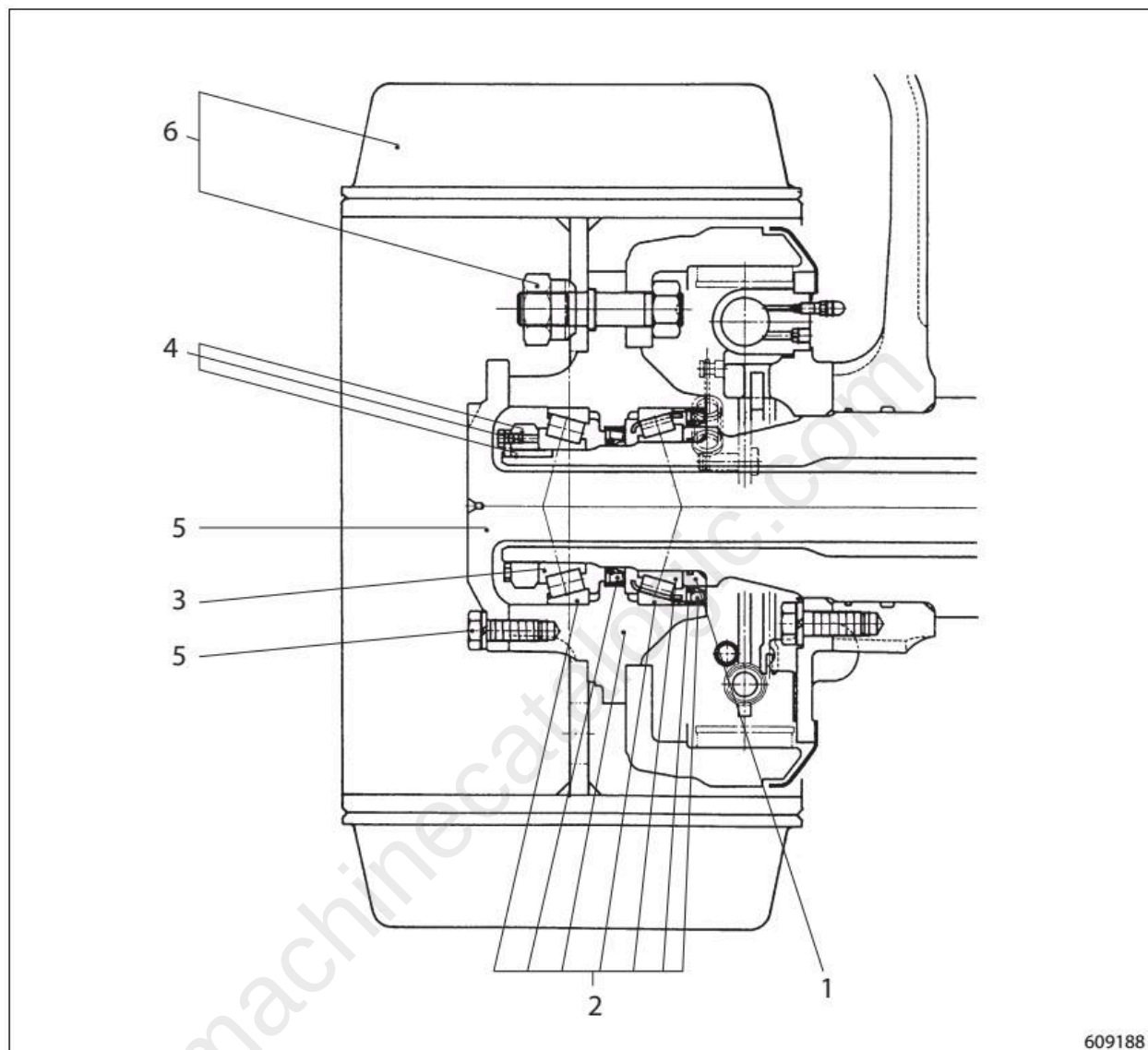


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| Without spring washer    |                   |                                                                                             |       |        |                                                                                             |        |        |                                                                                               |       |        |
|--------------------------|-------------------|---------------------------------------------------------------------------------------------|-------|--------|---------------------------------------------------------------------------------------------|--------|--------|-----------------------------------------------------------------------------------------------|-------|--------|
| Nominal size<br>mm (in.) | Pitch<br>mm (in.) | <br>500247 |       |        | <br>500248 |        |        | <br>500249 |       |        |
|                          |                   | N·m                                                                                         | kgf·m | lbf·ft | N·m                                                                                         | kgf·m  | lbf·ft | N·m                                                                                           | kgf·m | lbf·ft |
| 10 (0.39)                | 1.5 (0.06)        | 39.2                                                                                        | 4.0   | 28.9   | 51.0                                                                                        | 5.2    | 37.6   | 79.4                                                                                          | 8.1   | 58.6   |
| 12 (0.47)                | 1.75 (0.07)       | 69.6                                                                                        | 7.1   | 51.4   | 90.2                                                                                        | 9.2    | 66.5   | 135.3                                                                                         | 13.8  | 99.8   |
| 14 (0.55)                | 2 (0.08)          | 112.8                                                                                       | 11.5  | 83.2   | 146.1                                                                                       | 14.9   | 107.8  | 215.7                                                                                         | 22.0  | 159.1  |
| 16 (0.63)                | 2 (0.08)          | 172.6                                                                                       | 17.6  | 127.3  | 224.6                                                                                       | 22.9   | 165.6  | 323.6                                                                                         | 33.0  | 238.7  |
| 18 (0.71)                | 2.5 (0.10)        | 239.3                                                                                       | 24.4  | 176.5  | 311.9                                                                                       | 31.8   | 230.0  | 451.1                                                                                         | 46.0  | 332.7  |
| 20 (0.79)                | 2.5 (0.10)        | 336.4                                                                                       | 34.3  | 248.1  | 437.4                                                                                       | 44.6   | 322.6  | 630.6                                                                                         | 64.3  | 465.1  |
| 22 (0.87)                | 2.5 (0.10)        | 392.3                                                                                       | 40.0  | 289.3  | 587.4                                                                                       | 59.9   | 433.3  | 842.4                                                                                         | 85.9  | 621.3  |
| 24 (0.95)                | 3 (0.12)          | 578.6                                                                                       | 59.0  | 426.7  | 753.2                                                                                       | 76.8   | 555.5  | 1088.5                                                                                        | 111.0 | 802.9  |
| 27 (1.06)                | 3 (0.12)          | 852.2                                                                                       | 86.9  | 628.5  | 1108.2                                                                                      | 113.0  | 817.3  | 1588.7                                                                                        | 162.0 | 1771.7 |
| 30 (1.18)                | 3.5 (0.14)        | 1140.5                                                                                      | 116.3 | 841.2  | 1481.8                                                                                      | 151.1  | 1092.9 | 2168.3                                                                                        | 221.1 | 1599.2 |
| 33 (1.30)                | 3.5 (0.14)        | 1563.2                                                                                      | 159.4 | 1153.0 | 2031.9                                                                                      | 207.2  | 1498.7 | 2915.5                                                                                        | 297.3 | 2150.4 |
| 36 (1.42)                | 4 (0.16)          | 1972.1                                                                                      | 201.1 | 1454.6 | 2564.4                                                                                      | 261.5  | 1891.4 | 3765.8                                                                                        | 384.0 | 2777.5 |
| 39 (1.54)                | 4 (0.16)          | 2610.5                                                                                      | 266.2 | 1925.4 | 3393.1                                                                                      | 3469.0 | 2502.6 | 4845.5                                                                                        | 494.1 | 3573.8 |
| 42 (16.5)                | 4.5 (0.18)        | 3241.1                                                                                      | 330.5 | 2390.5 | 4212.9                                                                                      | 429.6  | 3107.3 | 6044.8                                                                                        | 616.4 | 4458.4 |

## 10. Assembling Axle Shaft and Hub

### 10.1 Assembly Sequence



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- |                                                                                                                    |                                    |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 1. Retainer, O-ring                                                                                                | 3. Taper roller bearing (inner)    |
| 2. Front hub drum assembly<br>Taper roller bearing (outer), Oil seal,<br>Taper roller bearing, Spacer and Oil seal | 4. Locknut, Lock washer, Bolt      |
|                                                                                                                    | 5. Axle shaft, Bolt, Spring washer |
|                                                                                                                    | 6. Front tire, Wheel nut           |

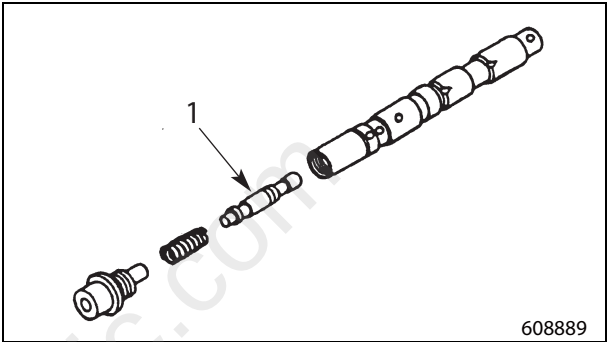
### 13. Inspection After Disassembling Control Valve

#### 13.1 Sections, Spools, and Return Springs

- (1) Check each sliding surface for cracks and defects. Also, check the check-valve seat for wear.
- (2) Check the spool for burn and distortion.  
Also, check for operating force.

| Item                  | Value                                     |
|-----------------------|-------------------------------------------|
| Spool operating force | 177 to 216N (18 to 22 kgf) [40 to 49 lbf] |

- (3) Check the tilt lock valve for damaged or sticking valve.



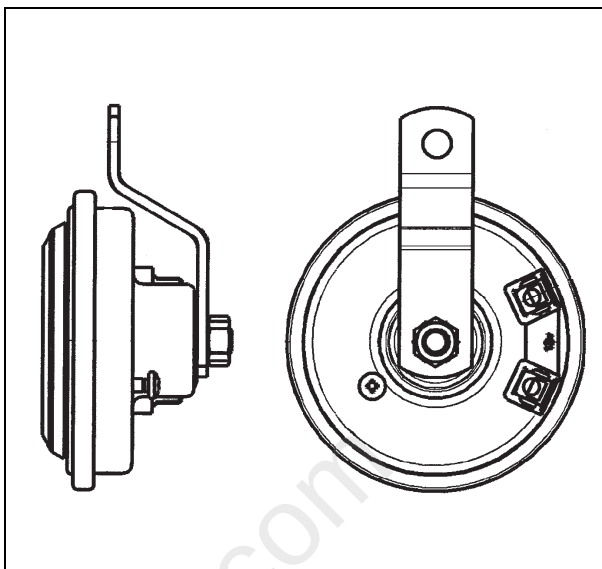
1. Tilt lock valve

## 5.4 Horn

Check that the horn sounds when applying the specified voltage to both terminals of the horn.

Replace the horn with a new one if it does not sound or its sound is abnormal.

Operating voltage: 9V to 16 V

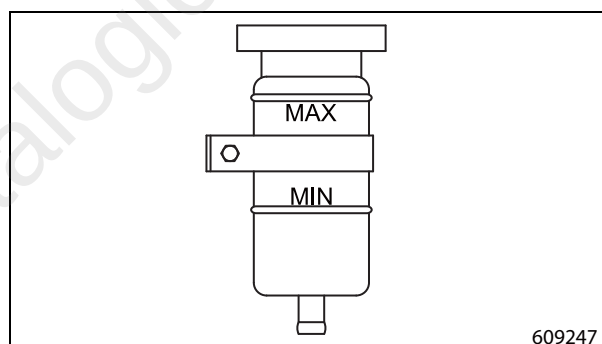


## 5.5 Reserve Tank

This reserve tank is equipped with LPG empty indicator switch.

Volume: Maximum 150 cc (9.2 cu. in.) / Minimum 50 cc (3.1 cu. in.)

Note: LPG empty indicator light glows when the brake fluid level reaches the minimum level.

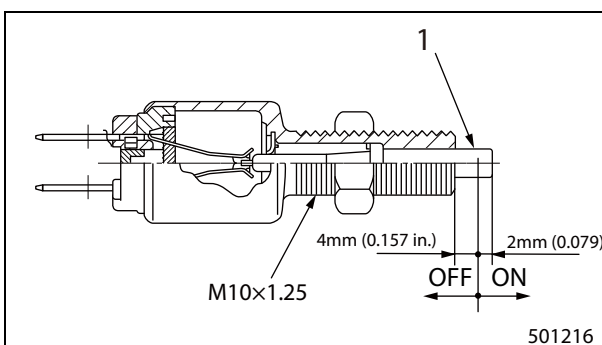


## 5.6 Stop Light Switch

Connect a tester across the terminals and check that the lights turn ON and OFF when the amount of the push rod extended projection is within the specified value.

Measure the insulation resistance value across the terminals when the push rod is pushed in.

Replace the switch if the measured insulation resistance value is less than the value listed below:



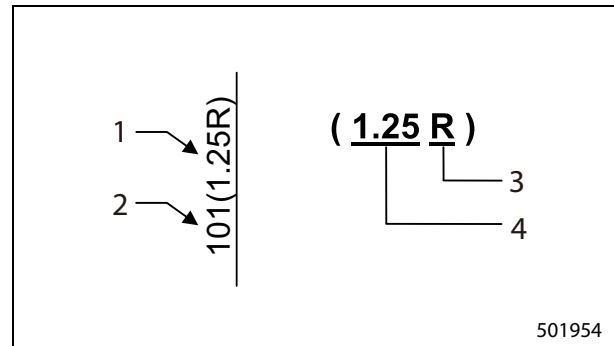
1. Push rod

| Item                  | Limit value                                            |
|-----------------------|--------------------------------------------------------|
| Insulation resistance | 1 M ohm or more with 500V insulation resistance tester |

Rated voltage: DC12V

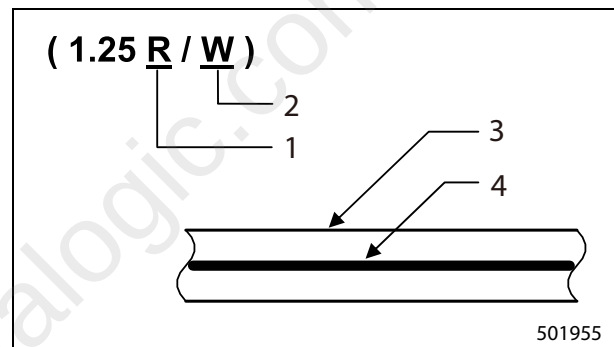
## 2.3 Connecting Lines

- (1) There are two thicknesses of the line which connect between elements in the circuit diagram. Each line is used as follows:
- Thick line: Connecting lines for the electric wires size of  $20 \text{ mm}^2$  ( $0.78 \text{ in}^2$ ) or above.
  - Thin line: All other connecting lines except the above.
- (2) Connecting lines are represented by the circuit number, wire diameter and wire color. For the connecting lines of  $0.5 \text{ mm}^2$  ( $0.02 \text{ in}^2$ ) wire size, the wire diameter is omitted.



1. Wire diameter, wire color  
2. Circuit number  
3. Wire color  
4. Wire diameter

- (3) Here are two types of wires: the one having only one color and the one having a colored stripe (combination of two colors).



1. Base color  
2. Stripe color  
3. Base color  
4. Stripe color

### Color codes

| Symbol | Color  | Symbol | Color       | Symbol | Color    |
|--------|--------|--------|-------------|--------|----------|
| B      | Black  | Br     | Brown       | P      | Pink     |
| W      | White  | L      | Blue        | Sb     | Sky blue |
| R      | Red    | Lg     | Light green | V      | Purple   |
| G      | Green  | O      | Orange      |        |          |
| Y      | Yellow | Gr     | Gray        |        |          |



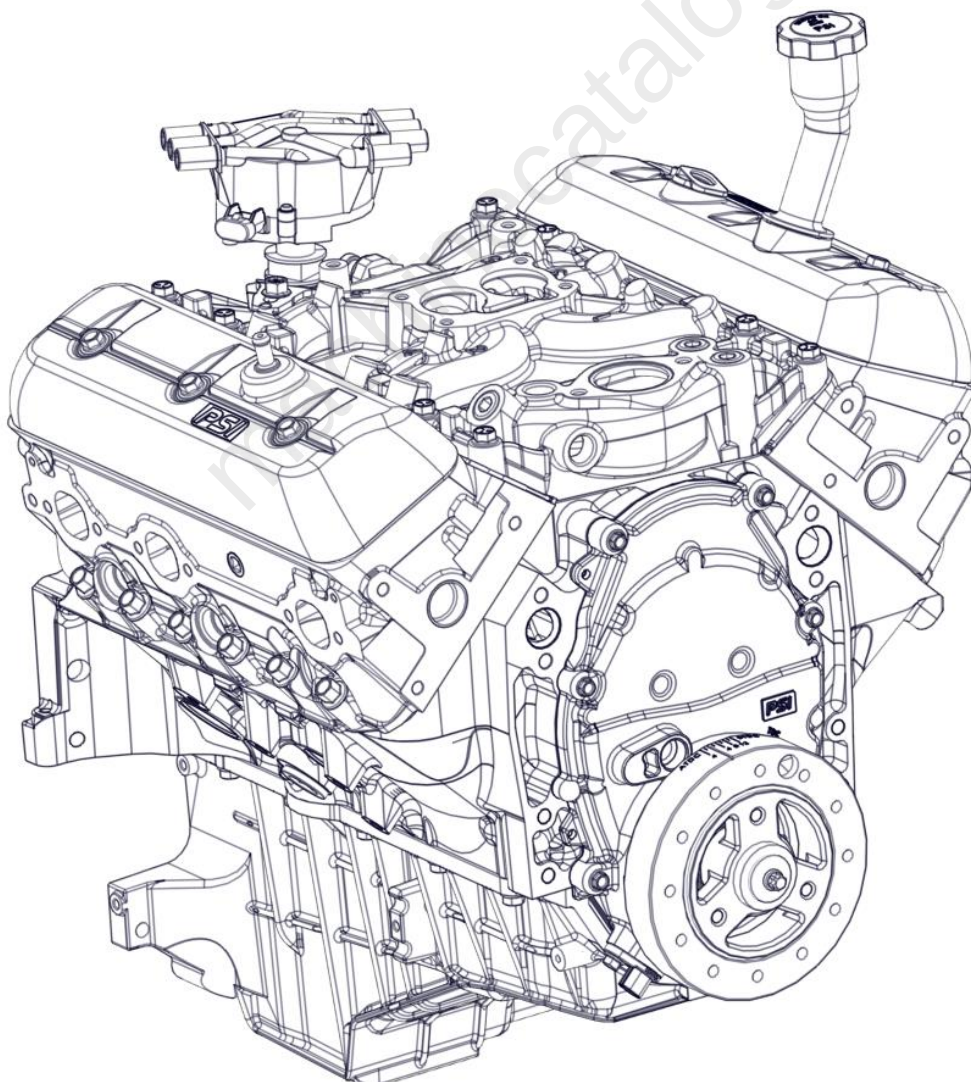
# FOREWORD

This service manual describes the specifications, maintenance, and service procedures for 4X LPG Engine of Mitsubishi Forklift Trucks.

To maintain the performance of the engine for many years and to ensure safe operation, it is important to use the engine correctly and conduct regular inspection and maintenance, and also to take necessary measures which involves the disassembly, inspection, repair, and assembly of the engine and engine parts.

Read this manual carefully and understand the work procedures fully before disassembling, inspecting, repairing, or assembling the engine.

The contents of this manual are based on the engine models that are being produced at the time of publication. Due to improvements made thereafter, the actual engine that you work on may differ partially from the one described in this manual.



## Full Version Available

### Caterpillar GC70K Forklift Engine Service and Schematic Manual (99739-82110)

Caterpillar GC70K forklift service manual, covers engine repair, testing, schematics, and service data. Searchable PDF download.

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