

# Shop Manual Supplement

# PC400-6 P400LC-6 PC450-6 PC450LC-6 HYDRAULIC EXCAVATOR

|                       |                  |              |               |
|-----------------------|------------------|--------------|---------------|
| <b>SERIAL NUMBERS</b> | <b>PC400-6</b>   | <b>32488</b> | <b>and up</b> |
|                       | <b>PC400LC-6</b> | <b>32488</b> | <b>and up</b> |
|                       | <b>PC450-6</b>   | <b>12629</b> | <b>and up</b> |
|                       | <b>PC450LC-6</b> | <b>12629</b> | <b>and up</b> |

- This manual contains only information related to the PC400 Serial No. 32488 and up, and PC450 Serial No. 12629 and up. For other information, see the PC400, 450 Shop Manual SEBM014506.
- PC400, 450-6 mount the SAA6D125E-2 engine.  
For details of the engine, see the 125-2 Series Engine Shop Manual.

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**SPECIFICATIONS****BACK HOE****PC400, 400LC-6**

| Machine model                                 |                |   | PC400-6                  | PC400LC-6                |                         |
|---|----------------|---|--------------------------|--------------------------|-------------------------|
| Serial number                                 |                |   | 32488 and up             | 32488 and up             |                         |
| Bucket capacity                               |                | m <sup>3</sup>  | 1.8                      | 1.8                      |                         |
| Operating weight                              |                | kg  | 41,400                   | 42,600                   |                         |
| Performance                                   | Working ranges | Max. digging depth                                      | mm                       | 7,760                    | 7,760                   |
|   |                | Max. vertical wall depth                                | mm                       | 6,850                    | 6,850                   |
|   |                | Max. digging reach                                      | mm                       | 12,020                   | 12,020                  |
|   |                | Max. reach at ground level                              | mm                       | 11,810                   | 11,810                  |
|   |                | Max. digging height                                     | mm                       | 10,920                   | 10,920                  |
|   |                | Max. dumping height                                     | mm                       | 7,570                    | 7,570                   |
|   |                | Max. digging force (using power max. function)          | kN{kg}                   | 224.7 {22,900}           | 224.7 {22,900}          |
|   |                | Swing speed   | rpm                      | 9.3                      | 9.3                     |
|   |                | Swing max. slope angle                                  | deg.                     | 20.0                     | 20.0                    |
|   |                | Travel speed  | km/h                     | Lo: 3.2 Mi: 4.5 Hi: 5.5  | Lo: 3.2 Mi: 4.5 Hi: 5.5 |
|   |                | Gradeability  | deg.                     | 35                       | 35                      |
|   |                | Ground pressure<br>[standard triple grouser shoe width] | kPa{kg/cm <sup>2</sup> } | 77.42 {0.79}<br>[600 mm] | 63.7 {0.65}<br>[700 mm] |
|   | Dimensions     | Overall length (for transport)                          |                          | mm                       | 11,835                  |
| Overall width                                 |                | mm  | 3,340                    | 3,340                    |                         |
| Overall width of track                        |                | mm  | 3,340                    | 3,340                    |                         |
| Overall height (for transport)                |                | mm  | 3,635                    | 3,635                    |                         |
| Overall height to top of cab                  |                | mm  | 3,265                    | 3,265                    |                         |
| Ground clearance of counterweight             |                | mm  | 1,320                    | 1,320                    |                         |
| Min. ground clearance                         |                | mm  | 554                      | 554                      |                         |
| Tail swing radius                             |                | mm  | 3,500                    | 3,500                    |                         |
| Min. swing radius of work equipment           |                | mm  | 4,770                    | 4,770                    |                         |
| Height of work equipment at min. swing radius |                | mm  | 9,200                    | 9,200                    |                         |
| Length of track on ground                     |                | mm  | 4,020                    | 4,350                    |                         |
| Track gauge                                   |                | mm  | 2,740                    | 2,740                    |                         |
| Height of machine cab                         |                | mm  | 2,715                    | 2,715                    |                         |


| Machine model              |                                  | PC400-6  | PC400LC-6  |                           |                      |                      |
|----------------------------|----------------------------------|--|--|---------------------------|----------------------|----------------------|
| Serial number              |                                  | 32488 and up   | 32488 and up   |                           |                      |                      |
| Engine                     | Model                            | SAA6D125E-2  |  |                           |                      |                      |
|                            | Type                             | 4-cycle, water-cooled, in-line, vertical, direct injection, with turbocharger and aftercooler (air cooled) |  |                           |                      |                      |
|                            | No. of cylinders – bore x stroke | mm   | 6 – 125 x 150  |                           |                      |                      |
|                            | Piston displacement              | ℓ {cc}   | 11.040 {11,040}  |                           |                      |                      |
|                            | Performance                      | Flywheel horsepower  | kW/rpm{HP/rpm}   | 228/2,050 {306/2,050}     |                      |                      |
|                            |                                  | Max. torque  | Nm/rpm{kgm/rpm}  | 1,213/1,500 {123.7/1,500} |                      |                      |
|                            |                                  | Max. speed at no load  | rpm  | 2,250                     |                      |                      |
|                            |                                  | Min. speed at no load  | rpm  | 700                       |                      |                      |
|                            |                                  | Min. fuel consumption  | g/kW.h{g/HP.h}   | 208 {155}                 |                      |                      |
|                            | Starting motor                   |  | 24V, 11 kW   |                           |                      |                      |
| Alternator                 |                                  | 24V, 33A   |  |                           |                      |                      |
| Battery                    |                                  | 12V, 150 Ah x 2  |  |                           |                      |                      |
| Radiator core type         |                                  | CWX-5  |  |                           |                      |                      |
| Under-carriage             | Carrier roller                   | 2 on each side   |  |                           |                      |                      |
|                            | Track roller                     | 7 on each side   | 8 on each side   |                           |                      |                      |
|                            | Track shoe                       | Assembly-type triple grouser, 46 on each side  | Assembly-type triple grouser, 49 on each side  |                           |                      |                      |
| Hydraulic system           | Hydraulic pump                   | Type x No.   | HPV160+160, variable displacement piston type x 2  |                           |                      |                      |
|                            |                                  | Delivery   | ℓ/min.   | 326 x 2                   |                      |                      |
|                            |                                  | Set pressure   | MPa{kg/cm <sup>2</sup> }   | 34.8 {355}                |                      |                      |
|                            | Control valve                    | Type x No.   | 6-spool + 1-spool type + 1-service valve x 1   |                           |                      |                      |
|                            |                                  | Control method   | Hydraulic  |                           |                      |                      |
|                            | Hydraulic motor                  | Travel motor   | KMV280ADT, Piston type (with brake valve, shaft brake): x 2                              |                           |                      |                      |
|                            |                                  | Swing motor  | KMF160ABE-3, Piston type (with safety valve, shaft brake, reverse prevention valve): x 1 |                           |                      |                      |
|                            | Hydraulic cylinder               | Type   |  | Boom                      | Arm                  | Bucket               |
|                            |                                  |  |  | Double-acting piston      | Double-acting piston | Double-acting piston |
|                            |                                  | Inside diameter of cylinder  | mm   | 160                       | 185                  | 160                  |
| Diameter of piston rod     |                                  | mm   | 110  | 120                       | 110                  |                      |
| Stroke                     |                                  | mm   | 1,570  | 1,820                     | 1,270                |                      |
| Max. distance between pins |                                  | mm   | 3,830  | 4,410                     | 3,265                |                      |
| Min. distance between pins | mm                               | 2,260  | 2,590  | 1,995                     |                      |                      |
| Hydraulic tank             |                                  | Box-shaped, sealed   |  |                           |                      |                      |
| Hydraulic filter           |                                  | Tank return side   |  |                           |                      |                      |
| Hydraulic cooler           |                                  | Air cooled   |  |                           |                      |                      |

## PC450, 450LC-6

| Machine model                                 |                |   | PC450-6                  | PC450LC-6                |                          |
|---|----------------|---|--------------------------|--------------------------|--------------------------|
| Serial number                                 |                |   | 12629 and up             | 12629 and up             |                          |
| Bucket capacity                               |                | m <sup>3</sup>  | 1.8                      | 1.8                      |                          |
| Operating weight                              |                | kg  | 42,240                   | 43,500                   |                          |
| Performance                                   | Working ranges | Max. digging depth                                      | mm                       | 7,760                    | 7,760                    |
|   |                | Max. vertical wall depth                                | mm                       | 6,850                    | 6,850                    |
|   |                | Max. digging reach                                      | mm                       | 12,020                   | 12,020                   |
|   |                | Max. reach at ground level                              | mm                       | 11,810                   | 11,810                   |
|   |                | Max. digging height                                     | mm                       | 10,920                   | 10,920                   |
|   |                | Max. dumping height                                     | mm                       | 7,570                    | 7,570                    |
|   |                | Max. digging force (using power max. function)          | kN{kg}                   | 224.7 {22,900}           | 224.7 {22,900}           |
|   |                | Swing speed   | rpm                      | 9.3                      | 9.3                      |
|   |                | Swing max. slope angle                                  | deg.                     | 20.0                     | 20.0                     |
|   |                | Travel speed  | km/h                     | Lo: 3.2 Mi: 4.5 Hi: 5.5  | Lo: 3.2 Mi: 4.5 Hi: 5.5  |
|   |                | Gradeability  | deg.                     | 35                       | 35                       |
|   |                | Ground pressure<br>[standard triple grouser shoe width] | kPa{kg/cm <sup>2</sup> } | 79.38 {0.81}<br>[600 mm] | 76.44 {0.78}<br>[600 mm] |
|   | Dimensions     | Overall length (for transport)                          |                          | mm                       | 11,925                   |
| Overall width                                 |                | mm  | 3,430                    | 3,430                    |                          |
| Overall width of track                        |                | mm  | 3,430                    | 3,430                    |                          |
| Overall height (for transport)                |                | mm  | 3,630                    | 3,630                    |                          |
| Overall height to top of cab                  |                | mm  | 3,265                    | 3,265                    |                          |
| Ground clearance of counterweight             |                | mm  | 1,320                    | 1,320                    |                          |
| Min. ground clearance                         |                | mm  | 554                      | 554                      |                          |
| Tail swing radius                             |                | mm  | 3,500                    | 3,500                    |                          |
| Min. swing radius of work equipment           |                | mm  | 4,840                    | 4,840                    |                          |
| Height of work equipment at min. swing radius |                | mm  | 9,300                    | 9,300                    |                          |
| Length of track on ground                     |                | mm  | 4,020                    | 4,350                    |                          |
| Track gauge                                   |                | mm  | 2,740                    | 2,740                    |                          |
| Height of machine cab                         |                | mm  | 2,715                    | 2,715                    |                          |

| Machine model              |                                  | PC450-6  | PC450LC-6  |                           |                      |                      |
|----------------------------|----------------------------------|--|--|---------------------------|----------------------|----------------------|
| Serial number              |                                  | 12629 and up   | 12629 and up   |                           |                      |                      |
| Engine                     | Model                            | SAA6D125E-2  |  |                           |                      |                      |
|                            | Type                             | 4-cycle, water-cooled, in-line, vertical, direct injection, with turbocharger and aftercooler (air cooled) |  |                           |                      |                      |
|                            | No. of cylinders – bore x stroke | mm   | 6 – 125 x 150  |                           |                      |                      |
|                            | Piston displacement              | ℓ {cc}   | 11.040 {11,040}  |                           |                      |                      |
|                            | Performance                      | Flywheel horsepower  | kW/rpm{HP/rpm}   | 228/2,050 {306/2,050}     |                      |                      |
|                            |                                  | Max. torque  | Nm/rpm{kgm/rpm}  | 1,213/1,500 {123.7/1,500} |                      |                      |
|                            |                                  | Max. speed at no load  | rpm  | 2,250                     |                      |                      |
|                            |                                  | Min. speed at no load  | rpm  | 700                       |                      |                      |
|                            |                                  | Min. fuel consumption  | g/kW.h{g/HP.h}   | 208 {155}                 |                      |                      |
|                            | Starting motor                   |  | 24V, 11 kW   |                           |                      |                      |
| Alternator                 |                                  | 24V, 33A   |  |                           |                      |                      |
| Battery                    |                                  | 12V, 150 Ah x 2  |  |                           |                      |                      |
| Radiator core type         |                                  | CWX-5  |  |                           |                      |                      |
| Under-carriage             | Carrier roller                   | 2 on each side   |  |                           |                      |                      |
|                            | Track roller                     | 7 on each side   | 8 on each side   |                           |                      |                      |
|                            | Track shoe                       | Assembly-type triple grouser, 46 on each side  | Assembly-type triple grouser, 49 on each side  |                           |                      |                      |
| Hydraulic system           | Hydraulic pump                   | Type x No.   | HPV160+160, variable displacement piston type x 2  |                           |                      |                      |
|                            |                                  | Delivery   | ℓ/min.   | 326 x 2                   |                      |                      |
|                            |                                  | Set pressure   | MPa{kg/cm <sup>2</sup> }   | 34.8 {355}                |                      |                      |
|                            | Control valve                    | Type x No.   | 6-spool + 1-spool type + 1-service valve x 1   |                           |                      |                      |
|                            |                                  | Control method   | Hydraulic  |                           |                      |                      |
|                            | Hydraulic motor                  | Travel motor   | KMV280ADT, Piston type (with brake valve, shaft brake): x 2                              |                           |                      |                      |
|                            |                                  | Swing motor  | KMF160ABE-3, Piston type (with safety valve, shaft brake, reverse prevention valve): x 1 |                           |                      |                      |
|                            | Hydraulic cylinder               | Type   |  | Boom                      | Arm                  | Bucket               |
|                            |                                  |  |  | Double-acting piston      | Double-acting piston | Double-acting piston |
|                            |                                  | Inside diameter of cylinder  | mm   | 160                       | 185                  | 160                  |
| Diameter of piston rod     |                                  | mm   | 110  | 130                       | 110                  |                      |
| Stroke                     |                                  | mm   | 1,570  | 1,985                     | 1,270                |                      |
| Max. distance between pins |                                  | mm   | 3,830  | 4,740                     | 3,265                |                      |
| Min. distance between pins | mm                               | 2,260  | 2,755  | 1,995                     |                      |                      |
| Hydraulic tank             |                                  | Box-shaped, sealed   |  |                           |                      |                      |
| Hydraulic filter           |                                  | Tank return side   |  |                           |                      |                      |
| Hydraulic cooler           |                                  | Air cooled   |  |                           |                      |                      |

## WEIGHT TABLE

 This weight table is a guide for use when transporting or handling component.

### BACK HOE

#### PC400, 400LC-6

Unit: kg

| Machine model   | PC400-6      | PC400LC-6    |
|---|--------------|--------------|
| Serial number   | 32488 and up | 32488 and up |
| Engine assembly (excl. air aftercooler and piping)    | 1,494        | 1,494        |
| • Engine  | 1,154        | 1,154        |
| • Damper  | 14.7         | 14.7         |
| • Hydraulic pump                                      | 210          | 210          |
| Radiator, oil cooler assembly (incl. aftercooler)     | 206 (224)    | 206 (224)    |
| Hydraulic tank, filter assembly (excl. hydraulic oil) | 254          | 254          |
| Fuel tank (excl. fuel)                                | 231          | 231          |
| Revolving frame                                       | 3,135        | 3,135        |
| Operator's cab  | 287          | 287          |
| Operator's seat                                       | 29           | 29           |
| Counterweight   | 8,890        | 8,890        |
| Swing machinery                                       | 535          | 535          |
| Control valve (standard)                              | 256          | 256          |
| Swing motor   | 82           | 82           |
| Travel motor  | 252 x 2      | 252 x 2      |
| Center swivel joint                                   | 37           | 37           |
| Track frame assembly                                  | 10,895       | 11,040       |
| • Track frame   | 6,604        | 6,604        |
| • Swing circle  | 605          | 605          |
| • Idler   | 235          | 235          |
| • Idler cushion                                       | 365 x 2      | 365 x 2      |
| • Carrier roller                                      | 31 x 4       | 31 x 4       |
| • Track roller  | 73 x 14      | 73 x 16      |
| • Final drive (incl. travel motor)                    | 788 x 2      | 788 x 2      |



Unit: kg

| Machine model                           | PC400-6                    | PC400LC-6                  |
|---|----------------------------|----------------------------|
| Serial number                           | 32488 and up               | 32488 and up               |
| Track shoe assembly                     |                            |                            |
| • Standard triple grouser shoe (600 mm) | 4,410                      | 4,700                      |
| • Standard triple grouser shoe (700 mm) | 4,910                      | 5,150                      |
| • Wide triple grouser shoe (800 mm)     | 5,330                      | 5,600                      |
| • Wide triple grouser shoe ( mm)        | —                          | —                          |
| • Swamp shoe ( mm)                      | —                          | —                          |
| • Flat shoe ( mm)                       | —                          | —                          |
| • Road liner (rubber pad type) ( mm)    | —                          | —                          |
| Boom assembly                           | 3,264                      | 3,264                      |
| Arm assembly                            | 2,120                      | 2,120                      |
| Bucket assembly                         | 1,300                      | 1,300                      |
| Boom cylinder assembly                  | 400 x 2                    | 400 x 2                    |
| Arm cylinder assembly                   | 580                        | 580                        |
| Bucket cylinder assembly                | 345                        | 345                        |
| Link assembly (large)                   | 397                        | 397                        |
| Link assembly (small)                   | —                          | —                          |
| Boom pin                                | 93 + 20 x 2 + 73 + 24 + 54 | 93 + 20 x 2 + 73 + 24 + 54 |
| Arm pin                                 | 17 + 24                    | 17 + 24                    |
| Bucket pin                              | 34 x 2                     | 34 x 2                     |
| Link pin                                | 38 x 2                     | 38 x 2                     |

**PC450, 450LC-6**

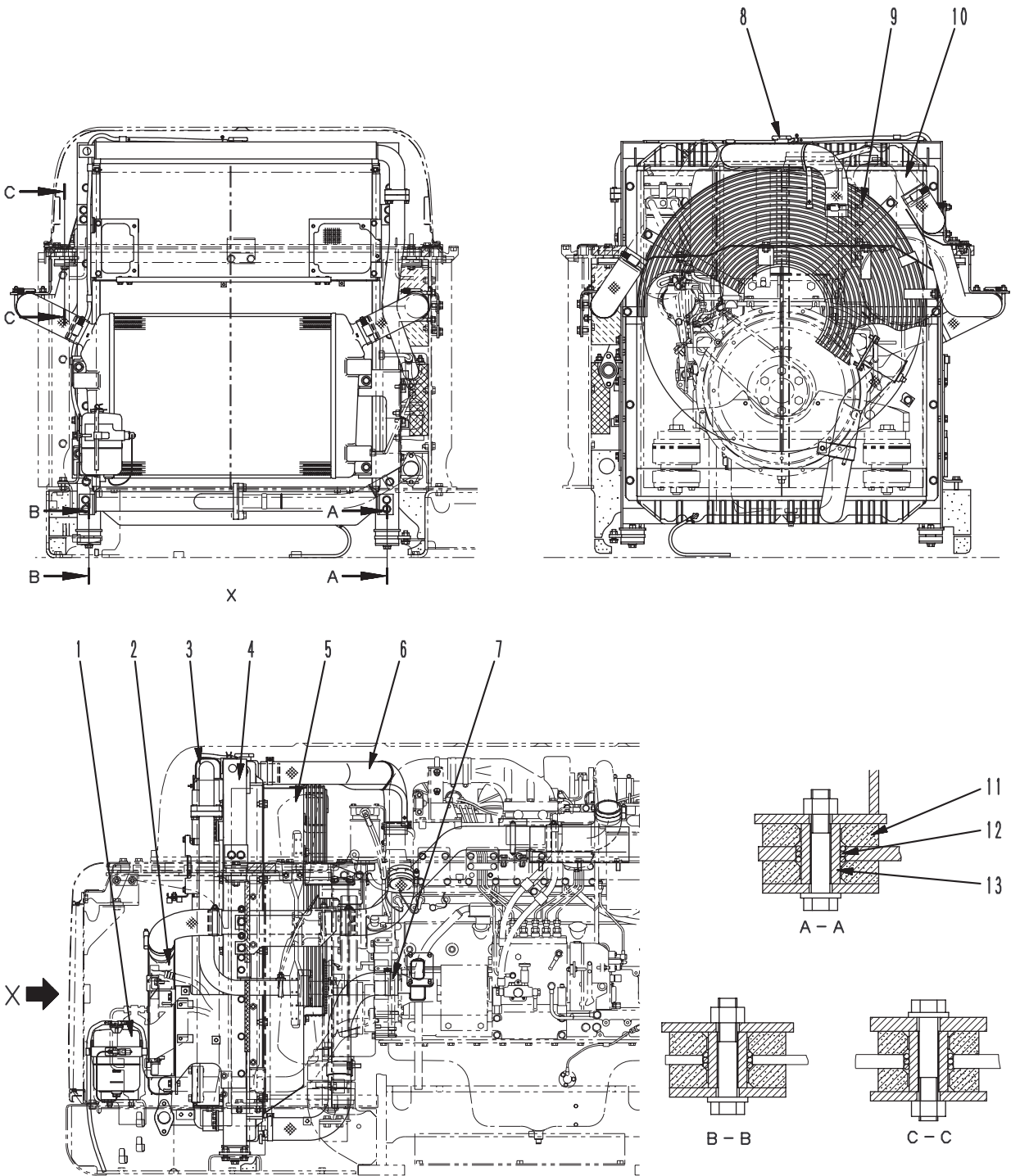
Unit: kg

| Machine model   | PC450-6      | PC450LC-6    |
|---|--------------|--------------|
| Serial number   | 12629 and up | 12629 and up |
| Engine assembly (excl. air aftercooler and piping)    | 1,494        | 1,494        |
| • Engine  | 1,154        | 1,154        |
| • Damper  | 14.7         | 14.7         |
| • Hydraulic pump                                      | 210          | 210          |
| Radiator, oil cooler assembly (incl. aftercooler)     | 206 (224)    | 206 (224)    |
| Hydraulic tank, filter assembly (excl. hydraulic oil) | 254          | 254          |
| Fuel tank (excl. fuel)                                | 231          | 231          |
| Revolving frame                                       | 3,269        | 3,269        |
| Operator's cab  | 287          | 287          |
| Operator's seat                                       | 29           | 29           |
| Counterweight   | 8,890        | 8,890        |
| Swing machinery                                       | 535          | 535          |
| Control valve (standard)                              | 256          | 256          |
| Swing motor   | 82           | 82           |
| Travel motor  | 252 x 2      | 252 x 2      |
| Center swivel joint                                   | 37           | 37           |
| Track frame assembly                                  | 11,100       | 11,245       |
| • Track frame   | 6,811        | 6,811        |
| • Swing circle  | 605          | 605          |
| • Idler   | 235          | 235          |
| • Idler cushion                                       | 365 x 2      | 365 x 2      |
| • Carrier roller                                      | 31 x 4       | 31 x 4       |
| • Track roller  | 73 x 14      | 73 x 16      |
| • Final drive (incl. travel motor)                    | 788 x 2      | 788 x 2      |

Unit: kg

| Machine model                           | PC450-6                    | PC450LC-6                  |
|---|----------------------------|----------------------------|
| Serial number                           | 12629 and up               | 12629 and up               |
| Track shoe assembly                     |                            |                            |
| • Standard triple grouser shoe (600 mm) | 4,410                      | 4,700                      |
| • Standard triple grouser shoe (700 mm) | 4,910                      | 5,150                      |
| • Wide triple grouser shoe ( mm)        | —                          | —                          |
| • Wide triple grouser shoe ( mm)        | —                          | —                          |
| • Swamp shoe ( mm)                      | —                          | —                          |
| • Flat shoe ( mm)                       | —                          | —                          |
| • Road liner (rubber pad type) ( mm)    | —                          | —                          |
| Boom assembly                           | 3,450                      | 3,450                      |
| Arm assembly                            | 2,295                      | 2,295                      |
| Bucket assembly                         | 1,690                      | 1,690                      |
| Boom cylinder assembly                  | 400 x 2                    | 400 x 2                    |
| Arm cylinder assembly                   | 627                        | 627                        |
| Bucket cylinder assembly                | 345                        | 345                        |
| Link assembly (large)                   | 397                        | 397                        |
| Link assembly (small)                   | —                          | —                          |
| Boom pin                                | 93 + 20 x 2 + 73 + 24 + 54 | 93 + 20 x 2 + 73 + 24 + 54 |
| Arm pin                                 | 17 + 24                    | 17 + 24                    |
| Bucket pin                              | 34 x 2                     | 34 x 2                     |
| Link pin                                | 38 x 2                     | 38 x 2                     |

# RADIATOR, OIL COOLER

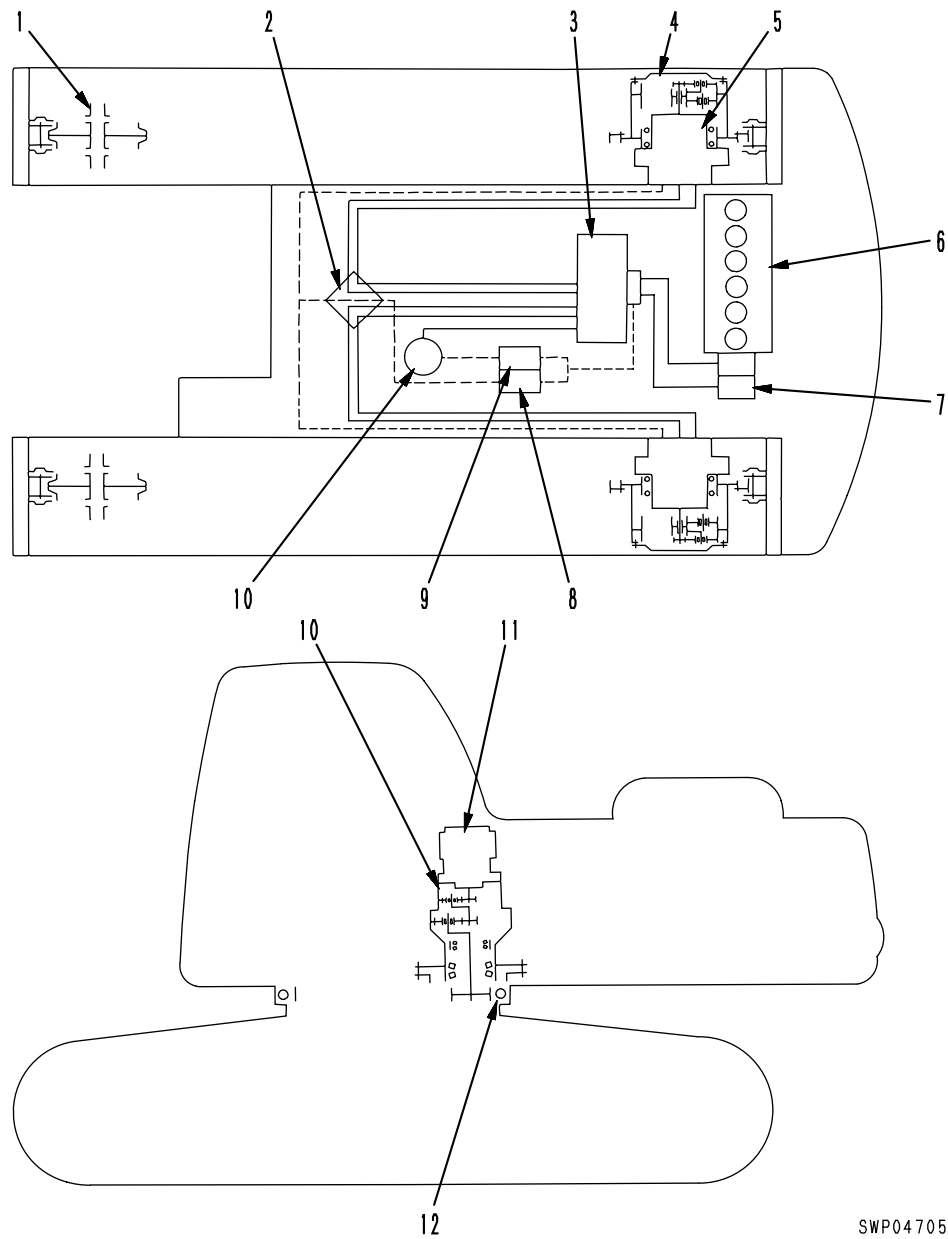


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- |                         |                 |
|-------------------------|-----------------|
| 1. Reservoir tank       | 8. Radiator cap |
| 2. Aftercooler          | 9. Net          |
| 3. Oil cooler           | 10. Shroud      |
| 4. Radiator             | 11. Cushion     |
| 5. Fan                  | 12. O-ring      |
| 6. Radiator inlet hose  | 13. Collar      |
| 7. Radiator outlet hose |                 |

**Specifications**  
 Radiator: CWX-5  
 Oil cooler: J-4

POWER TRAIN



SWP04705

- |                             |                                |
|-----------------------------|--------------------------------|
| 1. Idler                    | 7. Hydraulic pump (HPV160+160) |
| 2. Center swivel joint      | 8. Travel speed solenoid valve |
| 3. Control valve            | 9. Swing brake solenoid valve  |
| 4. Final drive              | 10. Swing machinery            |
| 5. Travel motor (KMV280ADT) | 11. Swing motor (KMF160ABE-3)  |
| 6. Engine (SAA6D125E-2)     | 12. Swing circle               |

## STANDARD VALUE TABLE FOR ENGINE RELATED PARTS

| Applicable model                     |  |  | PC400, 450-6                   |                     |                       |           |
|--------------------------------------|--|--|--------------------------------|---------------------|-----------------------|-----------|
| Engine                               |  |  | SAA6D125E-2                    |                     |                       |           |
| Item                                 | Measurement conditions   | Unit   | Standard value for new machine | Service limit value |                       |           |
| Engine speed                         | High idling (Active mode)  | rpm  | 2,250 ± 70                     | 2,250 ± 70          |                       |           |
|                                      | Low idling   |  | 700                            | 700                 |                       |           |
|                                      | Rated speed (Active mode)  |  | 2,050                          | —                   |                       |           |
| Rated speed                          | Air supply pressure (boost pressure)                               | kPa {mmHg}                                     | Min. 107 {Min. 800}            | 85.3 {640}          |                       |           |
| Exhaust gas color                    | At sudden acceleration   | Bosch index                                    | Max. 5.5                       | 7.5                 |                       |           |
|                                      | At high idling   |  | Max. 1.0                       | 2.0                 |                       |           |
| Valve clearance (normal temperature) | Intake valve   | mm   | 0.34                           | —                   |                       |           |
|                                      | Exhaust valve  |  | 0.71                           | —                   |                       |           |
| Compression pressure (SAE oil)       | Oil temperature: 40 – 60°C   | MPa {kg/cm <sup>2</sup> } (rpm)                | Min. 2.9 {30}                  | 2.0 {20}            |                       |           |
|                                      | (Engine speed)   |  | (150 – 200)                    | (150 – 200)         |                       |           |
| Blowby pressure (SAE oil)            | (Water temperature: Operating range)                               | kPa {mmH <sub>2</sub> O}                       | Max. 0.98 {100}                | 1.96 {200}          |                       |           |
|                                      | At rated output  |  |                                |                     |                       |           |
| Oil pressure                         | (Water temperature: Operating range)                               | kPa {kg/cm <sup>2</sup> }                      | 294 – 490 {3.0 – 5.0}          | 206 {2.1}           |                       |           |
|                                      | At high idling (SAE30)   |  |                                |                     |                       |           |
|                                      | At high idling (SAE10W)  |  |                                |                     | 245 – 441 {2.5 – 4.5} | 176 {1.8} |
|                                      | At low idling (SAE30)  |  |                                |                     | Min. 118 {1.2}        | 69 {0.7}  |
|                                      | At low idling (SAE10W)   |  | Min. 98 {1.0}                  | 69 {0.7}            |                       |           |
| Oil temperature                      | Whole speed range (inside oil pan)                                 | °C   | 80 – 120                       | 120                 |                       |           |
| Fuel injection timing                | Before top dead center   | (degree)                                       | 8.5 – 9.5                      | 8.5 – 9.5           |                       |           |
| Belt tension                         | Deflection when pressed with finger force of approx. 58.8 N {6 kg} | Fan pulley - alternator                        | 8                              | 6 – 10              |                       |           |
|                                      |  | Crankshaft pulley - air conditioner compressor | 15 – 18                        | 15 – 18             |                       |           |

## STANDARD VALUE TABLE FOR ELECTRICAL PARTS

| System                   | Name of component     | Connector No.               | Inspection method  | Judgment table  | Measurement conditions  |   |             |
|--------------------------|-----------------------|-----------------------------|--|---|---|---|-------------|
| Control system           | Fuel control dial     | E06 (male)                  | Measure resistance   | If the condition is within the range shown in the table below, it is normal | 1) Turn starting switch OFF.<br>2) Disconnect connector.  |   |             |
|                          |                       |                             |  | Between (1) – (2)   |   | 0.25 – 7 kΩ   |             |
|                          |                       |                             |  | Between (2) – (3)   |   | 0.25 – 7 kΩ   |             |
|                          | Governor motor        | Potentiometer               | E04 (male)   | Measure resistance  | If the condition is within the range shown in the table below, it is normal                                     | 1) Turn starting switch OFF.<br>2) Disconnect connector.  |             |
|                          |                       |                             |  |   | Between (1) – (2)   |   | 0.25 – 7 kΩ |
|                          |                       |                             |  |   | Between (2) – (3)   |   | 0.25 – 7 kΩ |
|                          | Motor                 | E05 (male)                  | Measure resistance   | If the condition is as shown in the table below, it is normal               | 1) Turn starting switch OFF.<br>2) Disconnect connector.  |   |             |
|                          |                       |                             |  | Between (1) – (2)   |   | 2.5 – 7.5 Ω   |             |
|                          |                       |                             |  | Between (3) – (4)   |   | 2.5 – 7.5 Ω   |             |
|                          |                       |                             |  | Between (1) – (3)   |   | Min. 1 MΩ   |             |
| Between (1) – chassis    |                       |                             |  | Min. 1 MΩ   |   |   |             |
| Engine speed sensor      | E7                    | Measure resistance          | If the condition is within the range shown in the table below, it is normal  | 1) Turn starting switch OFF.<br>2) Disconnect connector.                    |   |   |             |
|                          |                       | Between(male) (1) – (2)     | 500 – 1,000 Ω  |   |   |   |             |
|                          |                       | Between(male) (2) – chassis | Min. 1 MΩ  |   |   |   |             |
| Engine speed sensor      | E7                    | Measure voltage             | Measure with AC range  | 1) Start engine.<br>2) Insert T – adapter.                                  |   |   |             |
|                          |                       | Between (1) – (2)           | 0.5 – 3.0 V  |   |   |   |             |
| Adjust                   | E7                    | Adjust                      | 1) Screw in rotation sensor until it contacts ring gear, then turn back 1 ± 1/6 turns.<br>2) It must work normally when adjusted as above. |   |   |   |             |
|                          |                       | PPC oil pressure switch     | Travel S01<br>boom RAISE S02<br>arm OUT S03<br>boom LOWER S04<br>arm IN S05<br>bucket CURL S06<br>bucket DUMP S07<br>swing S08             | Measure resistance  | If the condition is as shown in the table below, it is normal<br>When boom, arm, and bucket levers are operated | 1) Start engine (or with engine stopped and accumulator charged)<br>2) Disconnect connectors S01 – S08. |             |
| Between (male) (1) – (2) | All levers at neutral | Min. 1 MΩ                   |  |   |   |   |             |
|                          |                       |                             | Levers operated  | Max. 1 Ω  |   |   |             |
|                          |                       |                             | Between (male) (1),(2) - chassis   | Min. 1 MΩ   |   |   |             |

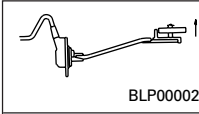
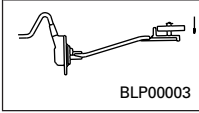
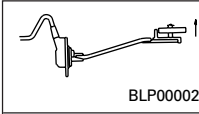
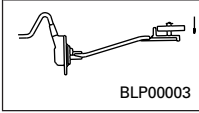
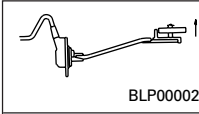
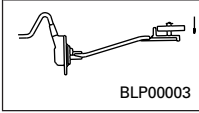
| System   | Name of component    | Connector No.                                 | Inspection method  | Judgment table  | Measurement conditions |                           |                           |  |  |  |             |  |
|--|----------------------|---|--|---|------------------------|---------------------------|---------------------------|--|--|--|-------------|--|
| Control system   | Pump pressure sensor | C07 (male)<br>(rear)<br>C08 (male)<br>(front) | Measure voltage  | If the condition is as shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (2) – (1)</td> <td>18 – 28 V</td> </tr> <tr> <td rowspan="2">Between (3) – (1)</td> <td>All levers at neutral</td> <td>0.5 – 1.5 V</td> </tr> <tr> <td>At arm IN relief</td> <td>3.1 – 4.5 V</td> </tr> </table> | Between (2) – (1)      | 18 – 28 V                 | Between (3) – (1)         | All levers at neutral  | 0.5 – 1.5 V  | At arm IN relief   | 3.1 – 4.5 V | 1) Start engine.<br>2) Turn fuel control dial to MAX position.<br>3) Insert T – adapter. |
|  | Between (2) – (1)    | 18 – 28 V                                     |  |   |                        |                           |                           |  |  |  |             |  |
|  | Between (3) – (1)    | All levers at neutral                         | 0.5 – 1.5 V  |   |                        |                           |                           |  |  |  |             |  |
|  |                      | At arm IN relief                              | 3.1 – 4.5 V  |   |                        |                           |                           |  |  |  |             |  |
|  | Swing lock switch    | X05 (male)                                    | Measure resistance   | If the condition is as shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) – (2)</td> <td rowspan="2">When switch is OFF</td> <td>Min. 1 MΩ</td> </tr> <tr> <td>Between (3) – (4)</td> <td>Max. 1 Ω</td> </tr> </table>   | Between (1) – (2)      | When switch is OFF        | Min. 1 MΩ                 | Between (3) – (4)  | Max. 1 Ω   | 1) Turn starting switch OFF.<br>2) Disconnect connector X05. |             |  |
|  | Between (1) – (2)    | When switch is OFF                            | Min. 1 MΩ  |   |                        |                           |                           |  |  |  |             |  |
|  | Between (3) – (4)    |   | Max. 1 Ω   |   |                        |                           |                           |  |  |  |             |  |
|  | TVC solenoid         | C04 (male)<br>C13 (male)                      | Measure resistance   | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) – (2)</td> <td>10 – 22 Ω</td> </tr> <tr> <td>Between(1), (2) – chassis</td> <td>Min. 1 MΩ</td> </tr> </table>  | Between (1) – (2)      | 10 – 22 Ω                 | Between(1), (2) – chassis | Min. 1 MΩ  | 1) Turn TVC prolix switch OFF.<br>2) Turn starting switch OFF.<br>3) Disconnect connectors C04, C13. |  |             |  |
| Between (1) – (2)  | 10 – 22 Ω            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Between(1), (2) – chassis  | Min. 1 MΩ            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Swing lock solenoid  | V04 (male)           | Measure resistance                            | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) – (2)</td> <td>20 – 60 Ω</td> </tr> <tr> <td>Between(1), (2) – chassis</td> <td>Min. 1 MΩ</td> </tr> </table> | Between (1) – (2)   | 20 – 60 Ω              | Between(1), (2) – chassis | Min. 1 MΩ                 | 1) Turn starting switch OFF.<br>2) Disconnect connector V04. |  |  |             |  |
| Between (1) – (2)  | 20 – 60 Ω            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Between(1), (2) – chassis  | Min. 1 MΩ            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Travel speed solenoid  | V06 (male)           | Measure resistance                            | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) – (2)</td> <td>20 – 60 Ω</td> </tr> <tr> <td>Between(1), (2) – chassis</td> <td>Min. 1 MΩ</td> </tr> </table> | Between (1) – (2)   | 20 – 60 Ω              | Between(1), (2) – chassis | Min. 1 MΩ                 | 1) Turn starting switch OFF.<br>2) Disconnect connector V06. |  |  |             |  |
| Between (1) – (2)  | 20 – 60 Ω            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Between(1), (2) – chassis  | Min. 1 MΩ            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Active boom solenoid   | V02 (male)           | Measure resistance                            | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) – (2)</td> <td>20 – 60 Ω</td> </tr> <tr> <td>Between(1), (2) – chassis</td> <td>Min. 1 MΩ</td> </tr> </table> | Between (1) – (2)   | 20 – 60 Ω              | Between(1), (2) – chassis | Min. 1 MΩ                 | 1) Turn starting switch OFF.<br>2) Disconnect connector V02. |  |  |             |  |
| Between (1) – (2)  | 20 – 60 Ω            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Between(1), (2) – chassis  | Min. 1 MΩ            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Merge/divider solenoid   | V03 (male)           | Measure resistance                            | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) – (2)</td> <td>20 – 60 Ω</td> </tr> <tr> <td>Between(1), (2) – chassis</td> <td>Min. 1 MΩ</td> </tr> </table> | Between (1) – (2)   | 20 – 60 Ω              | Between(1), (2) – chassis | Min. 1 MΩ                 | 1) Turn starting switch OFF.<br>2) Disconnect connector V03. |  |  |             |  |
| Between (1) – (2)  | 20 – 60 Ω            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Between(1), (2) – chassis  | Min. 1 MΩ            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Machine push-up solenoid<br>(When engine throttle, pump controller does not carry out control) | V05 (male)           | Measure resistance                            | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) – (2)</td> <td>20 – 60 Ω</td> </tr> <tr> <td>Between(1), (2) – chassis</td> <td>Min. 1 MΩ</td> </tr> </table> | Between (1) – (2)   | 20 – 60 Ω              | Between(1), (2) – chassis | Min. 1 MΩ                 | 1) Turn starting switch OFF.<br>2) Disconnect connector V05. |  |  |             |  |
| Between (1) – (2)  | 20 – 60 Ω            |   |  |   |                        |                           |                           |  |  |  |             |  |
| Between(1), (2) – chassis  | Min. 1 MΩ            |   |  |   |                        |                           |                           |  |  |  |             |  |

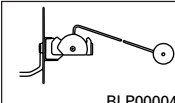
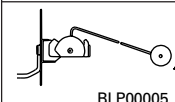
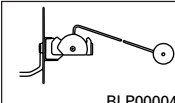
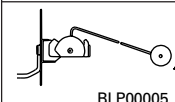
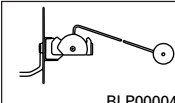
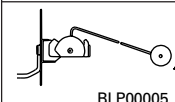
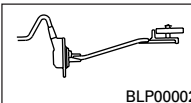
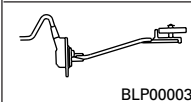
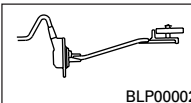
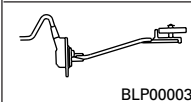
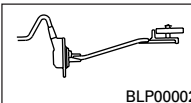
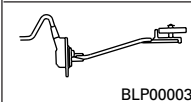
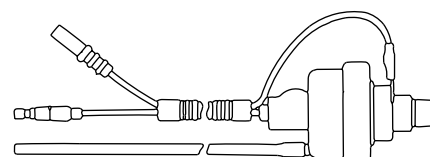


| System   | Name of component                 | Connector No.      | Inspection method  | Judgment table   | Measurement conditions            |   |                                  |  |  |   |   |
|--|-----------------------------------|--------------------|--|--|-----------------------------------|---|----------------------------------|--|--|---|---|
| Control system<br>Engine throttle, pump controller | LS-EPC solenoid                   | C10 (male)         | Measure resistance   | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) - (2)</td> <td>7 - 14 Ω</td> </tr> <tr> <td>Between(1), (2) - chassis</td> <td>Min. 1 MΩ</td> </tr> </table>  | Between (1) - (2)                 | 7 - 14 Ω  | Between(1), (2) - chassis        | Min. 1 MΩ  | 1) Turn starting switch OFF.<br>2) Disconnect connector C10. |   |   |
|  | Between (1) - (2)                 | 7 - 14 Ω           |  |  |                                   |   |                                  |  |  |   |   |
|  | Between(1), (2) - chassis         | Min. 1 MΩ          |  |  |                                   |   |                                  |  |  |   |   |
|  | Power supply                      | C01<br>C02         | Measure voltage  | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between C01 (7),(13) - (6),(12)</td> <td>20 - 30 V</td> </tr> <tr> <td>Between C02 (11),(21) - (6),(12)</td> <td>20 - 30 V</td> </tr> </table>  | Between C01 (7),(13) - (6),(12)   | 20 - 30 V   | Between C02 (11),(21) - (6),(12) | 20 - 30 V  | 1) Turn starting switch ON.<br>2) Insert T - adapter.        |   |   |
|  | Between C01 (7),(13) - (6),(12)   | 20 - 30 V          |  |  |                                   |   |                                  |  |  |   |   |
|  | Between C02 (11),(21) - (6),(12)  | 20 - 30 V          |  |  |                                   |   |                                  |  |  |   |   |
|  | Fuel control dial                 | C03                | Measure voltage  | If the condition is as shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (7) - (17) (power source)</td> <td>4.75 - 5.25 V</td> </tr> <tr> <td>Between (4) - (17) (low idling)</td> <td>4.0 - 4.75 V</td> </tr> <tr> <td>Between (4) - (17) (high idling)</td> <td>0.25 - 1.0 V</td> </tr> </table> | Between (7) - (17) (power source) | 4.75 - 5.25 V   | Between (4) - (17) (low idling)  | 4.0 - 4.75 V   | Between (4) - (17) (high idling)                             | 0.25 - 1.0 V  | 1) Turn starting switch ON.<br>2) Insert T - adapter. |
|  | Between (7) - (17) (power source) | 4.75 - 5.25 V      |  |  |                                   |   |                                  |  |  |   |   |
| Between (4) - (17) (low idling)                    | 4.0 - 4.75 V                      |                    |  |  |                                   |   |                                  |  |  |   |   |
| Between (4) - (17) (high idling)                   | 0.25 - 1.0 V                      |                    |  |  |                                   |   |                                  |  |  |   |   |
| Potentiometer                                      | C03                               | Measure voltage    | If the condition is as shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (14) - (17) (low idling)</td> <td>2.9 - 3.3 V</td> </tr> <tr> <td>Between (14) - (17) (high idling)</td> <td>0.5 - 0.9 V</td> </tr> <tr> <td>Between (7) - (17) (power source)</td> <td>4.75 - 5.25 V</td> </tr> </table> | Between (14) - (17) (low idling)   | 2.9 - 3.3 V                       | Between (14) - (17) (high idling)                     | 0.5 - 0.9 V                      | Between (7) - (17) (power source)  | 4.75 - 5.25 V  | 1) Turn starting switch ON.<br>2) Insert T - adapter. |   |
| Between (14) - (17) (low idling)                   | 2.9 - 3.3 V                       |                    |  |  |                                   |   |                                  |  |  |   |   |
| Between (14) - (17) (high idling)                  | 0.5 - 0.9 V                       |                    |  |  |                                   |   |                                  |  |  |   |   |
| Between (7) - (17) (power source)                  | 4.75 - 5.25 V                     |                    |  |  |                                   |   |                                  |  |  |   |   |
| Water temperature sensor                           | P07 (male)                        | Measure resistance | If the condition is as shown in the table below, it is normal<br><table border="1"> <tr> <td>Normal temperature (25°C)</td> <td>Approx. 37 - 50 kΩ</td> </tr> <tr> <td>100°C</td> <td>Approx. 3.5 - 4.0 kΩ</td> </tr> </table>   | Normal temperature (25°C)  | Approx. 37 - 50 kΩ                | 100°C   | Approx. 3.5 - 4.0 kΩ             | 1) Turn starting switch OFF.<br>2) Disconnect connector P07.<br>3) Insert T - adapter. into connector at sensor end. |  |   |   |
| Normal temperature (25°C)                          | Approx. 37 - 50 kΩ                |                    |  |  |                                   |   |                                  |  |  |   |   |
| 100°C  | Approx. 3.5 - 4.0 kΩ              |                    |  |  |                                   |   |                                  |  |  |   |   |
| Governor motor                                     | C02                               | Measure voltage    | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (2) - (3)</td> <td>1.8 - 4.6 V</td> </tr> <tr> <td>Between (4) - (5)</td> <td>1.8 - 4.6 V</td> </tr> </table>   | Between (2) - (3)  | 1.8 - 4.6 V                       | Between (4) - (5)                                     | 1.8 - 4.6 V                      | 1) Turn starting switch ON.<br>2) Insert T - adapter.  |  |   |   |
| Between (2) - (3)                                  | 1.8 - 4.6 V                       |                    |  |  |                                   |   |                                  |  |  |   |   |
| Between (4) - (5)                                  | 1.8 - 4.6 V                       |                    |  |  |                                   |   |                                  |  |  |   |   |
| Battery relay                                      | C01                               | Measure voltage    | If the condition is within the range shown in the table below, it is normal<br><table border="1"> <tr> <td>Between (1) - (6)</td> <td>20 - 30 V</td> </tr> </table> ★ This is only for 2.5 sec after the starting switch is operated ON → OFF; at other times it must be 0 V.  | Between (1) - (6)  | 20 - 30 V                         | 1) Turn starting switch ON.<br>2) Insert T - adapter. |                                  |  |  |   |   |
| Between (1) - (6)                                  | 20 - 30 V                         |                    |  |  |                                   |   |                                  |  |  |   |   |

| System  | Name of component  | Connector No.          | Inspection method   | Judgment table   | Measurement conditions   |                        |   |  |   |   |
|---|--|------------------------|---|--|--|------------------------|---|--|---|---|
| Control system<br>Engine throttle, pump controller                                      | Swing lock solenoid  | C01                    | Measure voltage   | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>When either swing or work equipment control lever is operated (solenoid ON, swing lock canceled)</td> <td rowspan="2">Between (3) – (6),(12)</td> <td>20 – 30 V</td> </tr> <tr> <td>Approx. 5 sec after swing lever and work equipment control levers are placed at neutral (solenoid OFF, swing lock applied)</td> <td>0 – 3 V</td> </tr> </table> | When either swing or work equipment control lever is operated (solenoid ON, swing lock canceled) | Between (3) – (6),(12) | 20 – 30 V   | Approx. 5 sec after swing lever and work equipment control levers are placed at neutral (solenoid OFF, swing lock applied) | 0 – 3 V   | <ol style="list-style-type: none"> <li>1) Start engine.</li> <li>2) Turn swing lock switch OFF.</li> <li>3) Turn swing lock prolix switch OFF.</li> <li>4) Insert T – adapter.</li> </ol> <p>★ The lever can be operated slightly (without moving the equipment).</p>   |
|   | When either swing or work equipment control lever is operated (solenoid ON, swing lock canceled)                           | Between (3) – (6),(12) | 20 – 30 V   |  |  |                        |   |  |   |   |
|   | Approx. 5 sec after swing lever and work equipment control levers are placed at neutral (solenoid OFF, swing lock applied) |                        | 0 – 3 V   |  |  |                        |   |  |   |   |
|   | Travel speed solenoid  | C01                    | Measure voltage   | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>With travel speed switch at Hi or Mi (solenoid ON, travel motor swash plate angle min.)</td> <td rowspan="2">Between (9) – (6),(12)</td> <td>20 – 30 V</td> </tr> <tr> <td>When travel speed switch is at Lo (solenoid OFF, travel motor swash plate angle max.)</td> <td>0 – 3 V</td> </tr> </table>   | With travel speed switch at Hi or Mi (solenoid ON, travel motor swash plate angle min.)          | Between (9) – (6),(12) | 20 – 30 V   | When travel speed switch is at Lo (solenoid OFF, travel motor swash plate angle max.)                                      | 0 – 3 V   | <ol style="list-style-type: none"> <li>1) Start engine.</li> <li>2) Insert T – adapter.</li> <li>3) Turn fuel control dial to MAX position.</li> <li>4) Operate the lever slightly not enough to move the machine.</li> </ol> <p>To check that the solenoid is OFF, measure with the fuel control dial at LOW (1200 rpm or below)</p> |
| With travel speed switch at Hi or Mi (solenoid ON, travel motor swash plate angle min.) | Between (9) – (6),(12)   | 20 – 30 V              |   |  |  |                        |   |  |   |   |
| When travel speed switch is at Lo (solenoid OFF, travel motor swash plate angle max.)   |  | 0 – 3 V                |   |  |  |                        |   |  |   |   |
| Active boom solenoid  | C01  | Measure voltage        | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>When active mode switch is OFF (solenoid ON, boom LOWER spool stroke 9 mm)</td> <td rowspan="2">Between (8) – (6),(12)</td> <td>20 – 30 V</td> </tr> <tr> <td>When active mode switch is ON (solenoid OFF, boom LOWER spool stroke 11.5 mm)</td> <td>0 – 3 V</td> </tr> </table> | When active mode switch is OFF (solenoid ON, boom LOWER spool stroke 9 mm)   | Between (8) – (6),(12)   | 20 – 30 V              | When active mode switch is ON (solenoid OFF, boom LOWER spool stroke 11.5 mm) | 0 – 3 V  | <ol style="list-style-type: none"> <li>1) Turn starting switch ON.</li> <li>2) Insert T – adapter.</li> </ol>   |   |
| When active mode switch is OFF (solenoid ON, boom LOWER spool stroke 9 mm)              | Between (8) – (6),(12)   | 20 – 30 V              |   |  |  |                        |   |  |   |   |
| When active mode switch is ON (solenoid OFF, boom LOWER spool stroke 11.5 mm)           |  | 0 – 3 V                |   |  |  |                        |   |  |   |   |
| Merge/divider valve solenoid  | C01  | Measure voltage        | <p>If the condition is as shown in the table below, it is normal.</p> <table border="1"> <tr> <td>When travel is operated independently (solenoid ON, divided)</td> <td rowspan="2">Between (2) – (6),(12)</td> <td>20 – 30 V</td> </tr> <tr> <td>When levers and pedals are at neutral (solenoid OFF, merged)</td> <td>0 – 3 V</td> </tr> </table>                               | When travel is operated independently (solenoid ON, divided)   | Between (2) – (6),(12)   | 20 – 30 V              | When levers and pedals are at neutral (solenoid OFF, merged)                  | 0 – 3 V  | <ol style="list-style-type: none"> <li>1) Turn starting switch ON.</li> <li>2) Insert T – adapter.</li> </ol> <p>★ The lever can be operated slightly</p> |   |
| When travel is operated independently (solenoid ON, divided)                            | Between (2) – (6),(12)   | 20 – 30 V              |   |  |  |                        |   |  |   |   |
| When levers and pedals are at neutral (solenoid OFF, merged)                            |  | 0 – 3 V                |   |  |  |                        |   |  |   |   |

| System                         | Name of component  | Connector No.                   | Inspection method  | Judgment table                 | Measurement conditions   |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
|--------------------------------|--|---------------------------------|--|--------------------------------|--|--|--|---|--|---------------------|--|------------|---------------------|------------------------|---------------|-----------------------------|------------------|---|---|
| Control system                 | Engine throttle, pump controller                           | TVC solenoid (default value)    | C02  | Measure current                | <p>If the condition is as shown in the table below, it is normal</p> <p>· H/O mode</p> <table border="1"> <tr> <td>Between front (8) – (18)</td> <td rowspan="2">310 ± 100 mA</td> </tr> <tr> <td>Between rear (9) – (19)</td> </tr> </table>            | Between front (8) – (18)   | 310 ± 100 mA   | Between rear (9) – (19)   | <ol style="list-style-type: none"> <li>1) Turn starting switch ON.</li> <li>2) Turn fuel control dial to MAX position</li> <li>3) Turn prolix switch OFF.</li> <li>4) All levers at neutral</li> </ol> |                     |  |            |                     |                        |               |                             |                  |   |   |
|                                |  | Between front (8) – (18)        | 310 ± 100 mA   |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
|                                |  | Between rear (9) – (19)         |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
|                                |  | LS-EPC solenoid (default value) | C02  | Measure current                | <p>If the condition is as shown in the table below, it is normal</p> <p>· H/O mode</p> <table border="1"> <tr> <td>Between (7) – (17)</td> <td>900 ± 80 mA</td> </tr> </table>   | Between (7) – (17)   | 900 ± 80 mA  | <ol style="list-style-type: none"> <li>1) Turn starting switch ON.</li> <li>2) Turn fuel control dial to MAX position</li> <li>3) All levers at neutral.</li> </ol> |  |                     |  |            |                     |                        |               |                             |                  |   |   |
|                                |  | Between (7) – (17)              | 900 ± 80 mA  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
|                                |  | L.H. knob switch                | C03  | Measure voltage                | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>When switch is ON</td> <td rowspan="2">Between (9) – GND</td> <td>20 – 28 V</td> </tr> <tr> <td>When switch is OFF</td> <td>0 – 1 V</td> </tr> </table> | When switch is ON  | Between (9) – GND  | 20 – 28 V   | When switch is OFF   | 0 – 1 V             | <ol style="list-style-type: none"> <li>1) Turn starting switch ON.</li> <li>2) Insertl T – adapter.</li> </ol> |            |                     |                        |               |                             |                  |   |   |
|                                |  | When switch is ON               | Between (9) – GND  | 20 – 28 V                      |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
|                                |  | When switch is OFF              |  | 0 – 1 V                        |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| S-NET                          | C17  | Measure voltage                 | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>Between (4),(12) – GND</td> <td>4 – 8 V</td> </tr> </table>   | Between (4),(12) – GND         | 4 – 8 V  | <ol style="list-style-type: none"> <li>1) Turn starting switch ON.</li> <li>2) Insertl T – adapter.</li> </ol> |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Between (4),(12) – GND         | 4 – 8 V  |                                 |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Kerosene mode                  | C17  | Measure voltage                 | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>Standard mode (Light oil mode)</td> <td rowspan="2">Between (15) – GND</td> <td>20 – 28 V</td> </tr> <tr> <td>Kerosene mode</td> <td>0 – 2 V</td> </tr> </table>  | Standard mode (Light oil mode) | Between (15) – GND   | 20 – 28 V  | Kerosene mode  | 0 – 2 V   | <ol style="list-style-type: none"> <li>1) Turn starting switch ON.</li> <li>2) Insertl T – adapter.</li> </ol>   |                     |  |            |                     |                        |               |                             |                  |   |   |
| Standard mode (Light oil mode) | Between (15) – GND   | 20 – 28 V                       |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Kerosene mode                  |  | 0 – 2 V                         |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| No. 2 throttle signal          | Monitoring code 16   | Engine speed                    | <p>If the condition is as shown in the table below, it is normal</p> <p style="text-align: center;">High idling (rpm)</p> <table border="1"> <tr> <td>Active</td> <td>Approx. 2,250</td> </tr> <tr> <td>H/O</td> <td>Approx. 2,150 (during operation)<br/>Approx. 1,900 (idling)</td> </tr> <tr> <td>G/O</td> <td>Approx. 2,050 (during operation)<br/>Approx. 1,900 (idling)</td> </tr> <tr> <td>F/O</td> <td>Approx. 1,900</td> </tr> <tr> <td>L/O</td> <td>Approx. 1,600</td> </tr> <tr> <td>Power max. (H/O) (G/O)</td> <td>Approx. 2,150</td> </tr> <tr> <td>Swift slow-down (H/O) (G/O)</td> <td>Approx. 1,600</td> </tr> </table> | Active                         | Approx. 2,250  | H/O  | Approx. 2,150 (during operation)<br>Approx. 1,900 (idling) | G/O   | Approx. 2,050 (during operation)<br>Approx. 1,900 (idling)   | F/O                 | Approx. 1,900  | L/O        | Approx. 1,600       | Power max. (H/O) (G/O) | Approx. 2,150 | Swift slow-down (H/O) (G/O) | Approx. 1,600    | <ol style="list-style-type: none"> <li>1) Start engine.</li> <li>2) Set monitoring code to 10 or 16 (command value).</li> <li>3) Operate working mode switch, active mode switch and L.H. knob switch.</li> </ol> |   |
| Active                         | Approx. 2,250  |                                 |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| H/O                            | Approx. 2,150 (during operation)<br>Approx. 1,900 (idling) |                                 |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| G/O                            | Approx. 2,050 (during operation)<br>Approx. 1,900 (idling) |                                 |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| F/O                            | Approx. 1,900  |                                 |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| L/O                            | Approx. 1,600  |                                 |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Power max. (H/O) (G/O)         | Approx. 2,150  |                                 |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Swift slow-down (H/O) (G/O)    | Approx. 1,600  |                                 |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Machine selection              | C17 – C02  | Continuity                      | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>Between selection 1</td> <td>C17(5) – C02(11)</td> <td>No continuity</td> </tr> <tr> <td>Between selection 2</td> <td>C17(13) – C02(11)</td> <td>Continuity</td> </tr> <tr> <td>Between selection 3</td> <td>C17(6) – C02(11)</td> <td>Continuity</td> </tr> <tr> <td>Between selection 4</td> <td>C17(14) – C02(11)</td> <td>No continuity</td> </tr> <tr> <td>Between selection 5</td> <td>C17(7) – C02(11)</td> <td>No continuity</td> </tr> </table>  | Between selection 1            | C17(5) – C02(11)   | No continuity  | Between selection 2  | C17(13) – C02(11)   | Continuity   | Between selection 3 | C17(6) – C02(11)   | Continuity | Between selection 4 | C17(14) – C02(11)      | No continuity | Between selection 5         | C17(7) – C02(11) | No continuity   | <ol style="list-style-type: none"> <li>1) Turn starting switch OFF.</li> <li>2) Disconnect connector.</li> <li>3) Connect T – adapter to wiring harness end.</li> </ol> |
| Between selection 1            | C17(5) – C02(11)   | No continuity                   |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Between selection 2            | C17(13) – C02(11)  | Continuity                      |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Between selection 3            | C17(6) – C02(11)   | Continuity                      |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Between selection 4            | C17(14) – C02(11)  | No continuity                   |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |
| Between selection 5            | C17(7) – C02(11)   | No continuity                   |  |                                |  |  |  |   |  |                     |  |            |                     |                        |               |                             |                  |   |   |

| System   | Name of component   | Connector No.              | Inspection method  | Judgment table   | Measurement conditions |  |                           |   |  |   |
|--|---|----------------------------|--|--|------------------------|--|---------------------------|---|--|---|
| Monitor  | Air cleaner clogging switch   | P11 (male)<br>P12 (female) | Continuity   | If the condition is as shown in the table below, it is normal <table border="1" style="margin-top: 10px;"> <tr> <td>Air cleaner normal</td> <td rowspan="2">Between P11 – P12</td> <td>Continuity</td> </tr> <tr> <td>Air cleaner clogged</td> <td>No continuity</td> </tr> </table> | Air cleaner normal     | Between P11 – P12  | Continuity                | Air cleaner clogged   | No continuity  | 1) Start engine.<br>2) Disconnect P11, P12. |
|  | Air cleaner normal  | Between P11 – P12          | Continuity   |  |                        |  |                           |   |  |   |
|  | Air cleaner clogged   |                            | No continuity  |  |                        |  |                           |   |  |   |
|  | Engine speed sensor   | E07                        | Measure resistance   | If the condition is within the range shown in the table below, it is normal <table border="1" style="margin-top: 10px;"> <tr> <td>Between (1) – (2)</td> <td>500 – 1000 Ω</td> </tr> <tr> <td>Between (1),(2) – chassis</td> <td>Min. 1 MΩ</td> </tr> </table>                       | Between (1) – (2)      | 500 – 1000 Ω   | Between (1),(2) – chassis | Min. 1 MΩ   | 1) Turn starting switch OFF.<br>3) Disconnect connector. |   |
|  |   |                            | Between (1) – (2)  | 500 – 1000 Ω   |                        |  |                           |   |  |   |
|  |   |                            | Between (1),(2) – chassis  | Min. 1 MΩ  |                        |  |                           |   |  |   |
| Measure voltage  | Measure with AC range <table border="1" style="margin-top: 10px;"> <tr> <td>Between (1) – (2)</td> <td>0.5 – 3.0 V</td> </tr> </table>        | Between (1) – (2)          | 0.5 – 3.0 V  | 1) Start engine.<br>2) Insert T – adapter.   |                        |  |                           |   |  |   |
| Between (1) – (2)  | 0.5 – 3.0 V   |                            |  |  |                        |  |                           |   |  |   |
| Adjust   | 1) Screw in rotation sensor until it contacts ring gear, then turn back $1 \pm 1/6$ turns<br>2) It must work normally when adjusted as above. |                            |  |  |                        |  |                           |   |  |   |
| Water level switch   | P08 (male)  | Measure resistance         | If the condition is as shown in the table below, it is normal <table border="1" style="margin-top: 10px;"> <tr> <td>Above LOW level in sub-tank</td> <td>Max. 1 Ω</td> </tr> <tr> <td>Below LOW level in sub-tank</td> <td>Min. 1 MΩ</td> </tr> </table>   | Above LOW level in sub-tank  | Max. 1 Ω               | Below LOW level in sub-tank  | Min. 1 MΩ                 | 1) Turn starting switch OFF.<br>2) Disconnect connector P08.<br>3) Insert T – adapter into connector at sensor end. |  |   |
| Above LOW level in sub-tank  | Max. 1 Ω  |                            |  |  |                        |  |                           |   |  |   |
| Below LOW level in sub-tank  | Min. 1 MΩ   |                            |  |  |                        |  |                           |   |  |   |
| Engine oil level switch  | P05 (male)  | Measure resistance         | If the condition is as shown in the table below, it is normal <table border="1" style="margin-top: 10px;"> <tr> <td> <br/>                     BLP00002<br/>                     Raise float                 </td> <td>Max. 1 Ω</td> </tr> <tr> <td> <br/>                     BLP00003<br/>                     Lower float                 </td> <td>Min. 1 MΩ</td> </tr> </table> | <br>BLP00002<br>Raise float   | Max. 1 Ω               | <br>BLP00003<br>Lower float | Min. 1 MΩ                 | 1) Turn starting switch OFF.<br>2) Disconnect connector P05.<br>3) Drain oil, then remove sensor.                   |  |   |
| <br>BLP00002<br>Raise float | Max. 1 Ω  |                            |  |  |                        |  |                           |   |  |   |
| <br>BLP00003<br>Lower float | Min. 1 MΩ   |                            |  |  |                        |  |                           |   |  |   |
| Water temperature sensor   | P07 (male)  | Measure resistance         | If the condition is as shown in the table below, it is normal <table border="1" style="margin-top: 10px;"> <tr> <td>Normal temperature (25°C)</td> <td>Approx. 37 – 50 kΩ</td> </tr> <tr> <td>100°C</td> <td>Approx. 3.5 – 4.0 kΩ</td> </tr> </table>  | Normal temperature (25°C)  | Approx. 37 – 50 kΩ     | 100°C  | Approx. 3.5 – 4.0 kΩ      | 1) Turn starting switch OFF.<br>2) Disconnect connector P07.<br>3) Insert T – adapter into connector at sensor end. |  |   |
| Normal temperature (25°C)  | Approx. 37 – 50 kΩ  |                            |  |  |                        |  |                           |   |  |   |
| 100°C  | Approx. 3.5 – 4.0 kΩ  |                            |  |  |                        |  |                           |   |  |   |

| System  | Name of component   | Connector No.      | Inspection method  | Judgment table  | Measurement conditions                                       |   |  |   |   |           |   |          |   |
|---|---|--------------------|--|---|--|---|--|---|---|-----------|---|----------|---|
| Monitor   | Engine oil pressure switch                                    | —                  | Measure resistance   | <p>If the condition is as shown in the table below, it is normal</p> <p>Low pressure end</p> <table border="1"> <tr> <td>Engine oil pressure above 68.6 kPa {0.7 kg/cm<sup>2</sup>}</td> <td>Min. 1M Ω</td> </tr> <tr> <td>Engine oil pressure below 29.4 kPa {0.3 kg/cm<sup>2</sup>}</td> <td>Max. 1 Ω</td> </tr> </table> <p>High pressure end</p> <table border="1"> <tr> <td>Engine oil pressure above 166.6 kPa {1.7 kg/cm<sup>2</sup>}</td> <td>Min. 1M Ω</td> </tr> <tr> <td>Engine oil pressure below 127.4 kPa {1.3 kg/cm<sup>2</sup>}</td> <td>Max. 1 Ω</td> </tr> </table> | Engine oil pressure above 68.6 kPa {0.7 kg/cm <sup>2</sup> } | Min. 1M Ω   | Engine oil pressure below 29.4 kPa {0.3 kg/cm <sup>2</sup> } | Max. 1 Ω  | Engine oil pressure above 166.6 kPa {1.7 kg/cm <sup>2</sup> } | Min. 1M Ω | Engine oil pressure below 127.4 kPa {1.3 kg/cm <sup>2</sup> } | Max. 1 Ω | <ol style="list-style-type: none"> <li>1) Install oil pressure measurement gauge.</li> <li>2) Remove wiring harness terminal.</li> <li>3) Start engine.</li> <li>4) Put tester in contact with terminal screw and chassis.</li> </ol> |
|   | Engine oil pressure above 68.6 kPa {0.7 kg/cm <sup>2</sup> }  | Min. 1M Ω          |  |   |  |   |  |   |   |           |   |          |   |
|   | Engine oil pressure below 29.4 kPa {0.3 kg/cm <sup>2</sup> }  | Max. 1 Ω           |  |   |  |   |  |   |   |           |   |          |   |
|   | Engine oil pressure above 166.6 kPa {1.7 kg/cm <sup>2</sup> } | Min. 1M Ω          |  |   |  |   |  |   |   |           |   |          |   |
| Engine oil pressure below 127.4 kPa {1.3 kg/cm <sup>2</sup> }   | Max. 1 Ω  |                    |  |   |  |   |  |   |   |           |   |          |   |
| Fuel level sensor   | P06 (male)  | Measure resistance | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>  <p>BLP00004</p> <p>Raise float to stopper</p> </td> <td>Approx. 12 Ω or below</td> </tr> <tr> <td>  <p>BLP00005</p> <p>Lower float to stopper</p> </td> <td>Approx. 85 – 110 Ω</td> </tr> </table> |  <p>BLP00004</p> <p>Raise float to stopper</p>  | Approx. 12 Ω or below  |  <p>BLP00005</p> <p>Lower float to stopper</p> | Approx. 85 – 110 Ω   | <ol style="list-style-type: none"> <li>1) Turn starting switch OFF.</li> <li>2) Disconnect connector P06.</li> <li>3) Drain fuel, then remove sensor.</li> <li>4) Insert T – adapter into sensor.</li> </ol> <p>★ Connect the T – adapter to the connector and sensor flange.</p> |   |           |   |          |   |
|  <p>BLP00004</p> <p>Raise float to stopper</p>  | Approx. 12 Ω or below   |                    |  |   |  |   |  |   |   |           |   |          |   |
|  <p>BLP00005</p> <p>Lower float to stopper</p> | Approx. 85 – 110 Ω  |                    |  |   |  |   |  |   |   |           |   |          |   |
| Hydraulic oil level switch  | P09 (male)  | Measure resistance | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>  <p>BLP00002</p> <p>Raise float</p> </td> <td>Max. 1 Ω</td> </tr> <tr> <td>  <p>BLP00003</p> <p>Lower float</p> </td> <td>Min. 1 MΩ</td> </tr> </table>  |  <p>BLP00002</p> <p>Raise float</p>  | Max. 1 Ω   |  <p>BLP00003</p> <p>Lower float</p>            | Min. 1 MΩ  | <ol style="list-style-type: none"> <li>1) Turn starting switch OFF.</li> <li>2) Disconnect connector P09.</li> <li>3) Drain oil, then remove sensor.</li> <li>4) Insert T – adapter into sensor.</li> </ol>   |   |           |   |          |   |
|  <p>BLP00002</p> <p>Raise float</p>            | Max. 1 Ω  |                    |  |   |  |   |  |   |   |           |   |          |   |
|  <p>BLP00003</p> <p>Lower float</p>            | Min. 1 MΩ   |                    |  |   |  |   |  |   |   |           |   |          |   |
| Air cleaner clogging switch   | P11 P12   | Measure resistance | <p>If the condition is as shown in the table below, it is normal</p> <table border="1"> <tr> <td>Air cleaner normal</td> <td>Max. 1 Ω</td> </tr> <tr> <td>Air cleaner clogged</td> <td>Min. 1 MΩ</td> </tr> </table>  <p>BLP00006</p>  | Air cleaner normal  | Max. 1 Ω   | Air cleaner clogged   | Min. 1 MΩ  | <ol style="list-style-type: none"> <li>1) Start engine.</li> <li>2) Disconnect P11, P12.</li> <li>3) Put tester in contact with connectors to measure.</li> </ol>   |   |           |   |          |   |
| Air cleaner normal  | Max. 1 Ω  |                    |  |   |  |   |  |   |   |           |   |          |   |
| Air cleaner clogged   | Min. 1 MΩ   |                    |  |   |  |   |  |   |   |           |   |          |   |

| Name of component       | Connector No.   | Inspection method   | Judgment table  | Measurement conditions |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|-------------------------|---|---|---|------------------------|--|--------------------|--|---------------------|------------|------------|-------------|------------------------|--|---|---------------|--|---|---------------|--|---|---------------|------------------|--|---|---------------|--|---|---------------|--|---|---------------|--|---|----------------|--|---|----------------|-----------|-------------|----------|--|
| Alternator              | Between alternator terminal R and chassis   | Measure voltage   | When engine is running (1/2 throttle or above) 27.5 – 29.5 V<br>★ If the battery is old, or after starting in cold areas, the voltage may not rise for some time. | 1) Start engine.       |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
| Gauges                  | Measure resistance between coolant temperature gauge C03 (female) (1) – C03 (female) (16) | <table border="1"> <thead> <tr> <th colspan="2">Position of gauge display</th> <th>Display level resistance kΩ (Monitor panel input resistance)</th> </tr> <tr> <th colspan="2">Starting switch ON</th> <th>Starting switch OFF</th> </tr> </thead> <tbody> <tr> <td rowspan="10">                     ↑<br/><br/>                     ↓                 </td> <td>Right side</td> <td>All OFF(10)</td> <td>Min. – Max.<br/>– 0.646</td> </tr> <tr> <td></td> <td>9</td> <td>0.575 – 0.342</td> </tr> <tr> <td></td> <td>8</td> <td>3.156 – 3.708</td> </tr> <tr> <td></td> <td>7</td> <td>3.422 – 3.900</td> </tr> <tr> <td rowspan="4">Display position</td> <td></td> <td>6</td> <td>3.600 – 4.349</td> </tr> <tr> <td></td> <td>5</td> <td>4.015 – 5.122</td> </tr> <tr> <td></td> <td>4</td> <td>4.728 – 6.816</td> </tr> <tr> <td></td> <td>3</td> <td>6.294 – 10.774</td> </tr> <tr> <td></td> <td>2</td> <td>9.946 – 36.535</td> </tr> <tr> <td>Left side</td> <td>1</td> <td>33.725 –</td> </tr> </tbody> </table> | Position of gauge display   |                        | Display level resistance kΩ (Monitor panel input resistance) | Starting switch ON |  | Starting switch OFF | ↑<br><br>↓ | Right side | All OFF(10) | Min. – Max.<br>– 0.646 |  | 9 | 0.575 – 0.342 |  | 8 | 3.156 – 3.708 |  | 7 | 3.422 – 3.900 | Display position |  | 6 | 3.600 – 4.349 |  | 5 | 4.015 – 5.122 |  | 4 | 4.728 – 6.816 |  | 3 | 6.294 – 10.774 |  | 2 | 9.946 – 36.535 | Left side | 1           | 33.725 – | 1) Insert a dummy resistance with the starting switch OFF, or measure the resistance of the sensor.<br>2) Check the display with the starting switch ON. |
|                         |   |   | Position of gauge display   |                        | Display level resistance kΩ (Monitor panel input resistance) |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
| Starting switch ON      |   | Starting switch OFF   |   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
| ↑<br><br>↓              | Right side  | All OFF(10)   | Min. – Max.<br>– 0.646  |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   | 9   | 0.575 – 0.342   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   | 8   | 3.156 – 3.708   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   | 7   | 3.422 – 3.900   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         | Display position  |   | 6   | 3.600 – 4.349          |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   |   | 5   | 4.015 – 5.122          |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   |   | 4   | 4.728 – 6.816          |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   |   | 3   | 6.294 – 10.774         |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   | 2   | 9.946 – 36.535  |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         | Left side   | 1   | 33.725 –  |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
| ★ Levels 8 and 9 flash. |   |   |   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
| Gauges                  | Measure resistance between fuel level gauge C03 (female) (2) – chassis                    | <table border="1"> <thead> <tr> <th colspan="2">Position of gauge display</th> <th>Display level resistance kΩ (Monitor panel input resistance)</th> </tr> <tr> <th colspan="2">Starting switch ON</th> <th>Starting switch OFF</th> </tr> </thead> <tbody> <tr> <td rowspan="10">                     ↑<br/><br/>                     ↓                 </td> <td>Right side</td> <td>9</td> <td>Min. – Max.<br/>– 13.82</td> </tr> <tr> <td></td> <td>8</td> <td>11.71 – 21.25</td> </tr> <tr> <td></td> <td>7</td> <td>18.90 – 28.45</td> </tr> <tr> <td></td> <td>6</td> <td>25.82 – 31.85</td> </tr> <tr> <td rowspan="4">Display position</td> <td></td> <td>5</td> <td>29.18 – 39.91</td> </tr> <tr> <td></td> <td>4</td> <td>37.00 – 44.60</td> </tr> <tr> <td></td> <td>3</td> <td>41.77 – 55.14</td> </tr> <tr> <td></td> <td>2</td> <td>50.42 – 77.07</td> </tr> <tr> <td></td> <td>1</td> <td>72.98 – 691.5</td> </tr> <tr> <td>Left side</td> <td>All OFF(10)</td> <td>638.00 –</td> </tr> </tbody> </table>   | Position of gauge display   |                        | Display level resistance kΩ (Monitor panel input resistance) | Starting switch ON |  | Starting switch OFF | ↑<br><br>↓ | Right side | 9           | Min. – Max.<br>– 13.82 |  | 8 | 11.71 – 21.25 |  | 7 | 18.90 – 28.45 |  | 6 | 25.82 – 31.85 | Display position |  | 5 | 29.18 – 39.91 |  | 4 | 37.00 – 44.60 |  | 3 | 41.77 – 55.14 |  | 2 | 50.42 – 77.07  |  | 1 | 72.98 – 691.5  | Left side | All OFF(10) | 638.00 – | 1) Insert a dummy resistance with the starting switch OFF, or measure the resistance of the sensor.<br>2) Check the display with the starting switch ON. |
|                         |   |   | Position of gauge display   |                        | Display level resistance kΩ (Monitor panel input resistance) |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
| Starting switch ON      |   | Starting switch OFF   |   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
| ↑<br><br>↓              | Right side  | 9   | Min. – Max.<br>– 13.82  |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   | 8   | 11.71 – 21.25   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   | 7   | 18.90 – 28.45   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   | 6   | 25.82 – 31.85   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         | Display position  |   | 5   | 29.18 – 39.91          |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   |   | 4   | 37.00 – 44.60          |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   |   | 3   | 41.77 – 55.14          |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   |   | 2   | 50.42 – 77.07          |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         |   | 1   | 72.98 – 691.5   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
|                         | Left side   | All OFF(10)   | 638.00 –  |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |
| ★ Level 1 flashes.      |   |   |   |                        |  |                    |  |                     |            |            |             |                        |  |   |               |  |   |               |  |   |               |                  |  |   |               |  |   |               |  |   |               |  |   |                |  |   |                |           |             |          |  |

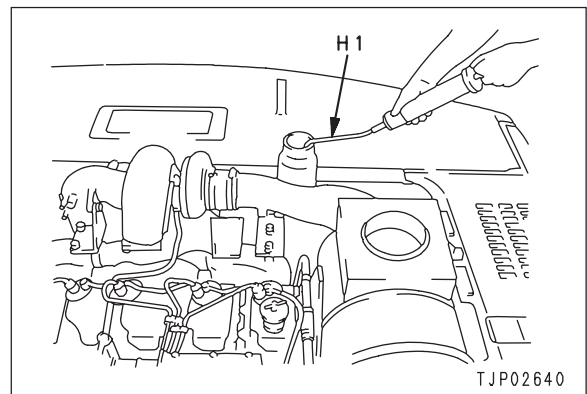


## MEASURING EXHAUST COLOR

- When measuring in the field when there is no air or power supply, use handy smoker checker **H1**; when recording official data, use smoke meter **H2**.
- ★ Raise the coolant temperature to the operating range before measuring.
- ⚠ When removing or installing the measuring equipment, be careful not to touch any high temperature part.

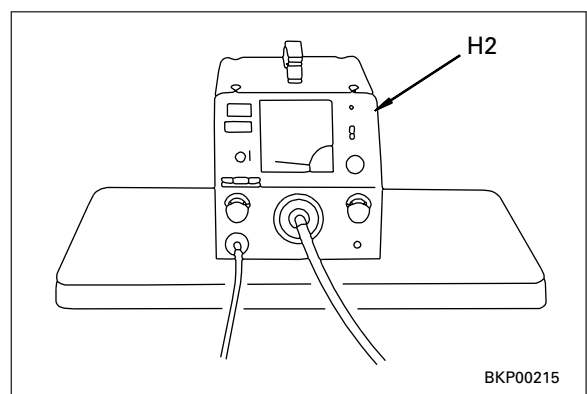
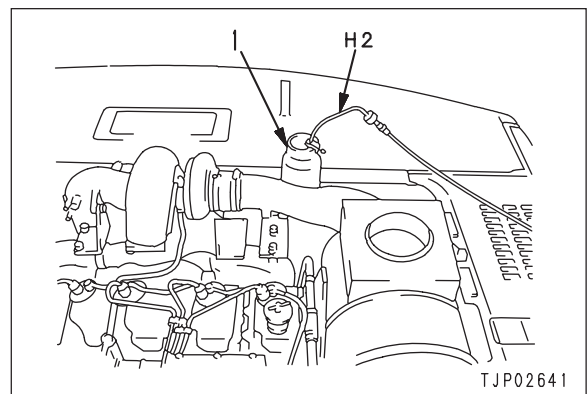
### 1. Measuring with handy smoke checker H1

- 1) Fit filter paper in tool **H1**.
- 2) Insert the exhaust gas intake port into the exhaust pipe, accelerate the engine suddenly, and at the same time operate the handle of tool **H1** to catch the exhaust gas on the filter paper.
- 3) Remove the filter paper and compare it with the scale provided to judge the condition.



### 2. Measuring with smoke meter H2

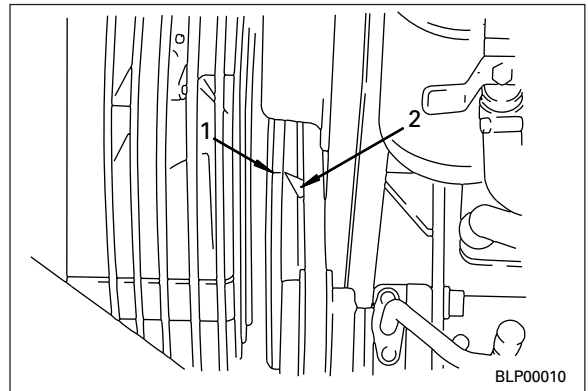
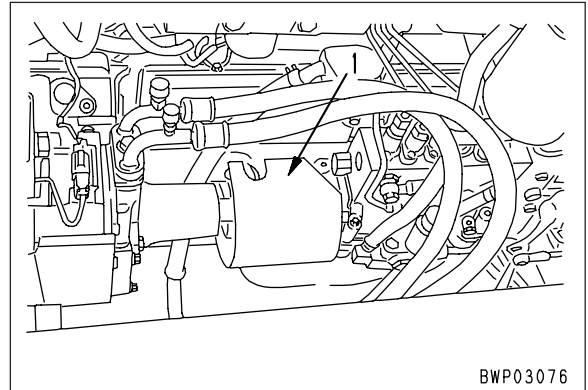
- 1) Insert the probe of tool **H2** into the outlet port of exhaust pipe(1), then tighten the clip to secure it to the exhaust pipe.
- 2) Connect the probe hose, accelerator switch plug, and air hose to tool **H2**.
  - ★ The pressure of the air supply should be less than 1.47 MPa {15 kg/cm<sup>2</sup>}.
- 3) Connect the power cord to the AC power source socket.
  - ★ When connecting the port, check first that the power switch of tool **H2** is OFF.
- 4) Loosen the cap nut of the suction pump, then fit the filter paper.
  - ★ Fit the filter paper securely so that the exhaust gas does not leak.
- 5) Turn the power switch of tool **H2** ON.
- 6) Accelerate the engine suddenly, and at the same time, depress the accelerator pedal of tool **H2** and catch the exhaust gas color on the filter paper.
- 7) Lay the filter paper used to catch the exhaust gas color on top of unused filter papers (10 sheets or more) inside the filter paper holder, and read the indicated value.



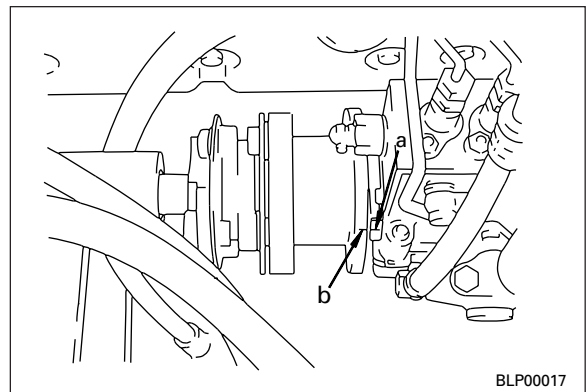


## TESTING AND ADJUSTING FUEL INJECTION TIMING

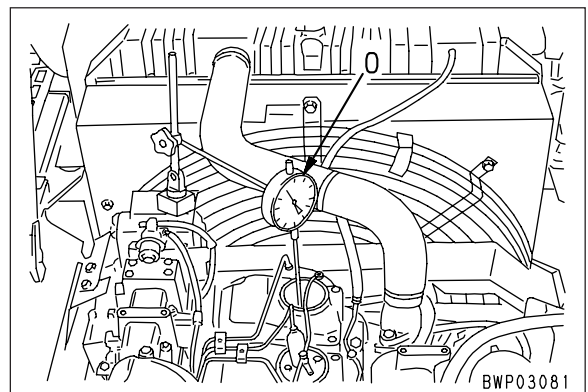
1. Remove the No. 1 cylinder nozzle holder assembly.
  - ★ For details, see DISASSEMBLY AND ASSEMBLY, REMOVAL OF NOZZLE HOLDER ASSEMBLY.
2. Remove coupling cover (1) of the fuel injection pump.
3. Align "1.6TOP" line (2) on the crankshaft pulley with pointer (3).



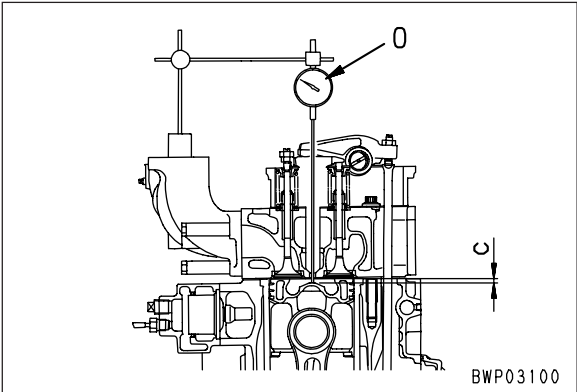
- ★ Check that line "a" on the fuel injection pump is near line "b" on the coupling. If the lines are not near each other (No. 1 cylinder exhaust top dead center), rotate the crankshaft pulley another 360° and align the lines again (No. 1 cylinder compression top dead center).



4. Install dial gauge **O** in the hole of the No. 1 nozzle holder, and set so that it contacts the top surface of the piston.
5. Set the scale on dial gauge **O** to 0 when the piston is at top dead center.
  - ★ Rotate the crankshaft in the normal direction and in the reverse direction to set to top dead center.
  - ★ Note down the value shown by the short hand on the dial gauge.





6. Rotate the crankshaft approx. 45° in the reverse direction.
7. Rotate the crankshaft again in the normal direction until the dimension becomes specified dimension "c". (Always rotate the crankshaft in the normal direction to align the position.)
  - ★ Specified dimension c: 1.21 ± 0.2 mm
  - ★ When specified dimension "c" is correct, check that line "a" on the fuel injection pump body is aligned with line "b" on the coupling.
8. Rotate the crankshaft in the normal direction and check again that when the No. 1 cylinder reaches top dead center (the dial gauge indicator starts to move in the opposite direction), the dial gauge display is 0 ± 0.2 mm. If it is not 0 ± 0.2 mm, carry out the adjustment again from Step 5.

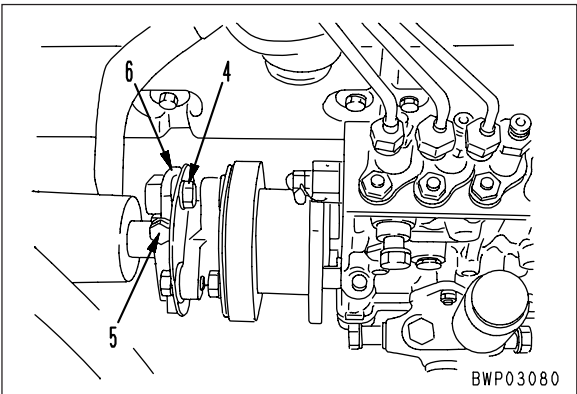


**Adjusting**

- ★ If the fuel injection timing is not correct, adjust as follows.
- ★ Set the crankshaft to specified dimension "c" (see Step 7 above) when adjusting.

1. Loosen 2 mounting bolts and nuts (4) and 1 mounting bolt (5), and set so that coupling (6) is free.
2. Align line "a" on the fuel injection pump with line "b" on the coupling.
3. Tighten 2 mounting bolts and nuts (4), then tighten 1 mounting bolt (5).

-  Mounting bolt, nut (4):  
**58.8 – 63.7 Nm {6.0 – 6.5 kgm}**
-  Mounting bolt (5):  
**73.5 – 83.3 Nm {7.5 – 8.5 kgm}**





## MEASURING AIR SUPPLY PRESSURE (BOOST PRESSURE)

**⚠** When removing or installing the measuring equipment or when carrying out the measurements, be careful not to touch any high temperature parts or rotating parts.

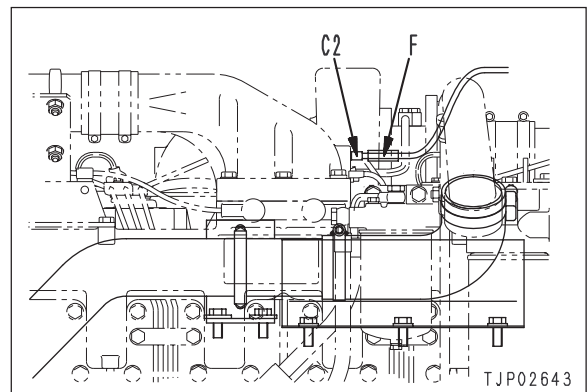
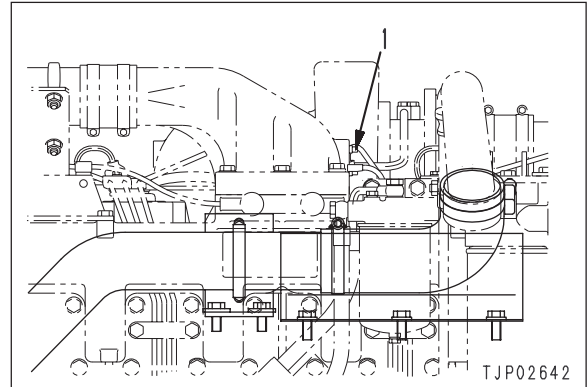
1. Remove air supply pressure measurement plug (1) (PT 1/8), then install the nipple **C2**.
2. Connect the oil pressure measurement hose to the coupler and pressure gauge **F** (-101.3 to +200 kPa {-760 to +1500 mmHg}).

**Note:** Run the engine at a mid-range speed or above, and use the self-seal portion of the gauge to bleed the oil from inside the hose.

- Insert the gauge about half way, and repeatedly open the self-seal portion to bleed the oil.
- ★ The gauge does not work if there is any oil inside the hose, so always be sure to bleed all the oil.

3. Run the engine at near the rated speed and measure the pressure indicated by the gauge.
  - ★ Near rated output
    - Run the engine at near the rated output. For details, see the measurement of the engine speed when the arm IN circuit is relieved in the H/O mode and power max. mode.

- ★ The air supply pressure (boost pressure) should be measured with the engine running at rated output. However, when measuring in the field, a similar value can be obtained with the above conditions.





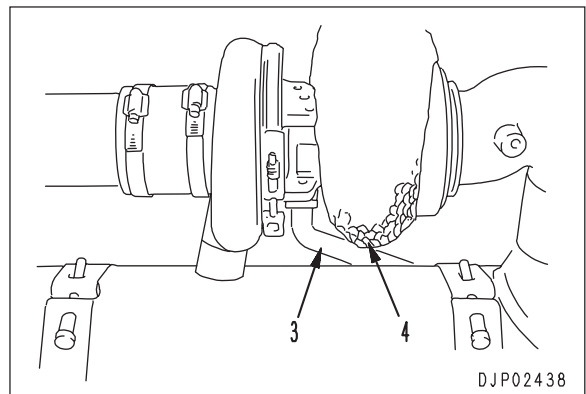
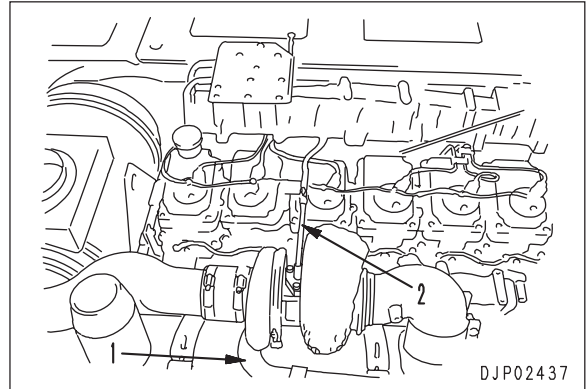
## REMOVAL OF TURBOCHARGER ASSEMBLY

1. Open engine hood.
2. Remove intake hose (1) and turbocharger lubrication inlet tube (2). ※ 1
3. Disconnect turbocharger lubrication outlet tube (3) from turbocharger (4).
4. Remove hydraulic pump top cover (5), then remove air cleaner assembly (6). ※ 2  
★ The air cleaner band cannot be removed, so remove hydraulic pump top cover (5).



Air cleaner assembly: **Approx. 30 kg**

5. Remove turbocharger assembly (7).



## INSTALLATION OF TURBOCHARGER ASSEMBLY

- Carry out installation in the reverse order to removal.

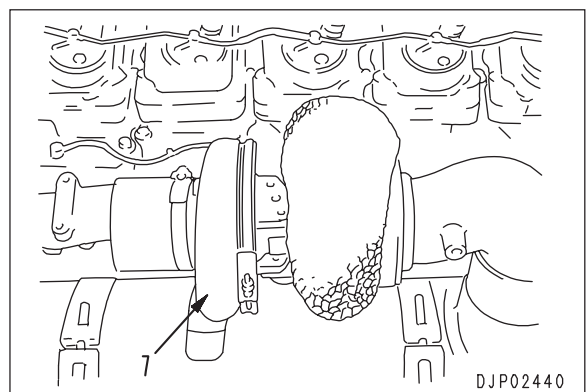
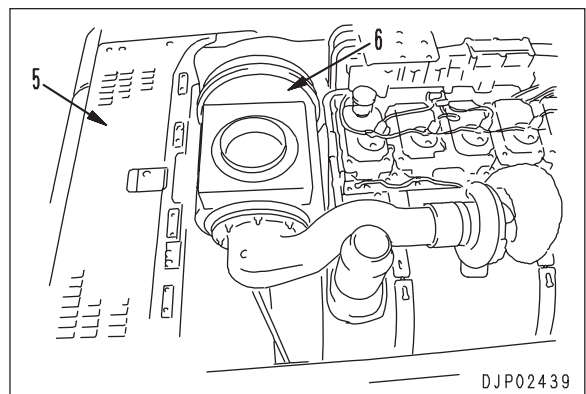
※ 1

**kgm** Lubrication tube joint bolt (cylinder block end): **29.4 ± 4.9 Nm {3.0 ± 0.5 kgm}**

**kgm** Intake connector hose clamp: **8.8 ± 0.5 Nm {0.90 ± 0.05 kgm}**

※ 2

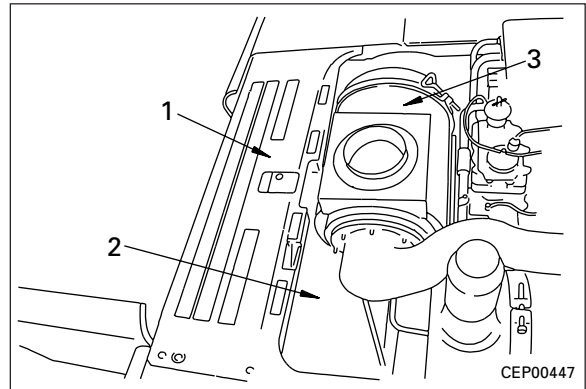
**kgm** Turbocharger, air cleaner connecting hose clamp: **8.8 ± 0.5 Nm {0.90 ± 0.05 kgm}**



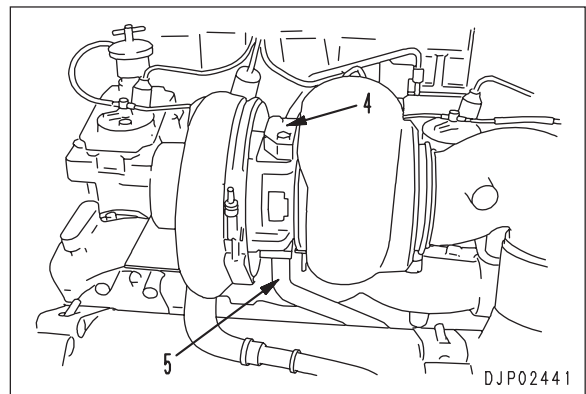
## REMOVAL OF CYLINDER HEAD ASSEMBLY

**⚠** Disconnect the cable from the negative (-) terminal of the battery.

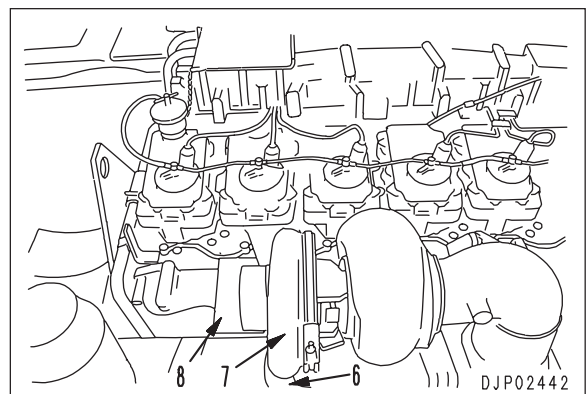
1. Remove cover (1), partition (2), and air cleaner assembly (3). ※ 1



2. Remove turbocharger lubrication tube (4) and outlet tube (5).

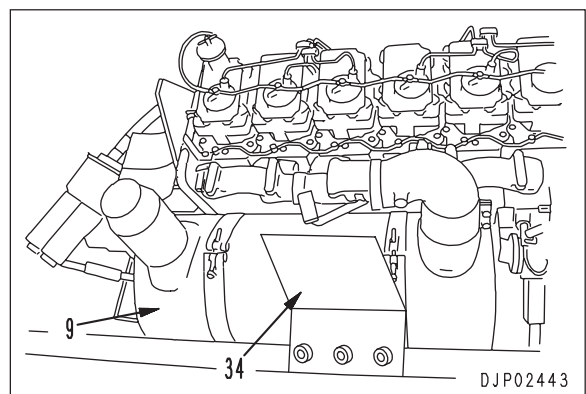


3. Remove intake hose (6), turbocharger assembly (7), and adiabatic cover (8). ※ 2

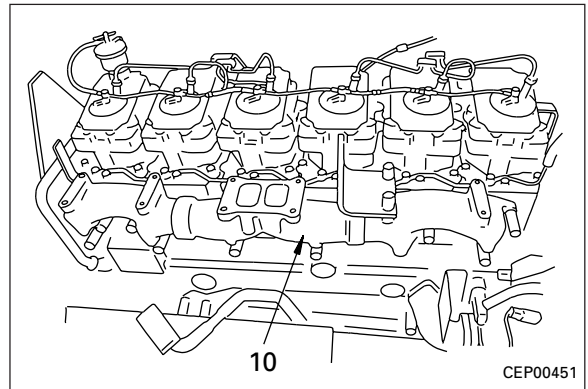


4. Remove heat isolation plate (34) and 2 mounting bands of exhaust muffler assembly (9), and lift off muffler assembly.

★ Pull out completely from the muffler water drain tube before removing. ※ 3



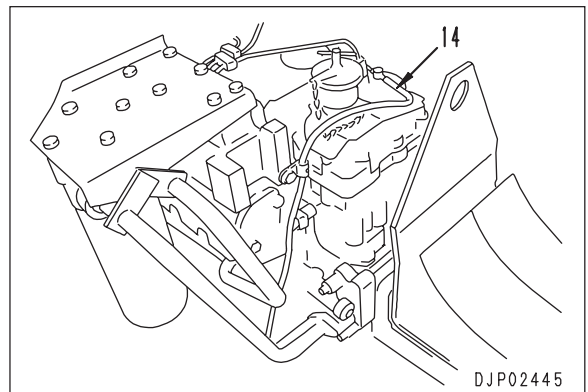
5. Remove exhaust manifold assembly (10). ※ 4



6. Disconnect corrosion resistor (11) together with mounting bracket.

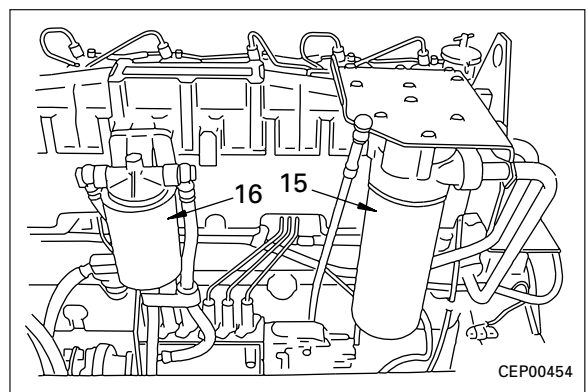


7. Disconnect spill tube (14).



8. Remove oil filter assembly (15) together with mounting bracket.

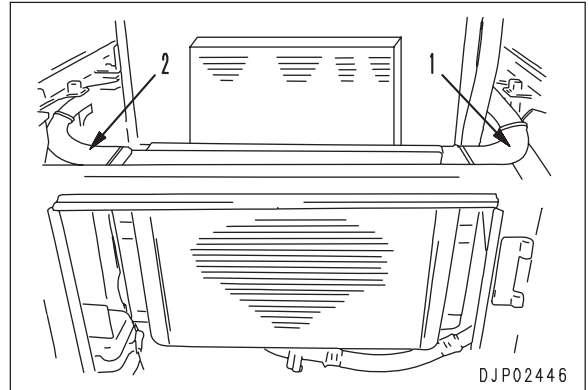
9. Remove 2 mounting bolts of fuel filter assembly (16), then move towards control valve with hose still connected to fuel filter assembly.





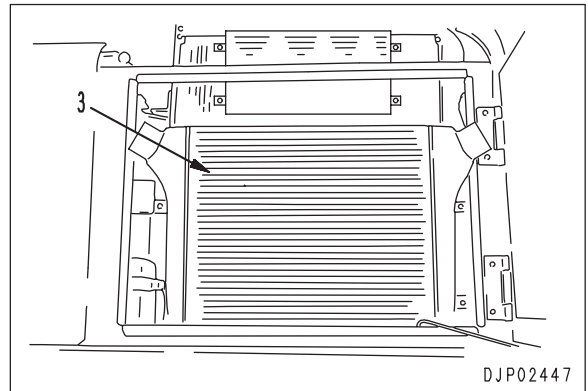
## REMOVAL OF AFTERCOOLER ASSEMBLY

1. Open aftercooler front cover.
2. Loosen clamps of aftercooler inlet hose (1) and outlet hose (2).
3. Remove mounting bolts, pull out from hose, and remove aftercooler assembly (3).



## INSTALLATION OF AFTERCOOLER ASSEMBLY

- Carry out installation in the reverse order to removal.



## REMOVAL OF HYDRAULIC COOLER ASSEMBLY

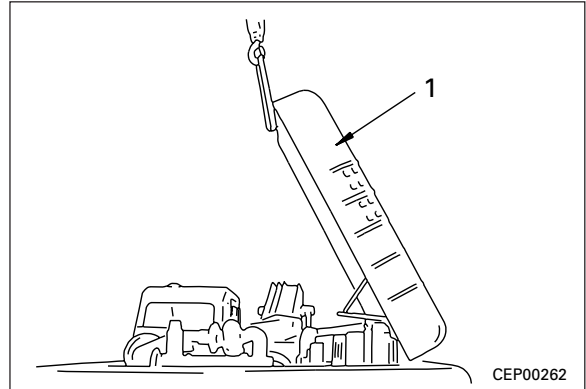
**⚠** Loosen the oil filler cap slowly to release the pressure inside the hydraulic tank.

1. Drain oil from hydraulic tank.

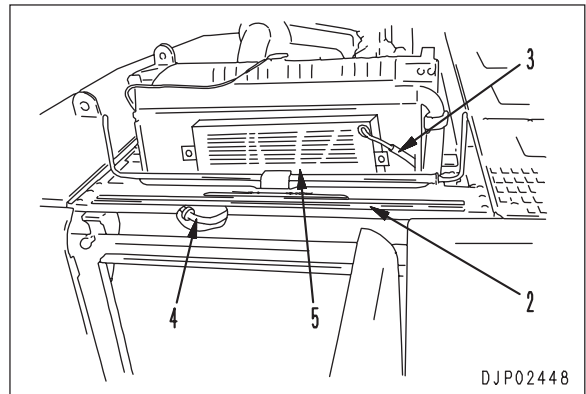


Hydraulic tank: **Approx. 270 ℓ**

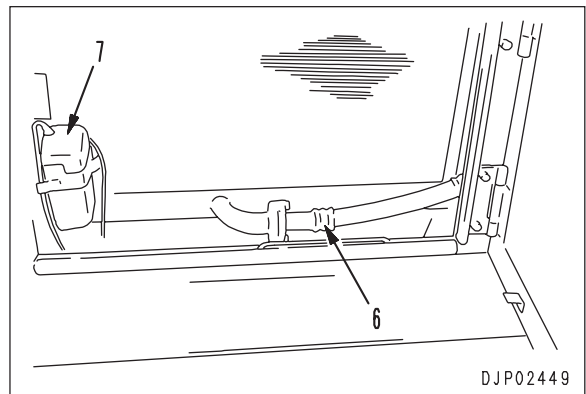
2. Lift off engine hood (1).



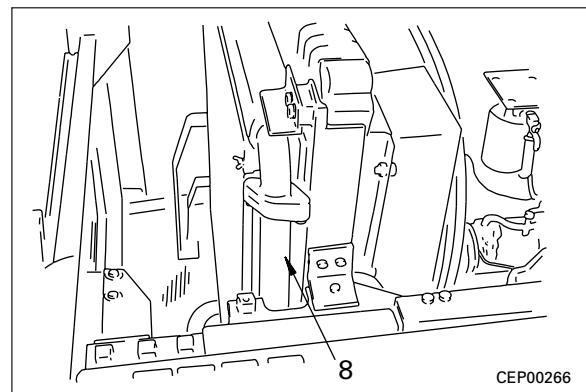
3. Remove frame and spring assembly (2).
4. Remove aftercooler assembly.  
For details, see REMOVAL OF AFTERCOOLER ASSEMBLY.
5. Disconnect air conditioner hoses (3) and (4), remove condenser assembly (5).



6. Disconnect cooler outlet hose (6), and remove radiator sub-tank (7).



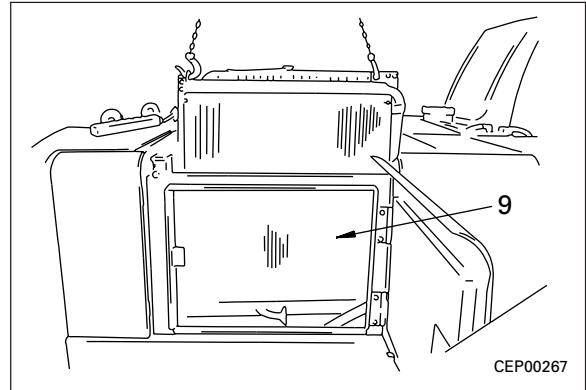
7. Disconnect cooler inlet tube (8).



8. Sling hydraulic cooler assembly (9), remove mounting bolts (bottom: left and right; top: left and right), then lift off hydraulic cooler assembly (9).



Hydraulic cooler assembly: **110 kg**



## INSTALLATION OF HYDRAULIC COOLER ASSEMBLY

- Carry out installation in the reverse order to removal.
- **Refilling with oil (hydraulic tank)**
  - ★ Add oil through the oil filler to the specified level.  
Run the engine to circulate the oil through the system. Then check the oil level again.

## REMOVAL OF RADIATOR, HYDRAULIC COOLER ASSEMBLY

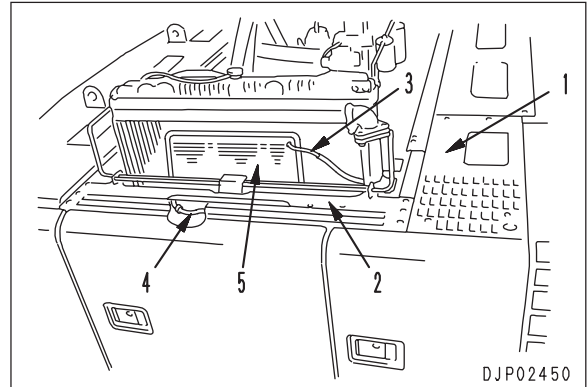
**⚠** Lower the work equipment completely to the ground and stop the engine. Then loosen the oil filler cap slowly to release the pressure inside the hydraulic tank.

1. Drain oil from hydraulic tank.

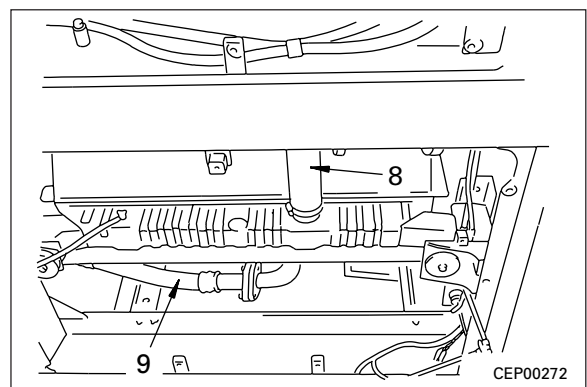
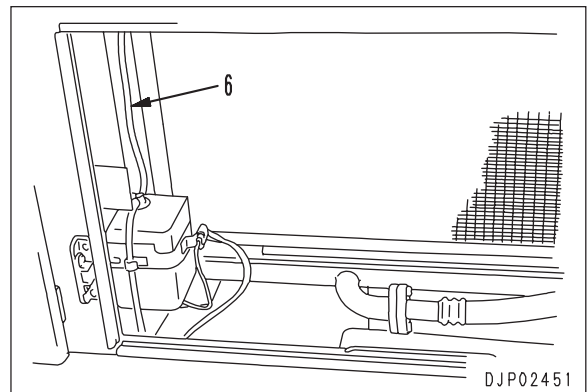


Hydraulic tank: **Approx. 270 ℓ**

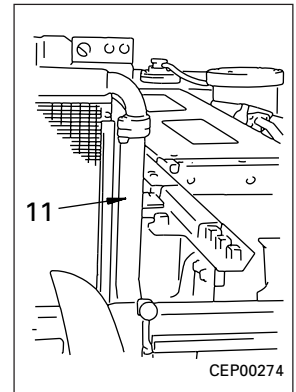
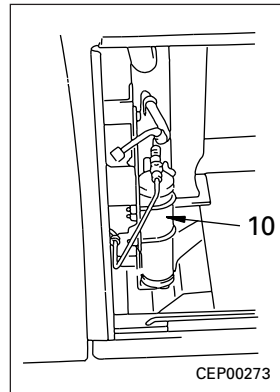
2. Drain coolant.
3. Lift off engine hood, then remove cover (1) and frame and spring assembly (2).
4. Disconnect air conditioner hose (3) and (4), and remove condenser assembly (5).
  - ★ Collect refrigerant (R134a).
  - For details, see REMOVAL OF AIR CONDITIONER COMPRESSOR ASSEMBLY.
5. Remove aftercooler assembly.  
For details, see REMOVAL OF AFTERCOOLER ASSEMBLY.
6. Disconnect sub-tank hose (6).



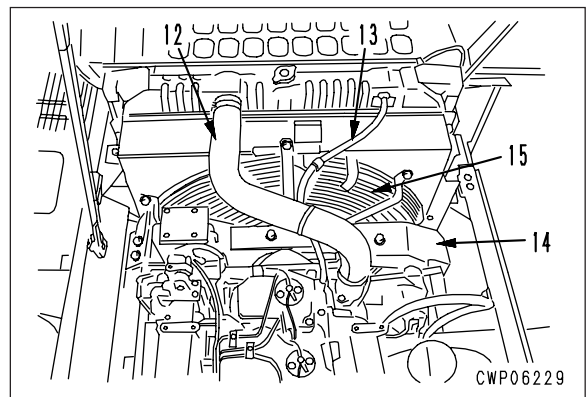
7. Remove undercover under radiator, and disconnect radiator lower hose (8) and cooler outlet hose (9).
  - ★ The radiator lower hose is clamped to the radiator, so be sure to disconnect the clamps.
  - ★ When the cooler outlet hose is disconnected, oil will flow out, so set a container under the machine to catch the oil, and disconnect the hose from the cover on the right side of the machine.



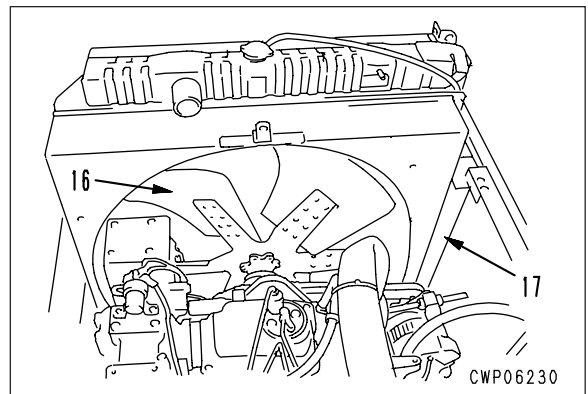
- 8. With hose still connected, disconnect receiver tank (10) together with bracket, and move towards chassis.
- 9. Disconnect hydraulic cooler inlet hose (11).



- 10. Disconnect radiator upper hose (12) and aeration hose (13) at radiator end, and move towards engine.
- 11. Remove cover (14), then remove fan guard (15).

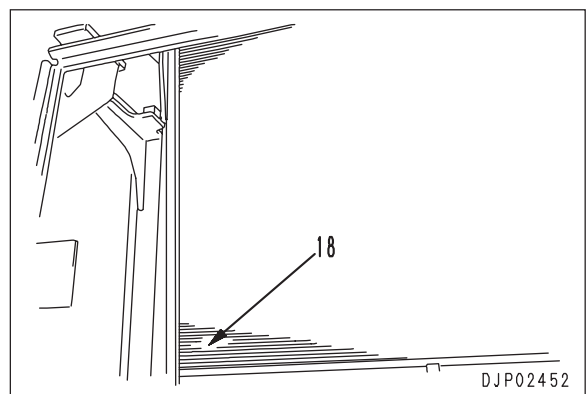


- 12. Remove fan (16), and move towards radiator.
  - ★ Fit cardboard between the radiator core and fan (16) to prevent damage to the radiator core.
- 13. Remove right side cover (17) of radiator.



- 14. Sling radiator and hydraulic cooler assembly (18), remove mount bolts (top: 2; bottom: 2).

※ 1

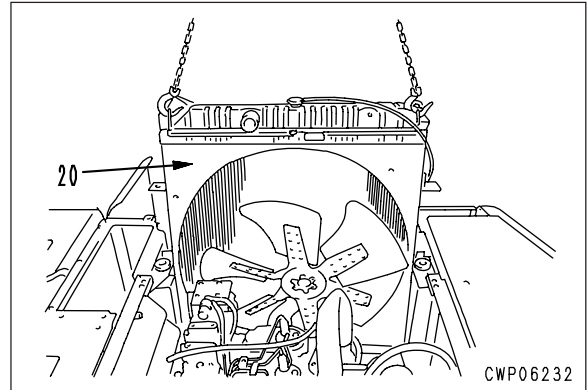


15. Lift off radiator and hydraulic cooler assembly (20).

- ★ When removing, be careful of the position in relation to the surrounding area.



Radiator, hydraulic cooler assembly:  
**206 kg**  
 (Incl. aftercooler: **224 kg**)



## INSTALLATION OF RADIATOR, HYDRAULIC COOLER ASSEMBLY

- Carry out installation in the reverse order to removal.

※ 1



Radiator mount bolt:  
**110.3 ± 12.3 Nm {11.25 ± 1.25 kgm}**

- **Refilling with water**
  - ★ Add water through the water filler to the specified level.  
Run the engine to circulate the water through the system. Then check the water level again.
- **Refilling with oil (hydraulic tank)**
  - ★ Add oil through the oil filler to the specified level.  
Run the engine to circulate the oil through the system. Then check the oil level again.
- **Charging air conditioner with gas**
  - ★ Using tool X, charge the air conditioner circuit with refrigerant (R134a).