# WSM

WORKSHOP MANUAL

# FRONT LOADER

## LA271·LA301·LA351·LA401
## LA272·LA302·LA352·LA402

Kubota

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# MECHANISM

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# ⚠ SAFETY FIRST

**This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and decals on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.**

**It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.**

⚠ **DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

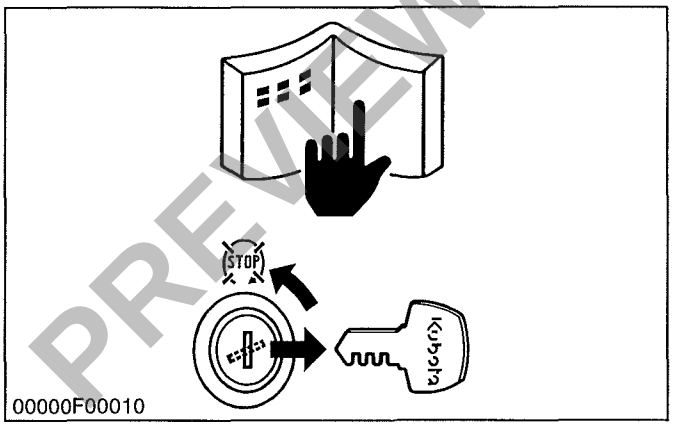
⚠ **WARNING : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ **CAUTION : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

■ **IMPORTANT : Indicates that equipment or property damage could result if instructions are not followed.**

■ **NOTE : Gives helpful information.**

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## BEFORE SERVICING AND REPAIRING

(1) Read all instructions and safety instructions in this manual and on your machine safety decals.
(2) Clean the work area and machine.
(3) Park the machine on a firm and level ground, and set the parking brake.
(4) Lower the implement to the ground.
(5) Stop the engine, and remove the key.
(6) Disconnect the battery negative cable.
(7) Hang a **"DO NOT OPERATE"** tag in operator station.

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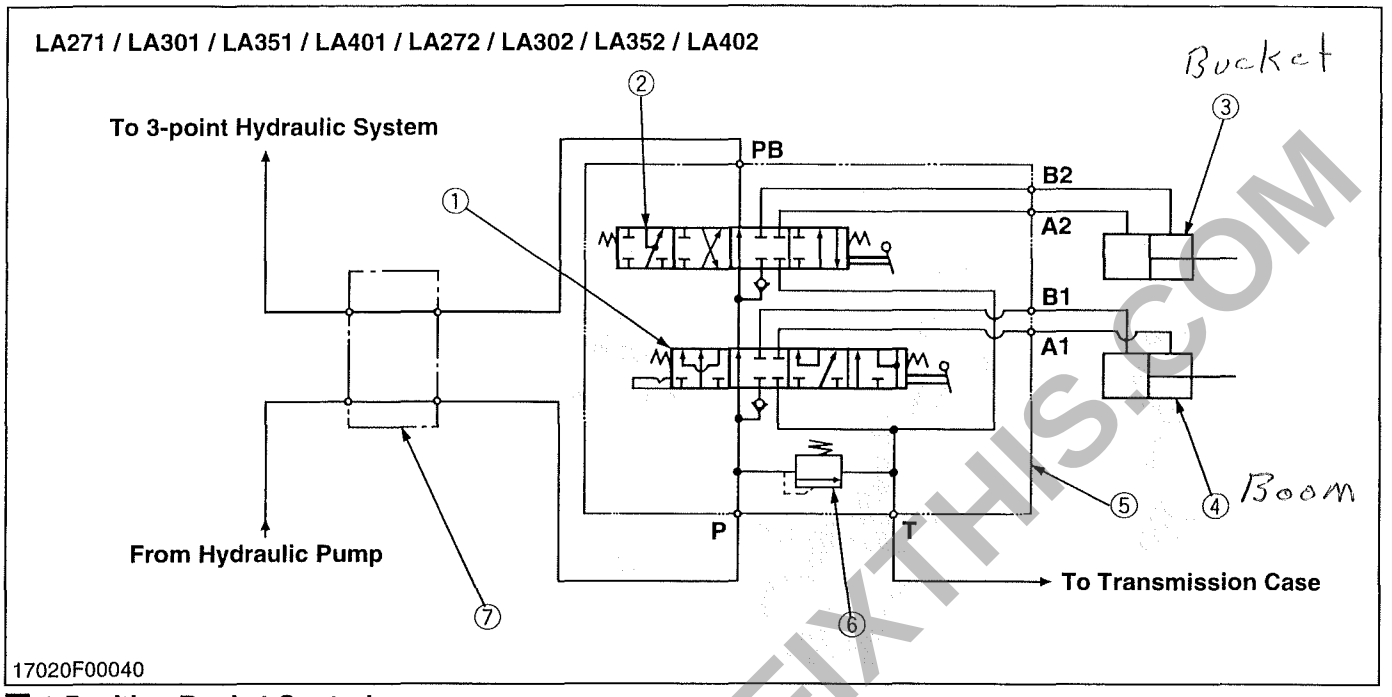
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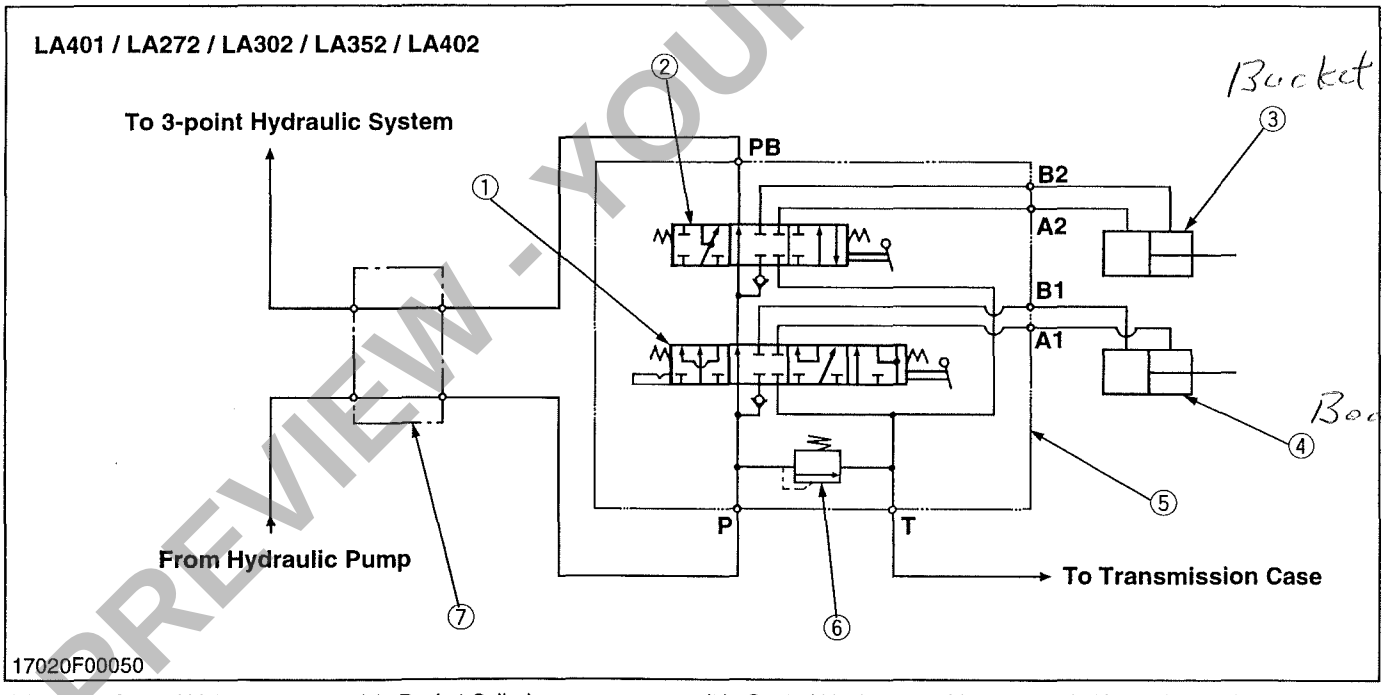
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# [2] HYDRAULIC CIRCUIT

## ■ 4 Position Bucket Control




## ■ 3 Position Bucket Control




(1) Boom Control Valve
(2) Bucket Control Valve
(3) Bucket Cylinder
(4) Boom Cylinder
(5) Control Vavle Assembly
(6) Relief Valve
(7) Hydraulic Block

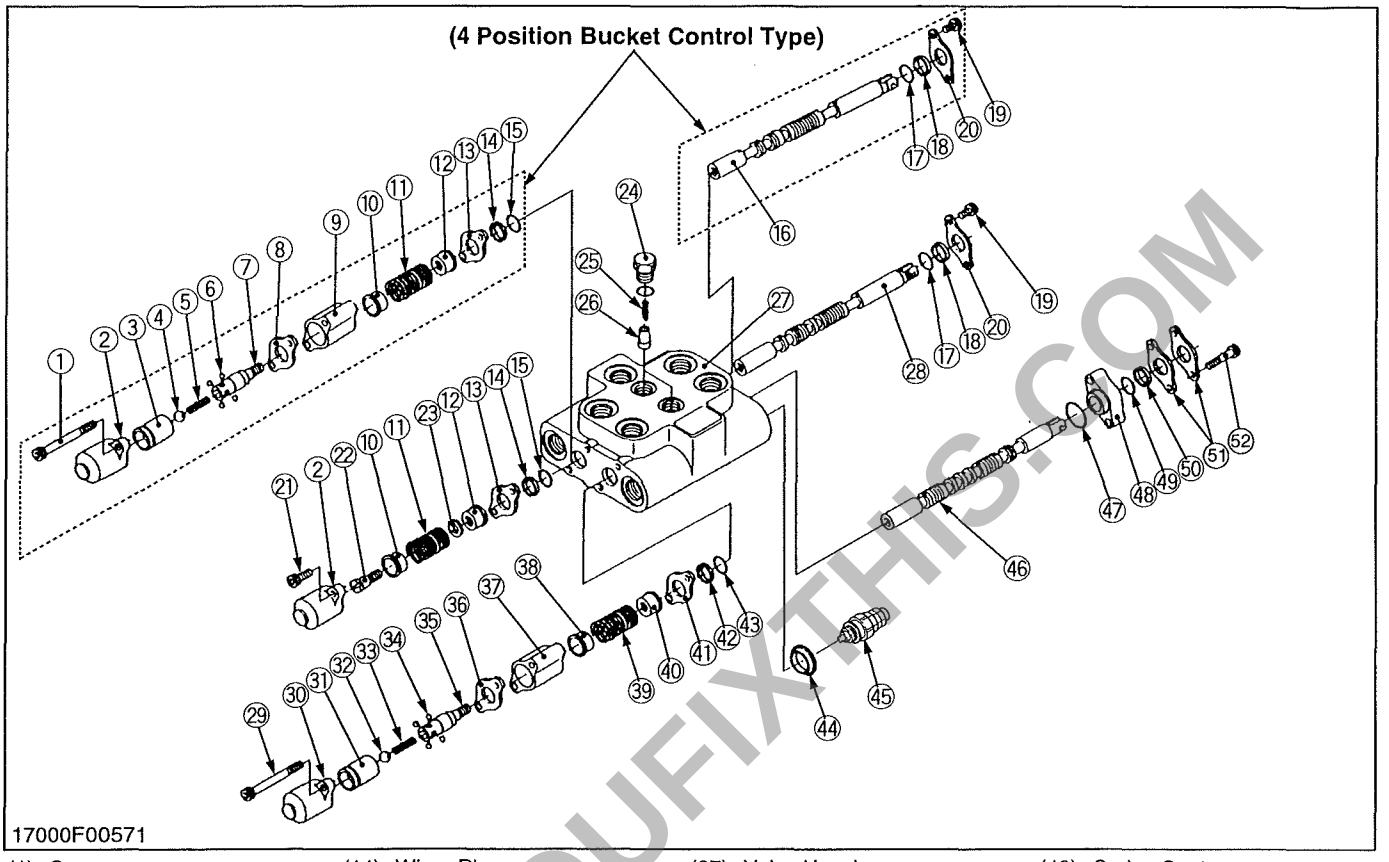
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## Disassembling Control Valve (For LA401 · LA272 · LA302 · LA352 · LA402 and New Valve)




(1) Screw
(2) Cap
(3) Sleeve
(4) Ball
(5) Spring
(6) Ball
(7) Pin
(8) Seal Plate
(9) Spacer
(10) Spring Seat
(11) Spring
(12) Spring Seat
(13) Seal Plate
(14) Wiper Ring
(15) O-ring
(16) Spool for Bucket
(17) O-ring
(18) Wiper Ring
(19) Screw
(20) Seal Plate
(21) Screw
(22) Cap Screw
(23) Collar
(24) Plug
(25) Spring
(26) Load Check Valve
(27) Valve Housing
(28) Spool for Bucket
(29) Screw
(30) Cap
(31) Sleeve
(32) Ball
(33) Spring
(34) Ball
(35) Pin
(36) Seal Plate
(37) Spacer
(38) Spring Seat
(39) Spring
(40) Spring Seat
(41) Seal Plate
(42) Wiper Ring
(43) O-ring
(44) Seal Ring
(45) Relief Valve
(46) Spool for Boom
(47) O-ring
(48) Spacer
(49) O-ring
(50) Wiper Ring
(51) Seal Plate
(52) Screw

### ■ Boom Control Section

1. Remove the plug (24) and take out the spring (25) and load check valve (26).
2. Remove the seal plates (51), wiper ring (50) and spacer from the valve housing (27).
3. Remove the cap (30) and spacer (37), and draw out the spool (46) with other component parts from valve housing (27).

### ■ Bucket Control Section

1. Remove the plug (24) and take out the spring (25) and load check valve (26).
2. Remove the seal plate (20) and wiper ring (18) from the valve housing (27).

**[3 Position Bucket Control Type]**

3. Remove the cap (2), seal plate (13) and wiper ring (14), and draw out the spool (28) with other component parts from the valve housing (27).

**[4 Position Bucket Control Type]**

3. Remove the cap (2), seal plate (8), spacer (9), seal plate (13) and wiper ring (14), and draw out the spool (16) with other component parts from the valve housing (27).

**(When reassembling)**

- Clean all parts with a suitable solvent, and dry with a lint-free cloth or air.
- Visually inspect all parts for signs of scoring of damage.
- Install the spool and spacer to the valve housing, using care not to damage the O-rings.

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# SERVICING SPECIFICATIONS

| Item | | Factory Specification | Allowable Limit |
|---|---|---|---|
| Relief Valve<br>**Condition**<br>• Engine Speed ..... Maximum<br>• Oil Temperature .... 45 to 55 °C<br>113 to 131 °F | Setting Pressure<br>LA271 / LA272<br>LA351 / LA352<br>LA401 / LA402<br><br>LA301 / LA302 | 13.1 to 13.8 MPa<br>133.5 to 140.5 kgf/cm$^2$<br>1900 to 2000 psi<br><br>14.5 to 15.2 MPa<br>147.5 to 154.6 kgf/cm$^2$<br>2100 to 2200 psi | –<br><br>– |
| Piston Rod | Bend | – | 0.25 mm<br>0.0098 in. |

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# TIGHTENING TORQUES

## [1] GENERAL USE SCREWS, BOLTS AND NUTS

Screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual should be tightened according to the table below.

| **American standard cap screws with UNC or UNF threads** | | | | **Metric cap screws** | | | |
|---|---|---|---|---|---|---|---|
| **Grade** | SAE 5 or 8 | | | **Grade** | Property class 8.8 (Approx. SAE grade 5) | | |
| **Size** \ Unit | N·m | kgf·m | ft-lbs | **Size** \ Unit | N·m | kgf·m | ft-lbs |
| **1/4** | 9.8 to 11.7 | 1.0 to 1.2 | 7.2 to 8.6 | **M6** | 9.8 to 11.2 | 1.0 to 1.1 | 7.2 to 8.3 |
| **5/16** | 19.0 to 23.1 | 1.9 to 2.4 | 14 to 17 | **M8** | 23.6 to 27.4 | 2.4 to 2.8 | 17.4 to 20.2 |
| **3/8** | 33.9 to 40.7 | 3.5 to 4.2 | 25 to 30 | **M10** | 48.1 to 55.8 | 4.9 to 5.7 | 35.5 to 41.2 |
| **1/2** | 88.1 to 105.8 | 9.0 to 10.8 | 65 to 78 | **M12** | 77.5 to 90.1 | 7.9 to 9.2 | 57.2 to 66.5 |
| **9/16** | 122.0 to 146.4 | 12.4 to 14.9 | 90 to 108 | **M14** | 124 to 147 | 12.6 to 15.0 | 91.2 to 108 |
| **5/8** | 176.3 to 211.5 | 18.0 to 21.6 | 130 to 156 | **M16** | 196 to 225 | 20.0 to 23.0 | 145 to 166 |
| – | – | – | – | **M18** | 275 to 318 | 28.0 to 32.5 | 203 to 235 |

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## [2] HYDRAULIC FITTINGS

| **Item** | Thread size | Tightening torque | | |
|---|---|---|---|---|
| | | N·m | kgf·m | ft-lbs |
| **Adjustable elbow and adapter** | 9/16 | 37 to 44 | 3.7 to 4.6 | 27 to 33 |
| | 3/4 | 47 to 54 | 4.8 to 5.5 | 35 to 40 |
| **Hose fitting and flare nut** | 9/16 | 22 to 25 | 2.2 to 2.6 | 16 to 19 |
| | 3/4 | 35 to 41 | 3.6 to 4.1 | 26 to 30 |
| | 7/8 | 65 to 71 | 6.6 to 7.2 | 48 to 52 |
| | 1/4 | 30 to 35 | 3.1 to 3.6 | 22 to 26 |
| **Adapter (NPT)** | 3/8 | 39 to 44 | 3.9 to 4.4 | 28 to 32 |
| | 1/2 | 49 to 58 | 5.0 to 5.9 | 36 to 43 |

**NOTE : When connecting a hose with flare nut, after tightening the nut with specified torque, return it approximately 45 degrees and re-tighten it to specified torque.**

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# TROUBLESHOOTING

| Symptom | Probable Cause | Solution | Reference Page |
|---|---|---|---|
| **Boom Does Not Rise** | • Control valve malfunctioning | Repair or replace | S-9 |
| | • Boom cylinder defective | Repair or replace | S-12 |
| | • Control lever linkage defective | Repair or replace | – |
| | • Hydraulic pump malfunctioning | Repair or replace | – |
| | • Oil filter clogged | Clean or replace | – |
| | • Relief valve spring damaged | Replace | – |
| | • Hydraulic hose damaged | Replace | – |
| | • Relief valve dirty or stuck | Clean | – |
| **Boom Does Not Lower** | • Control valve malfunctioning | Repair or replace | S-9 |
| **Insufficient Boom Speed** | • Boom cylinder tube worn or damaged | Replace | S-12 |
| | • Boom cylinder piston ring (piston seal and O-ring) worn or damaged | Replace | S-13 |
| | • Oil leaks from tube joints | Repair | – |
| | • Relief valve setting pressure too low | Adjust | S-9 |
| | • Insufficient transmission fluid | Refill | S-2 |
| | • Dirty relief valve | Clean | – |
| **Bucket Does Not Move** | • Control valve malfunctioning | Repair or replace | S-9 |
| | • Bucket cylinder defective | Repair or replace | S-12 |
| | • Control lever linkage defective | Repair or replace | – |
| | • Hydraulic pump malfunctioning | Repair or replace | – |
| | • Oil filter clogged | Clean or replace | – |
| | • Relief valve spring damaged | Replace | – |
| | • Hydraulic hose damaged | Replace | – |
| | • Dirty relief valve | Clean | – |
| **Insufficient Bucket Speed** | • Bucket cylinder tube worn or damaged | Replace | S-12 |
| | • Bucket cylinder piston ring (piston seal and O-ring) worn or damaged | Replace | S-13 |
| | • Oil leaks from tube joints | Repair | – |
| | • Relief valve setting pressure too low | Adjust | S-9 |
| | • Insufficient transmission fluid | Refill | S-2 |
| | • Dirty relief valve | Clean | – |
| **Front End Loader Drops by Its Weight** | • Boom cylinder tube worn or damaged | Replace | S-12 |
| | • Boom cylinder piston ring (piston seal and O-ring) worn or damaged | Replace | S-13 |
| | • Oil leaks from tube joints | Repair | – |
| | • Control valve malfunctioning | Repair or replace | – |

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# SPECIFICATIONS

## LOADER SPECIFICATIONS

| Model | | LA271 | LA301 | LA351 | LA401 |
|---|---|---|---|---|---|
| ASAE Rated Lift Capacity | | 270 kg (595 lbs) | 300 kg (660 lbs) | 350 kg (770 lbs) | 400 kg (882 lbs) |
| ASAE Rated Brakeout Force | | 4450 N (1000 lbs) | 5120 N (1150 lbs) | 5940 N (1335 lbs) | 7060 N (1586 lbs) |
| Boom Cylinder | Bore | 38.1 mm (1.50 in.) | | 44.5 mm (1.75 in.) | |
| | Stroke | 307 mm (12.10 in.) | | 289 mm (11.40 in.) | 435 mm (17.13 in.) |
| Bucket Cylinder | Bore | 38.1 mm (1.50 in.) | | 44.5 mm (1.75 in.) | |
| | Stroke | 330 mm (13.00 in.) | | | 450 mm (17.72 in.) |
| Control Valve | 3 Position Bucket Control Valve Type | – | | | One Detent Float Position, Power Beyond Circuit |
| | 4 Position Bucket Control Valve Type | One Detent Float Position, Two Stage Bucket Dump, Power Beyond Circuit | | | |
| Relief Valve Setting Pressure | | 133.5 to 140 kgf/cm$^2$ (1900 to 2000 psi) | 147.5 to 154.6 kgf/cm$^2$ (2100 to 2200 psi) | 133.5 to 140.5 kgf/cm$^2$ (1900 to 2000 psi) | |
| Net Weight (Approx.) | | 208 kg (460 lbs) | 216 kg (475 lbs) | 226 kg (500 lbs) | 280 kg (617 lbs) |

| Model | | LA272 | LA302 | LA352 | LA402 |
|---|---|---|---|---|---|
| ASAE Rated Lift Capacity | | 270 kg (595 lbs) | 300 kg (660 lbs) | 350 kg (770 lbs) | 400 kg (882 lbs) |
| ASAE Rated Brakeout Force | | 4460 N (1005 lbs) | 4990 N (1120 lbs) | 5940 N (1335 lbs) | 7500 N (1685 lbs) |
| Boom Cylinder | Bore | 38.1 mm (1.50 in.) | | 44.5 mm (1.75 in.) | |
| | Stroke | 307 mm (12.10 in.) | | 289 mm (11.40 in.) | 435 mm (17.13 in.) |
| Bucket Cylinder | Bore | 38.1 mm (1.50 in.) | | 44.5 mm (1.75 in.) | |
| | Stroke | 330 mm (13.00 in.) | | | 450 mm (17.72 in.) |
| Control Valve | 3 Position Bucket Control Valve Type | One Detent Float Position, Power Beyond Circuit | | | |
| | 4 Position Bucket Control Valve Type | One Detent Float Position, Two Stage Bucket Dump, Power Beyond Circuit | | | |
| Relief Valve Setting Pressure | | 133.5 to 140 kgf/cm$^2$ (1900 to 2000 psi) | 147.5 to 154.6 kgf/cm$^2$ (2100 to 2200 psi) | 133.5 to 140.5 kgf/cm$^2$ (1900 to 2000 psi) | |
| Net Weight (Approx.) | | 208 kg (460 lbs) | 216 kg (475 lbs) | 226 kg (500 lbs) | 280 kg (617 lbs) |

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