

Compact Excavator

TB15FR
TB25FR

BOOK No: CC5E000

WORKSHOP
MANUAL

TAKEUCHI

Product: Takeuchi TB15FR, TB25FR Mini Compact Excavator Service Repair Workshop Manual(Book No: CC5E000)
Full Download: <https://www.aresrepairmanual.com/downloads/takeuchi-tb15frtb25fr-mini-compact-excavator-service-repair-workshop-manualbook-no-cc5e000/>

Product: Takeuchi TB15FR, TB25FR Mini Compact Excavator Service Repair Workshop Manual(Book No. CC5E000)

Full Download: <https://www.aresrepairmanual.com/downloads/takeuchi-tb15frtb25f>

r-mini-compact-excavator-service-repair-workshop-manualbook-
no-cc5e000/

II. SPECIFICATIONS

SPECIFICATIONS

CONTENTS

Standards for Judging Performance.....	3
Reference Value Table.....	3
Methods for Inspecting Performance.....	7

In regard to Standard Values and Allowable Values

The terms used in the items "Servicing Standards" and "Standards for Judging Performance" have the following meanings.

Standard Value This indicates the standard value for the new machine at the time of shipping from the factory. It should be used as the target value for maintenance work after operation.

Allowable Value The dimensions of parts change during use because of wear and deformation. Also, the performance of pumps, motors, and other hydraulic equipment drops, and this is the estimated value indicating the use limit for the respective part. It is decided under reference to the standard at the time of shipping, the results of various tests, etc. As the use conditions, the degree of repairs, etc., differ for each machine, these should be combined and used as reference for servicing standards and standards for judging performance.

* Do not use the standard values and the allowable values as standards for customer claims.

STANDARDS FOR JUDGING PERFORMANCE

REFERENCE VALUE TABLE

■ TB15FR

Serial Number				11810004~	
Item		Unit	Standard Values	Allowable Values	
Engine Speed	High	min ⁻¹	2270 ±50	—	
	Low	min ⁻¹	1100 ±100	—	
Hydraulic Oil Pressure					
	Boom	MPa	19.6 $^{+1.2}_0$	—	
	Arm	MPa	19.6 $^{+1.2}_0$	—	
	Dozer Blade	MPa	17.7 $^{+1.2}_0$	—	
	Slew	MPa	11.8 ±2.2	—	
	Pilot Pressure	MPa	3.4 ±0.3	—	
Travel					
Travel Speed (5 rev.)					
Steel Crawler	Low Speed	s			
	High Speed	s			
Rubber Crawler	Low Speed	s	25.5 ±1.2	29.3	
	High Speed	s	13.6 ±0.8	16.3	
Travel Speed (10m)					
Steel Crawler	Low Speed	s			
	High Speed	s			
Rubber Crawler	Low Speed	s	15.4 ±1.0	17.9	
	High Speed	s	8.5 ±0.8	10.5	
Travel Curve		mm	125 $^0_{-125}$	500	
Natural Travel drop		mm	0	—	
Slew					
Slew Time		s	13.3 ±0.8	15.4	
Overrun When Slewing Stops		mm	40.0 ±20	77	
Natural Slew Drop		mm	0	—	
Cylinders					
Cylinder Speed					
Boom	Extended	s	3.1 ±0.4	3.8	
	Retracted	s	3.8 ±0.6	4.8	
Arm	Extended	s	3.8 ±0.4	4.6	
	Retracted	s	3.0 ±0.4	3.7	
Bucket	Extended	s	2.6 ±0.4	3.3	
	Retracted	s	1.8 ±0.4	2.4	
Dozer Blade	Extended	s	2.2 ±0.4	2.8	
	Retracted	s	2.3 ±0.4	2.9	
Offset	Extended	s	4.2 ±0.4	5.0	
	Retracted	s	3.0 ±0.4	3.7	

SPECIFICATIONS

STANDARDS FOR JUDGING PERFORMANCE

Serial Number		11810004~		
Item	Unit	Standard Values	Allowable Values	
Cylinders				
Natural Cylinder Drop				
Boom	mm	12 ⁰ _{-.12}	24	
Arm	mm	5 ⁰ _{.5}	10	
Bucket	mm	3 ⁰ _{.3}	6	
Dozer Blade	mm	3 ⁰ _{.3}	6	
Offset	mm	5 ⁰ _{.5}	10	
Bucket Tip	mm	140 ⁰ _{-.140}	560	
Levers				
Lever Operating Force				
Boom	N	6.9 ± 2.9		
Arm	N	6.9 ± 2.9		
Bucket	N	6.9 ± 2.9		
Slew	N	6.9 ± 2.9		
Travel	N	9.8 ± 2.9		
Dozer Blade	N			
Offset	N	41.2 ± 11.8		
Lever Play				
Boom	mm	4 ⁰ _{.4}		
Arm	mm	4 ⁰ _{.4}		
Bucket	mm	4 ⁰ _{.4}		
Slew	mm	4 ⁰ _{.4}		
Travel	mm	40 ⁰ _{-.40}		
Dozer Blade	mm	15 ⁰ _{.15}		
Slew Bearing				
Backlash	mm	20 ± 15	75	
Slew Bearing Play	mm	0.7 ± 0.3	1.5	
Crawler				
Crawler Tension	Steel	mm	100~115	—
	Rubber	mm	65~70	—

■ TB25FR

Serial Number			12810004~	
Item		Unit	Standard Values	Allowable Values
Engine Speed	High	min ⁻¹	2400 ±60	—
	Low	min ⁻¹	1050 ⁺¹⁰⁰ / ₋₅₀	—
Hydraulic Oil Pressure				
	Boom	MPa	21.1 ±1.0	—
	Arm	MPa	21.1 ±1.0	—
	Dozer Blade	MPa	17.7 ^{+1.5} / ₀	—
	Slew	MPa	14.7 ⁺²⁰ / ₀	—
	Pilot Pressure	MPa		—
Travel				
Travel Speed (5 rev.)				
Steel Crawler	Low Speed	s		
	High Speed	s		
Rubber Crawler	Low Speed	s	31.3 ±1.2 (12810004~12810091)	35.6
		s	33.0 ± 1.2 (12810092~)	37.3
	High Speed	s	17.7 ± 1.7 (12810004~12810091)	20.9
		s	18.6 ± 0.7 (12810092~)	21.8
Travel Speed (10m)				
Steel Crawler	Low Speed			
	High Speed			
Rubber Crawler	Low Speed	s	15.3 ±1.0	17.8
	High Speed	s	8.8 ±0.7	10.7
Travel Curve		mm	125 ⁰ / _{±25}	500
Natural Travel drop		mm	60 ⁰ / _±	120
Slew				
Slew Time		s	12.7 ±0.5	14.5
Overrun When Slewing Stops		mm	85 ±35	157
Natural Slew Drop		mm	10 ⁰ / _±	20
Cylinders				
Cylinder Speed				
Boom	Extended	s	2.6 ±0.5	3.4
	Retracted	s	2.3 ±0.5	3.0
Arm	Extended	s	3.6 ±0.4	4.4
	Retracted	s	3.3 ±0.4	4.0
Bucket	Extended	s	3.0 ±0.4	3.7
	Retracted	s	2.2 ±0.4	2.8
Dozer Blade	Extended	s	3.0 ±0.4	3.7
	Retracted	s	2.9 ±0.4	3.6
Offset	Extended	s	4.3 ±0.4	5.1
	Retracted	s	3.0 ±0.4	3.7

SPECIFICATIONS

STANDARDS FOR JUDGING PERFORMANCE

Serial Number		12810004~		
Item	Unit	Standard Values	Allowable Values	
Cylinders				
Natural Cylinder Drop				
Boom	mm	10^{0}_{-10}	20	
Arm	mm	10^{0}_{-10}	20	
Bucket	mm	10^{0}_{-10}	20	
Dozer Blade	mm	5^{0}_{-5}	10	
Offset	mm	5^{0}_{-5}	10	
Bucket Tip	mm	125^{0}_{-125}	500	
Levers				
Lever Operating Force				
Boom	N	6.9 ± 2.9		
Arm	N	6.9 ± 2.9		
Bucket	N	6.9 ± 2.9		
Slew	N	6.9 ± 2.9		
Travel	N	14.7 ± 4.9		
Dozer Blade	N	14.7 ± 4.9		
Offset	N	41.2 ± 11.8		
Lever Play				
Boom	mm	4^{0}_{-4}		
Arm	mm	4^{0}_{-4}		
Bucket	mm	4^{0}_{-4}		
Slew	mm	4^{0}_{-4}		
Travel	mm	40^{0}_{-40}		
Dozer Blade	mm	15^{0}_{-15}		
Slew Bearing				
Backlash	mm	20 ± 15	75	
Slew Bearing Play	mm	0.7 ± 0.4	1.8	
Crawler				
Crawler Tension	Steel	mm	145~155	—
	Rubber	mm	77~87	—

METHODS FOR INSPECTING PERFORMANCE

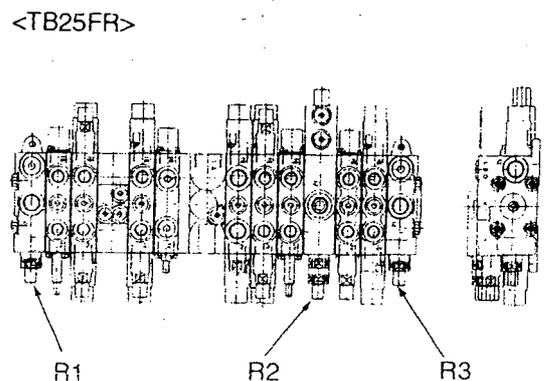
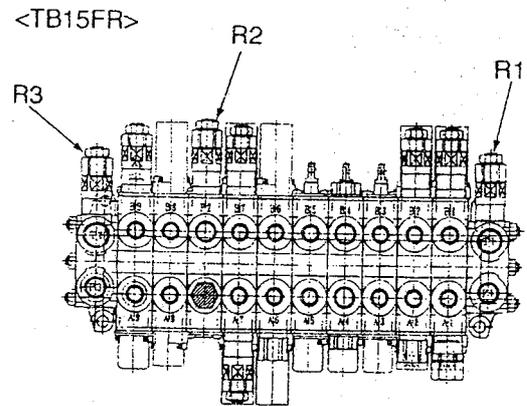
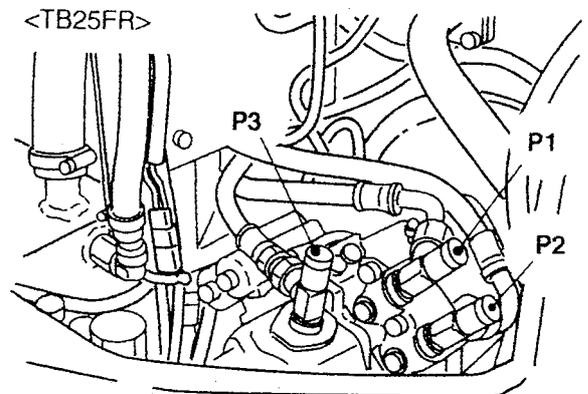
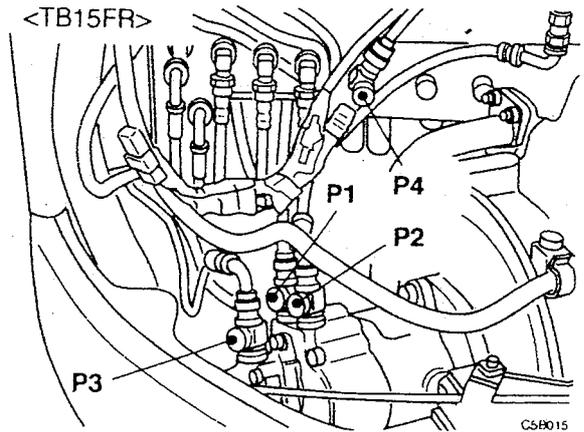
Hydraulic Oil Pressure (Main Relief Valve Set Pressure)

Boom, Arm

Measuring Method

- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Mount the pressure gauge on the pressure detection port, operate the desired hydraulic circuit and measure the relief pressure.

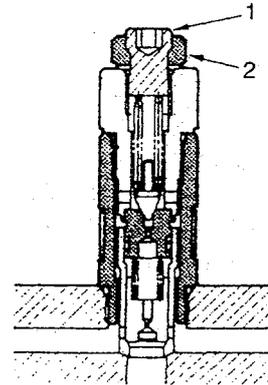
Circuit	Pressure Detection Port		Relief Valve
	Port Position	Size	
Boom	P1	G1/4	R1
Arm	P2	G1/4	R2



Adjusting Method

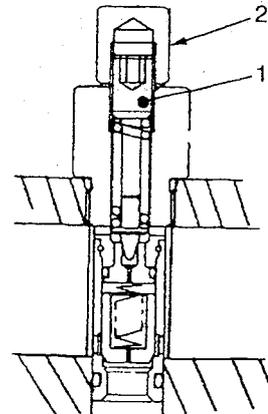
1. Loosen locknut (2), then begin adjusting pressure by turning setting screw (1).
Turning clockwise raises the set pressure.
Turning counterclockwise lowers the set pressure.
2. In order to keep the setting screw from turning after pressure has been adjusted, tighten the locknut while at the same time holding the setting screw firmly in place.
3. Operate the relief valve once more to confirm that the pressure that has been set it stabilized.

<TB15FR>



E4B016

<TB25FR>



C5B016

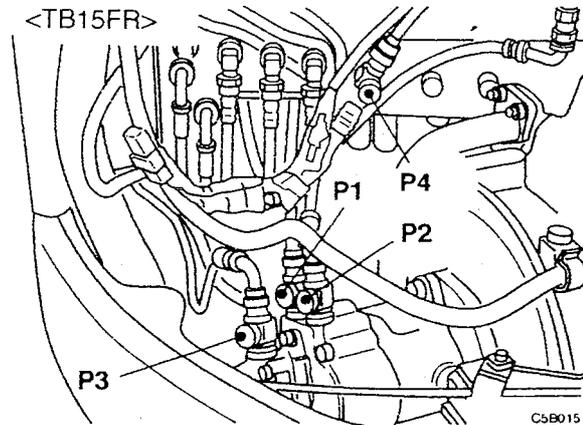
Dozer Blade

Measuring Method

- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Mount the pressure gauge on the pressure detection port, operate the desired hydraulic circuit and measure the relief pressure.

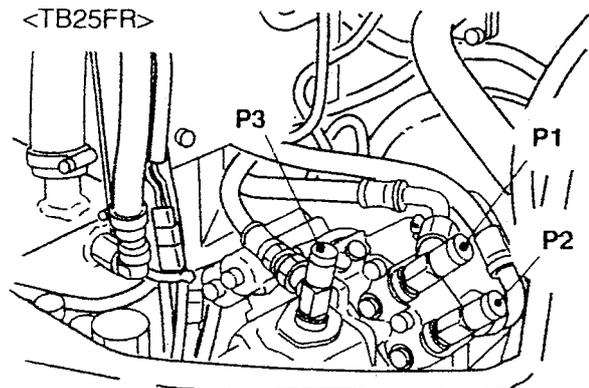
Circuit	Pressure Detection Port		Relief Valve
	Port Position	Size	
Dozer Blade	P3	G1/4	R3

<TB15FR>

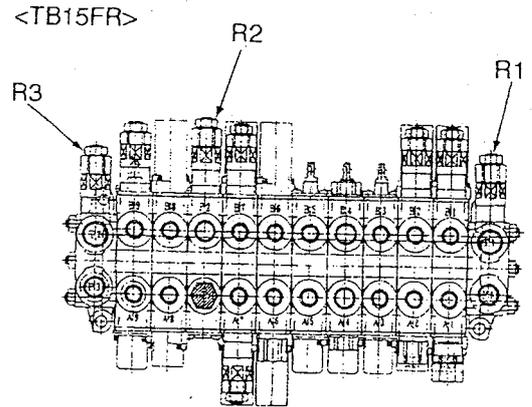


C5B015

<TB25FR>

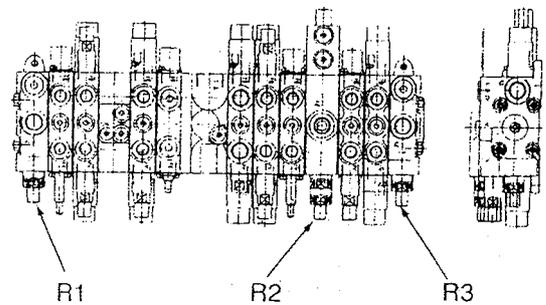


E4B015



C58018

<TB25FR>

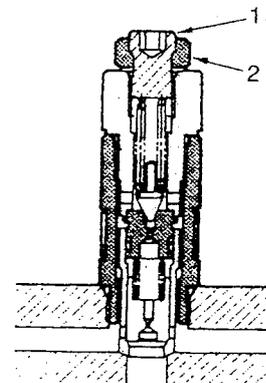


E48018

Adjusting Method

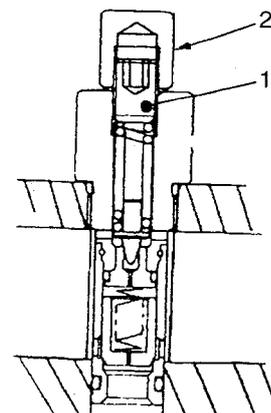
1. Loosen locknut (2), then begin adjusting pressure by turning setting screw (1).
Turning clockwise raises the set pressure.
Turning counterclockwise lowers the set pressure.
2. In order to keep the setting screw from turning after pressure has been adjusted, tighten the locknut while at the same time holding the setting screw firmly in place.
3. Operate the relief valve once more to confirm that the pressure that has been set it stabilized.

<TB15FR>



E48016

<TB25FR>



C58016

Hydraulic Oil Pressure (Slewing Relief Valve Set Pressure)

Measuring Method

- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Mount the pressure gauge on the pressure detection port and set a solid obstacle so that the upperstructure cannot slew in the direction to be measured. Next, operate the circuit to be measured and measure the relief pressure.

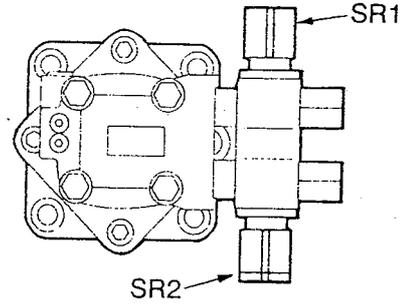
Circuit	Pressure Detection Port		Relief Valve
	Port Position	Size	
Right Slew	P3	G1/4	SR1
Left Slew	P3	G1/4	SR2

Adjusting Method

<TB25FR>

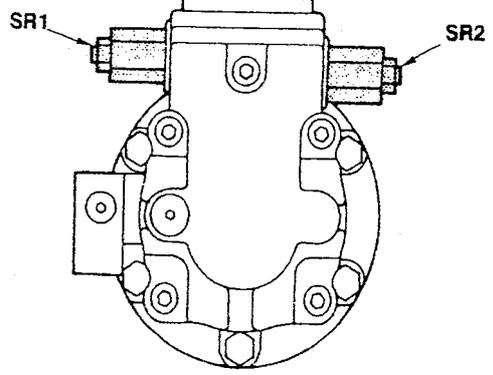
1. Loosen locknut (2), then begin adjusting pressure by turning setting screw (1).
Turning clockwise raises the set pressure.
Turning counterclockwise lowers the set pressure.
2. In order to keep the setting screw from turning after pressure has been adjusted, tighten the locknut while at the same time holding the setting screw firmly in place.
3. Operate the relief valve once more to confirm that the pressure that has been set it stabilized.

<TB15FR>



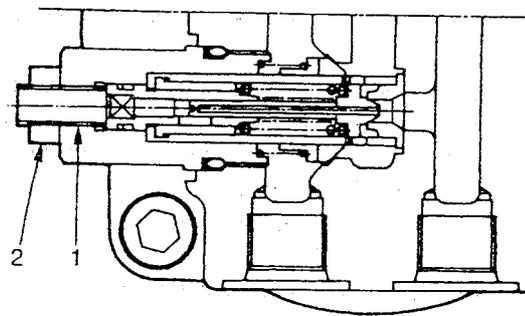
C5B017

<TB25FR>



E5B017

<TB25FR>

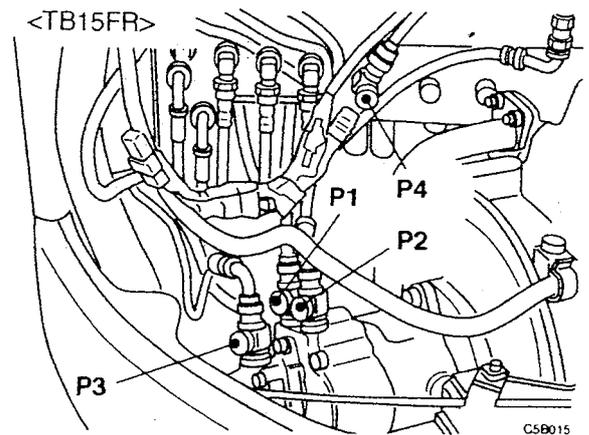


L2B019

Hydraulic Oil Pressure (Pilot Relief Valve Set Pressure)**Measuring Method**

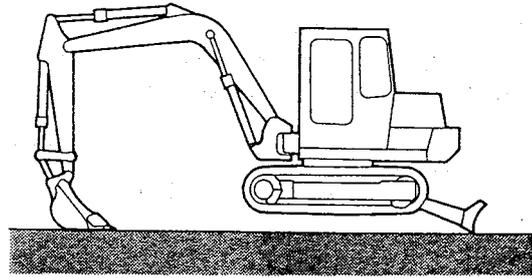
- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Mount pressure gauge on the pressure detection port and measure the pilot relief pressure.

Pressure Detection Port		Relief Valve
Port Position	Size	
P4	G1/4	R4



Travel Speed (5 Revolutions)

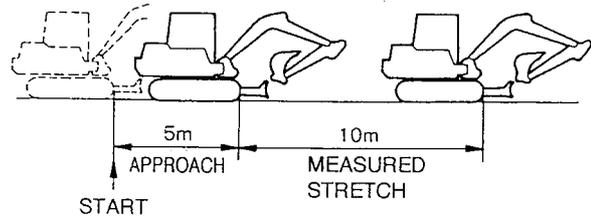
- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Excavator body raised using both hoe attachment and dozer blade.
- Set crawler belts in motion. Starting after one full revolution, measure the time required for 5 revolutions. (To measure speed after it has stabilized.)



Y2-B229

Travel Speed (10m)

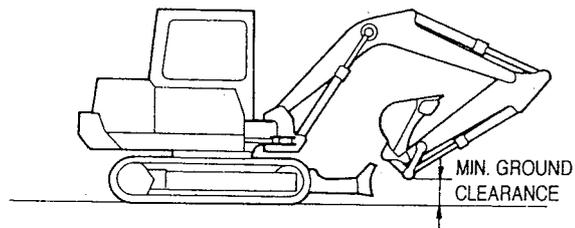
- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Travel Posture
- Set excavator in motion. Starting after a distance of 5 meters, measure the time required to travel 10 meters. Do this on level ground.



Y2-B230

■ **Travel Posture**

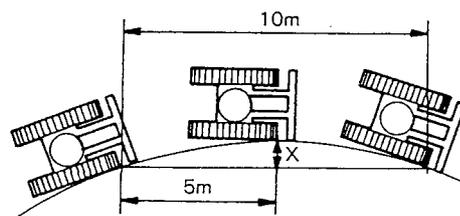
Fully extend the arm and bucket cylinders and adjust the hoe attachment so that its lowest part is even with the excavator's minimum ground clearance level. The hoe attachment, of course, should be in a no-load state and the dozer blade should not be touching the ground.



Y2-B231

Travel Curve

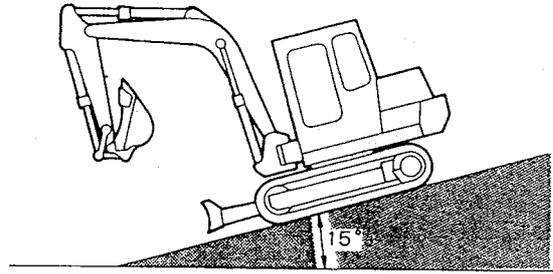
- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Travel Posture
- Starting after an approach of 5 meters, drive the excavator in a turn for 10 meters, then measure the distance of X (5 m point). Do this on level ground.



Y2-B232

Natural Travel Drop

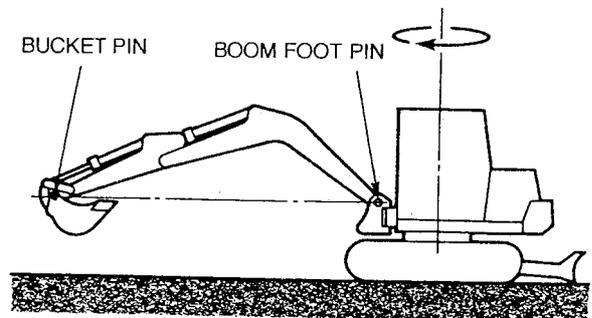
- Engine : Stopped
- Hydraulic Oil Temp. : 50~60°C
- Gradient : 15°
- Measurement Posture: Fully extend the boom, arm and bucket cylinder and completely retract the dozer blade cylinder.
- With the excavator parked at angle for 5 minutes, measure the extent of natural drop.



Y2-B233

Slew Time

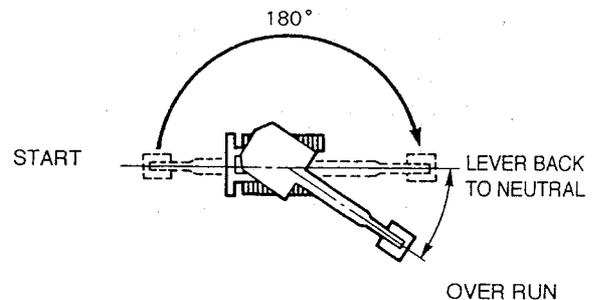
- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Completely retract the arm cylinder, fully extend the bucket cylinder and adjust so that boom foot pin and bucket pin are at matching height. Rest the dozer blade on the ground.
- With the hoe attachment in a no-load state, wait 1 rotation, then measure the time required for the next 2 rotations.



Y2-B234

Overrun When Slewing Stops

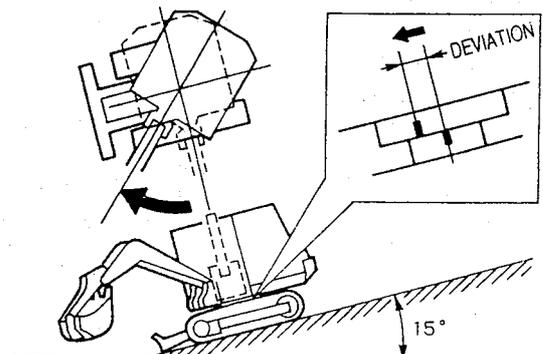
- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Same as that for measuring slew time.
- Draw matching marks on the outer race of the slew bearing and lower frame at an exactly 180 degrees rotation from the starting point. With the hoe attachment in a no-load state, rotate 180 degrees at, which point return the operation lever to neutral. Measure the differential between the position marks and the point the hoe attachment stops.



Y2-B235

Natural Slew Drop

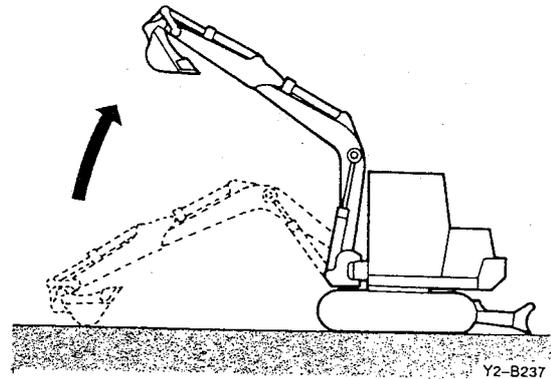
- Engine : Stopped
- Hydraulic Oil Temp. : 50~60°C
- Gradient : 15°
- Measurement Posture: Same as that for measuring slew time.
- Rotate the upper machinery so that it is directly abeam of the grade, then draw positional marks on the slew bearing's outer race and the lower frame. Then measure the distance that develops between the marks after 5 minutes.



Y2-B236

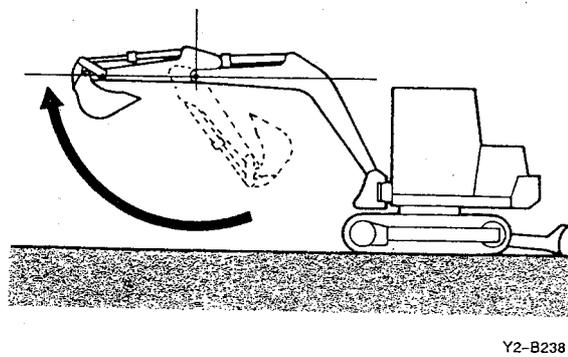
Boom Cylinder Speed

- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Completely retract the arm cylinder, fully extend the bucket cylinder and rest the dozer blade on the ground.
- Then measure the time required for the bucket to reach its highest elevation point (lowest point) from its lowest point (highest point) resting on the ground. (Do not include the cushioning time.)



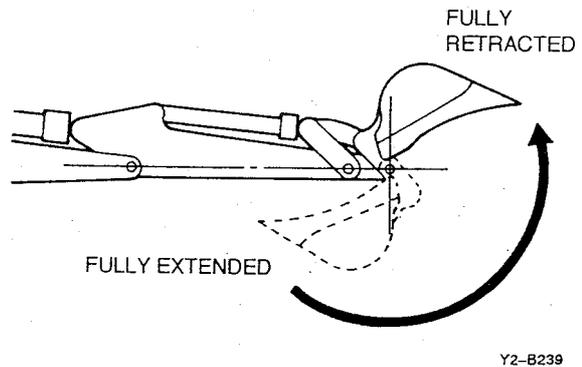
Arm Cylinder Speed

- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Completely retract the arm cylinder, fully extend the bucket cylinder, position the arm horizontally and rest the dozer blade on the ground.
- Then measure the time required for the arm cylinder to completely retract (extend) from a fully extended state (retracted state).



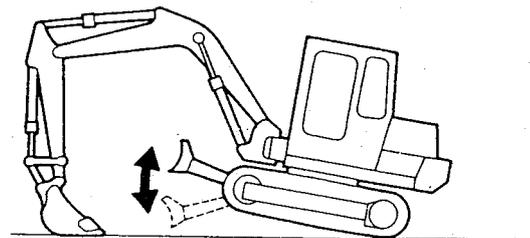
Bucket Cylinder Speed

- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Completely retract the arm cylinder, position the arm horizontally and rest the dozer blade on the ground.
- Then measure the time required for the bucket cylinder to completely retract (extend) from a fully extended state (retracted state).



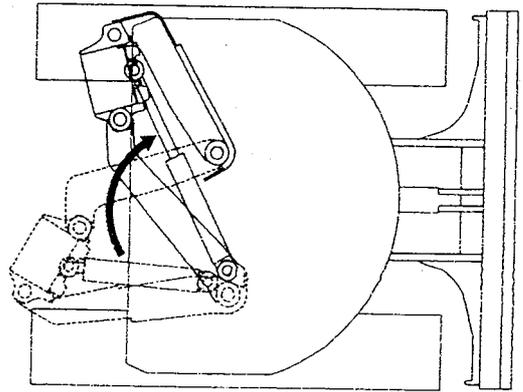
Dozer Blade Cylinder Speed

- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Using the hoe attachment, lift up the dozer blade end of the excavator.
- Then, raising and lowering the dozer blade full stroke, measure the time required per stroke in each direction.



Offset Cylinder Speed

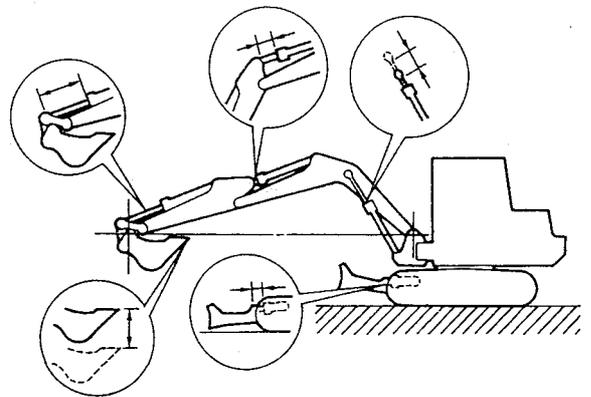
- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Same as that for measuring slew time.
- While swinging the boom left (right) to right (left), measure the time required for a full stroke each way.
(Do not include the cushioning time.)



L2F022

Natural Cylinder Drop**Boom, Arm, Bucket, Dozer Blade, Bucket Tip**

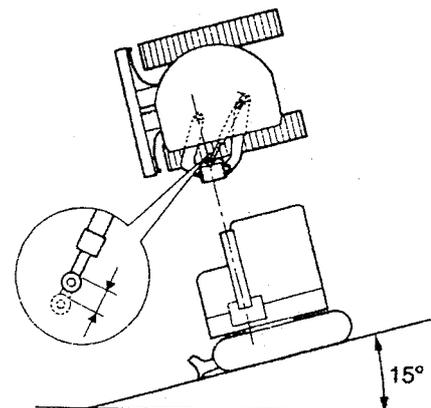
- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Measurement Posture: Completely retract the dozer blade and arm cylinders, fully extend the bucket cylinder and adjust the bucket pin position to the same height as the boom foot pin.
- Maintain this position for 10 minutes, then measure the change in rod length and the distance the bucket tip falls.



Y2-B243

Offset Cylinder

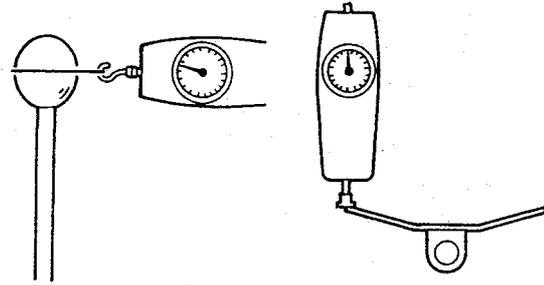
- Engine : Stopped
- Hydraulic Oil Temp. : 50~60°C
- Gradient : 15°
- Measurement Posture: Same as that for measuring slew time.
- Rotate the upper machinery so that it is directly above the grade, then measure the change in rod length after 5 minutes.



L2F023

Lever Operating Force

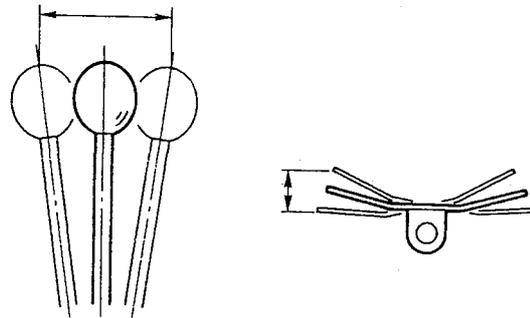
- With the engine stopped, attach a push-pull scale to the center of the operation lever's handle grip, or in the case of a pedal, position a push-pull scale to its tip and record the measurement at the point the lever/pedal reaches full stroke.



Y2-B245

Lever Play

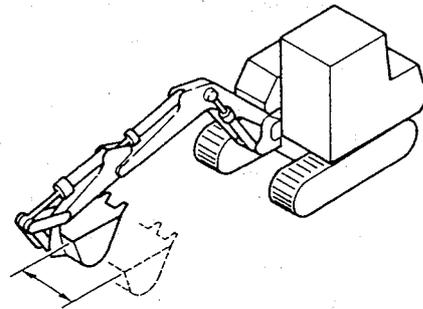
- Measure any discernible play at the tip of the lever (pedal).



Y2-B246

Backlash

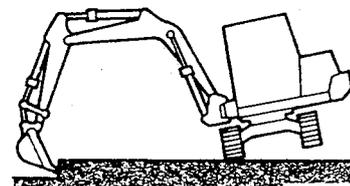
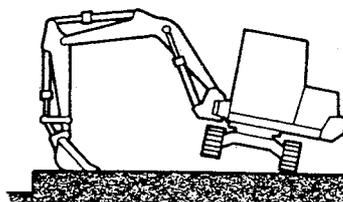
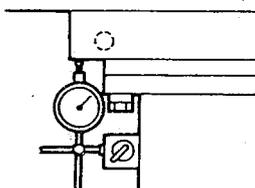
- Measurement Posture : Completely retract the arm cylinder and fully extend the bucket cylinder.
- Move the tips of the bucket teeth from side to side (left and right) and measure the play.



Y2-B247

Slew Bearing Play

1. Attach a dial gauge to the bottom face of the slew bearing's race located near the front of the upper machinery.
2. Raise the crawler on one side off the ground and set the dial gauge to zero.
3. Then raise the opposite crawler and read the dial gauge.

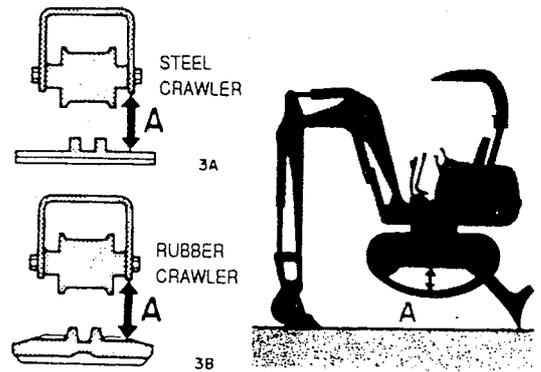


Y2-B248

Crawler Tension

- Raise the excavator completely off the ground using the hoe attachment and dozer blade. Then measure the distance (of droop) between the center point on the crawler frame and top of the crawler shoe.

Note: For the rubber crawler, the measuring should be performed after placing the joint portion with "M" mark to the top center.



Y2-093

III . MACHINE CONFIGURATION

CONTENTS

Drive System 3

Slew System 9

Travel System 11

Upper Frame 15

Control System 19

Attachments 25

Hydraulic System 27

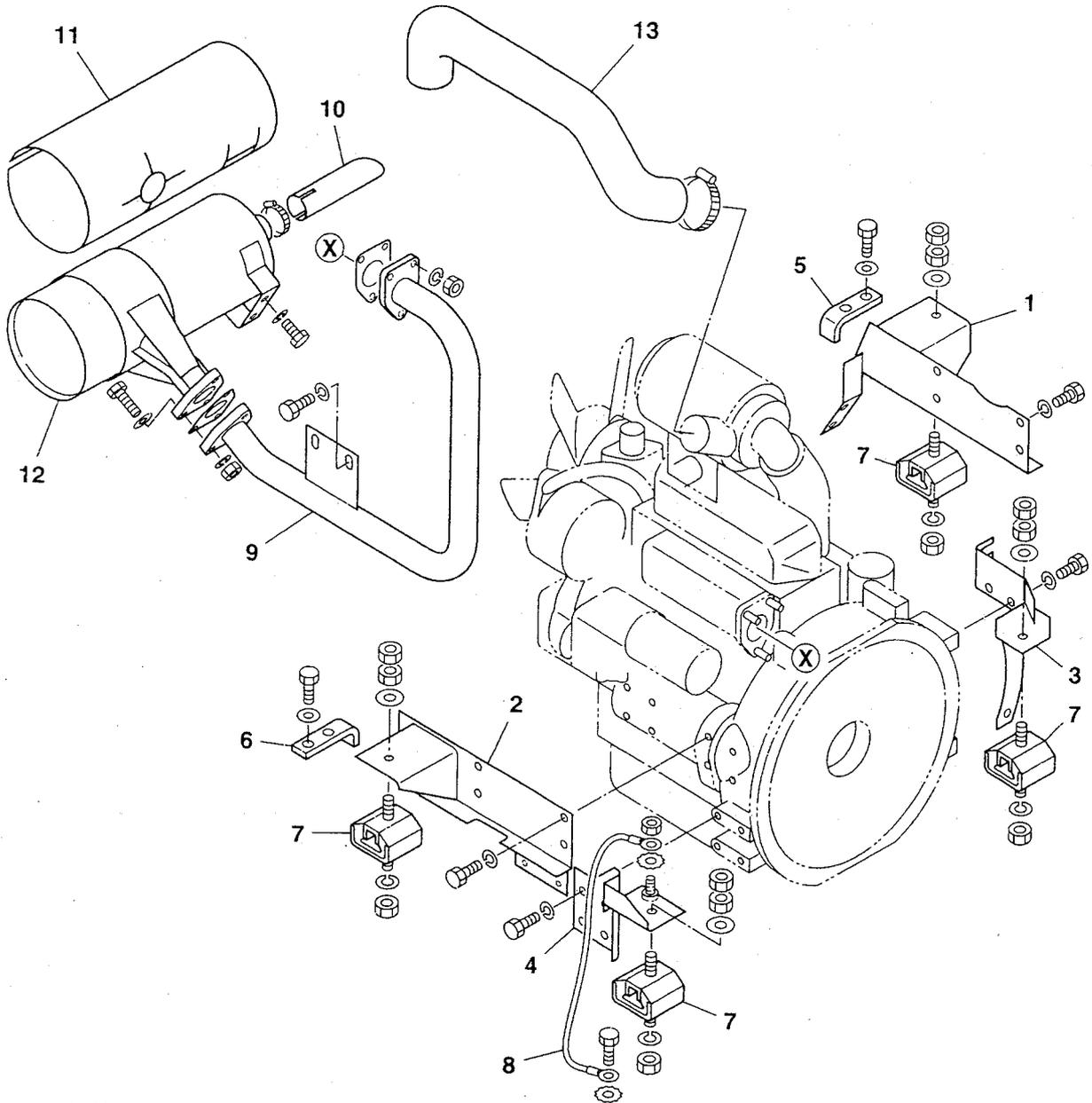
Electrical System 33

DRIVE SYSTEM

CONSTRUCTION

Engine Mount

■ TB15FR



A: 241 N·m

B: 193 N·m

C: 55 N·m

Apply thread-locking compound.

C5C100

1. Engine Foot FR

2. Engine Foot FL

3. Engine Foot RR

4. Engine Foot RL

5. Stopper

6. Stopper

7. Cushion Rubber

8. Ground Cable

9. Exhaust Pipe

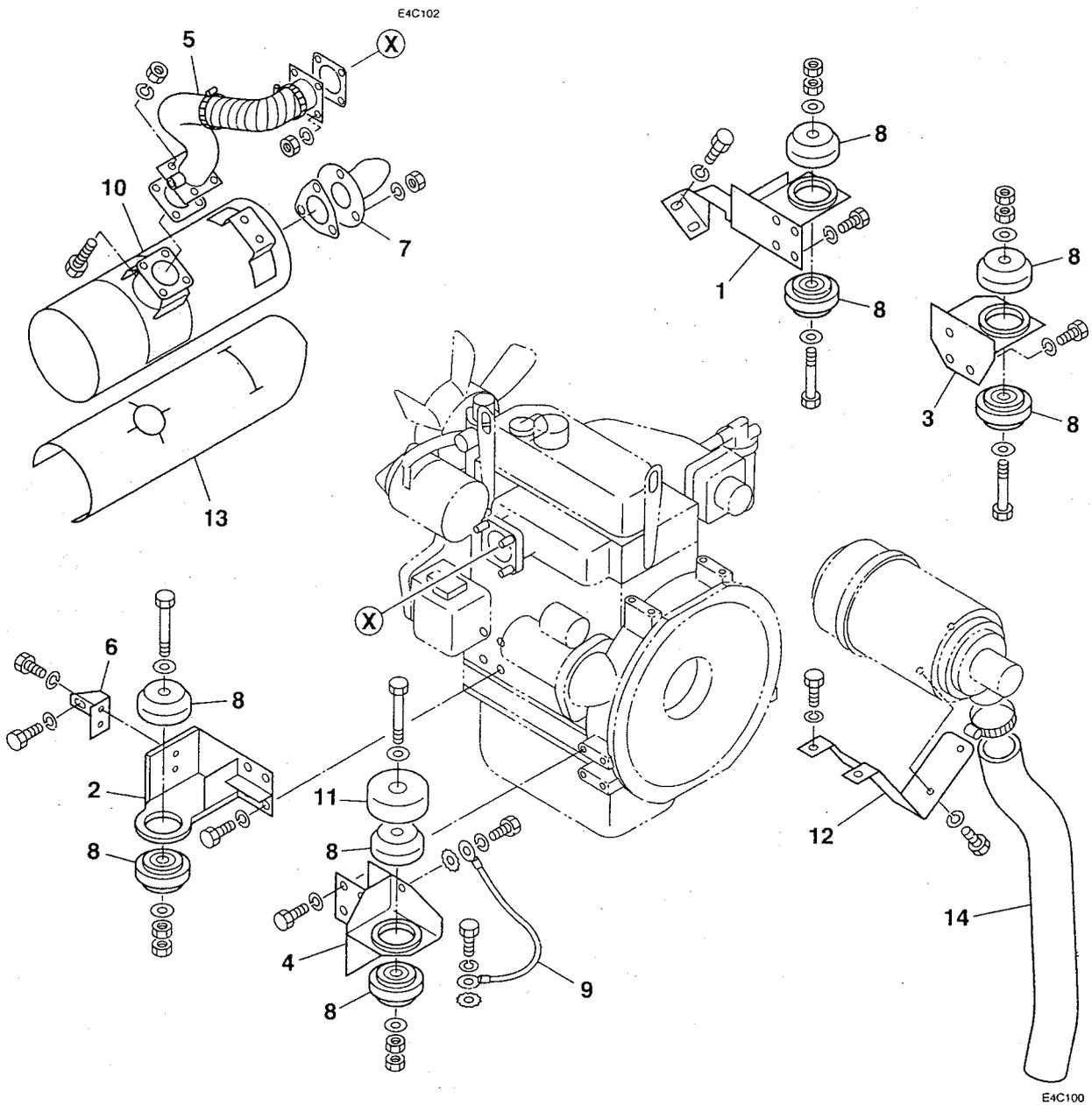
10. Exhaust Pipe

11. Insulator

12. Silencer

13. Air Hose

■ TB25FR



A: ⇨ 241 N·m

B: ⇨ 193 N·m

C: ⇨ 55 N·m

Apply thread-locking compound.

1. Engine Foot FR

2. Engine Foot FL

3. Engine Foot RR

4. Engine Foot RL

5. Exhaust Pipe

6. Angle

7. Exhaust Pipe

8. Cushion Rubber

9. Ground Cable

10. Silencer

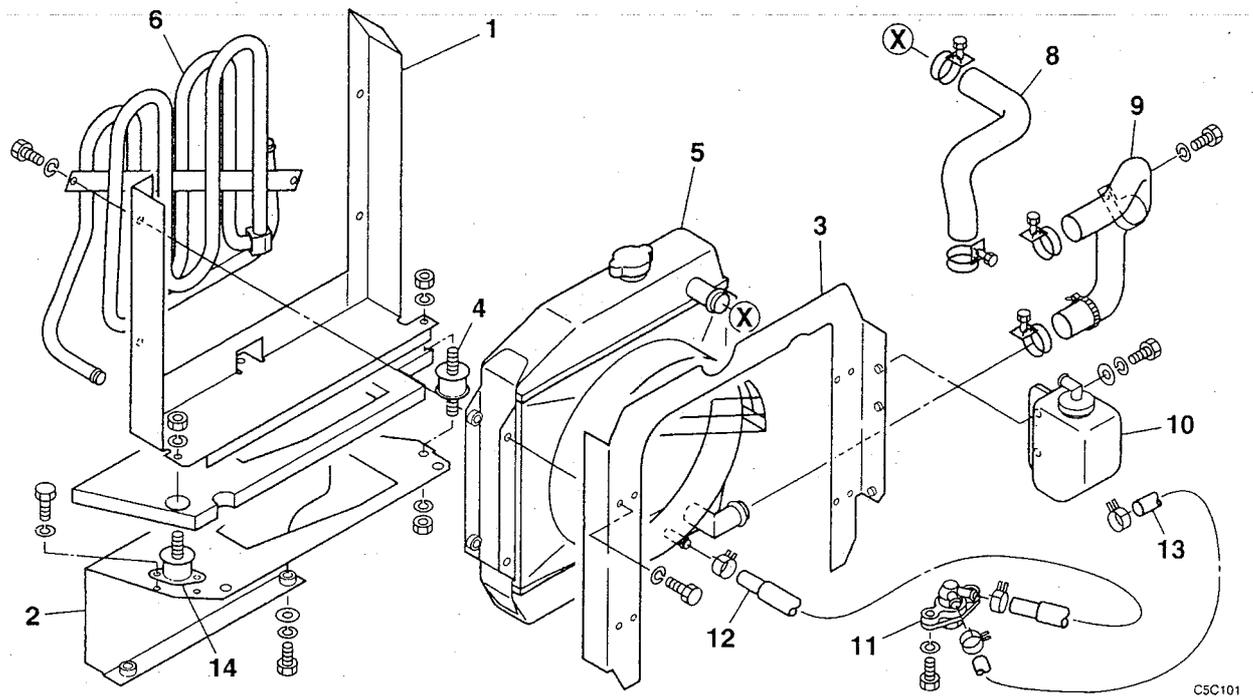
11. Cover

12. Bracket

13. Insulator

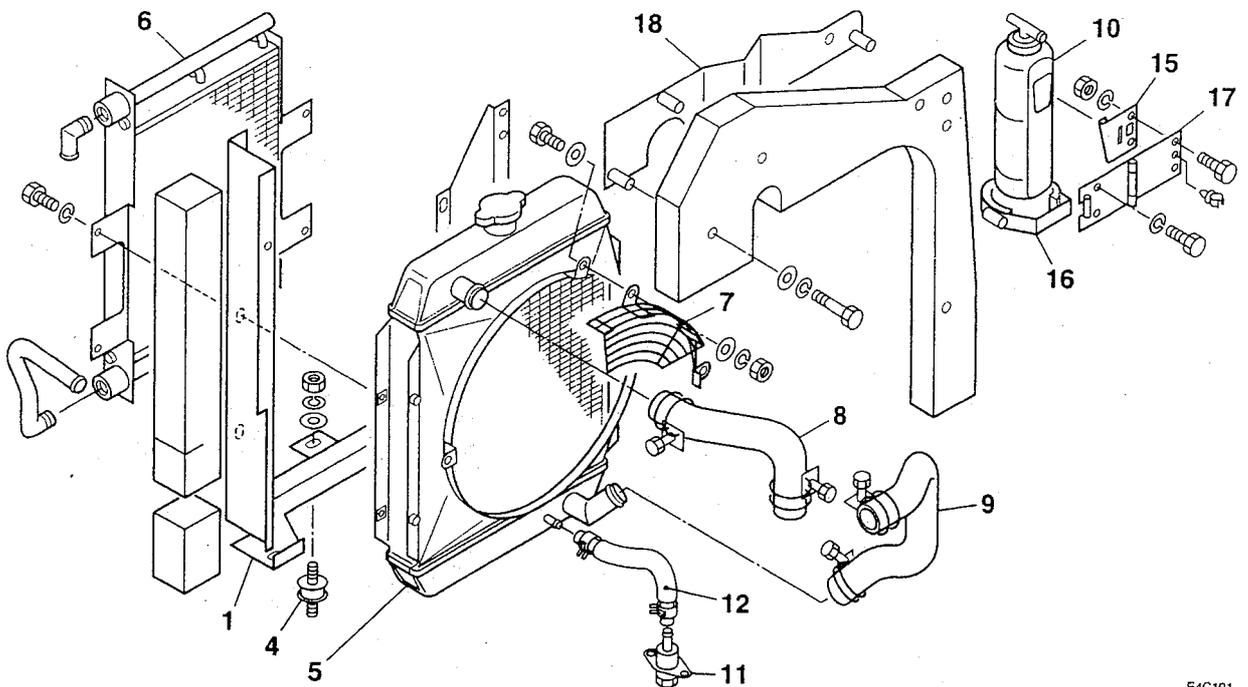
14. Air Hose

Radiator
 ■ TB15FR



C5C101

■ TB25FR

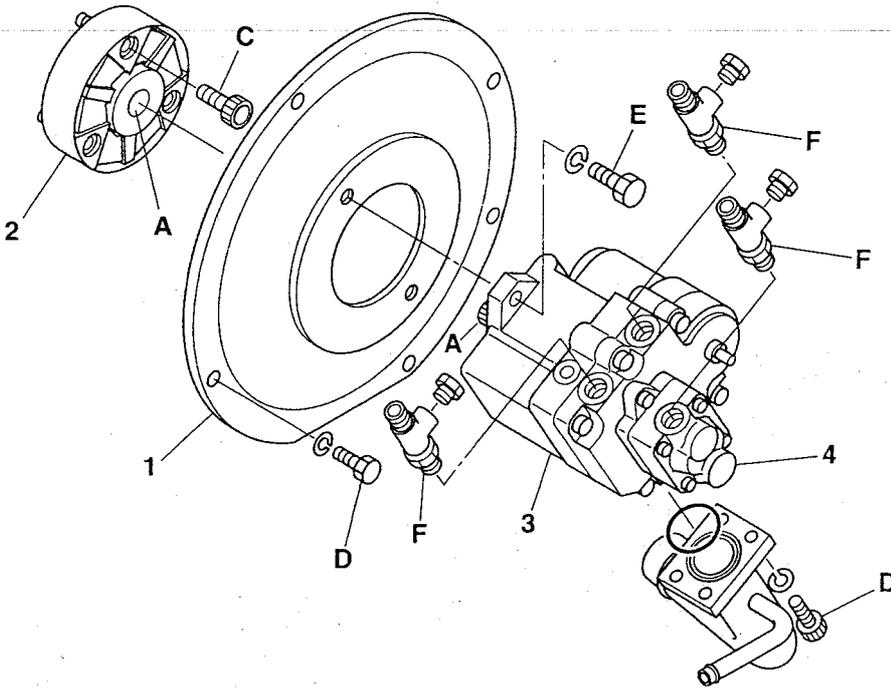


E4C101

- | | | |
|-------------------|--------------------------|--------------------|
| 1. Bracket | 7. Fan Guard | 13. Drain Hose |
| 2. Cover | 8. Radiator Hose (Upper) | 14. Cushion Rubber |
| 3. Plate | 9. Radiator Hose (Lower) | 15. Bracket |
| 4. Cushion Rubber | 10. Sub Tank | 16. Band |
| 5. Radiator | 11. Drain Cock | 17. Hinge |
| 6. Oil Cooler | 12. Drain Hose | 18. Plate |

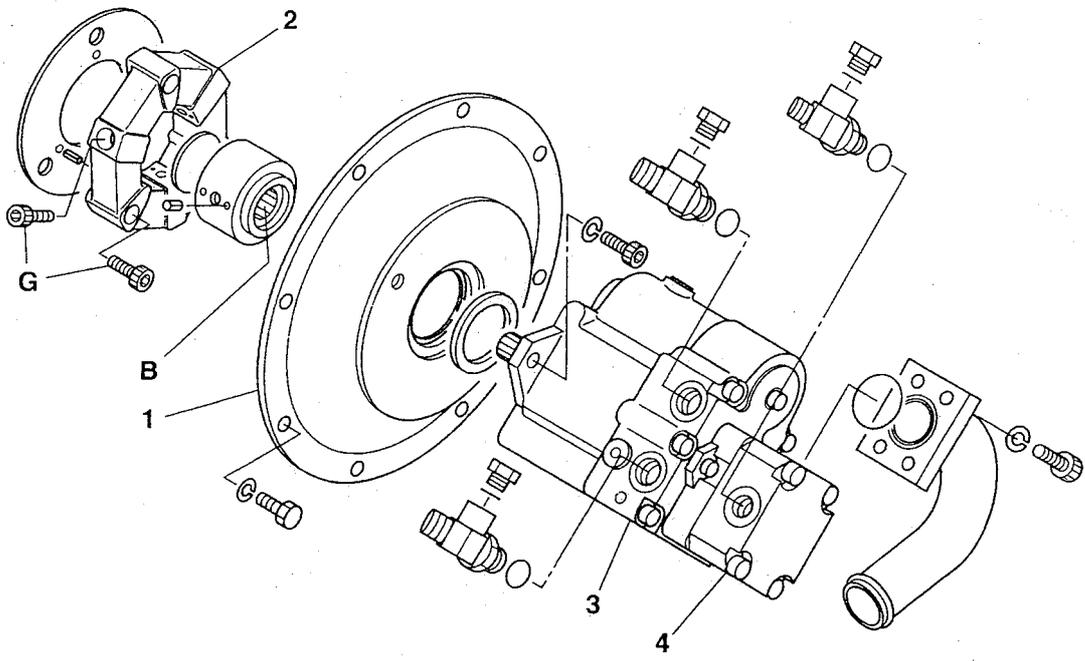
Pump Coupling

■ TB15FR



CSC102

■ TB25FR



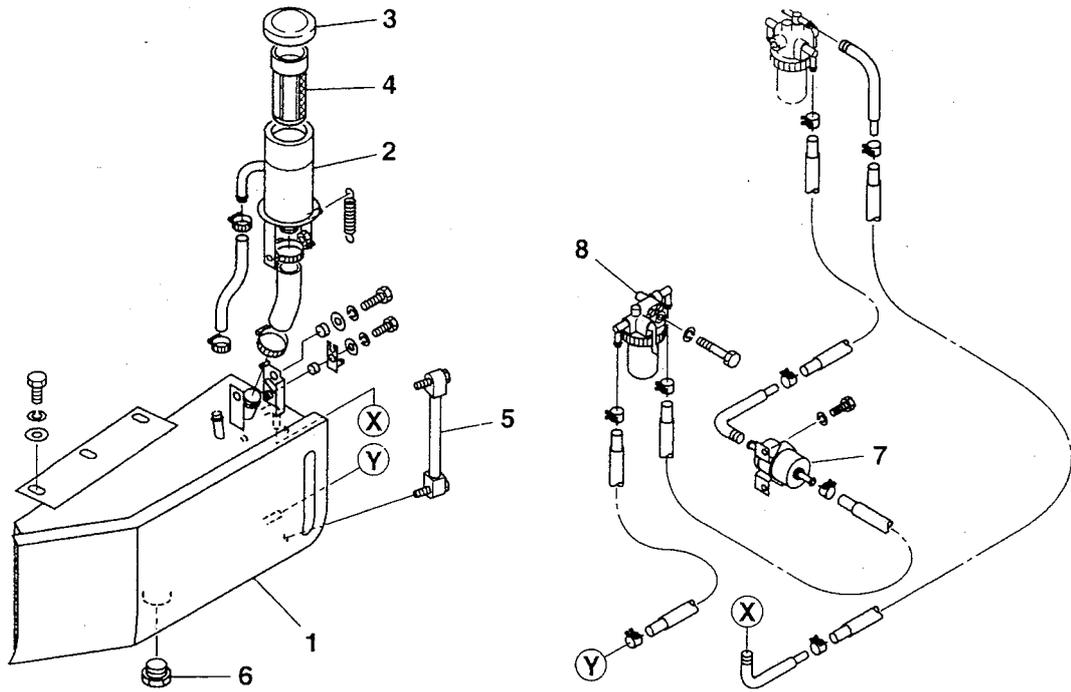
E4C102

- A: Apply molybdenum disulfide grease.
- B: Fill with molybdenum disulfide grease.
- C: 47.1 N·m
- D: 54.9 N·m
- E: 102.0 N·m
- F: 49.0 N·m
- G: 83.4~92.2 N·m; Apply molybdenum disulfide grease.

- 1. Engine Housing
- 2. Coupling
- 3. Hydraulic Pump (Piston)
- 4. Hydraulic Pump (Gear)

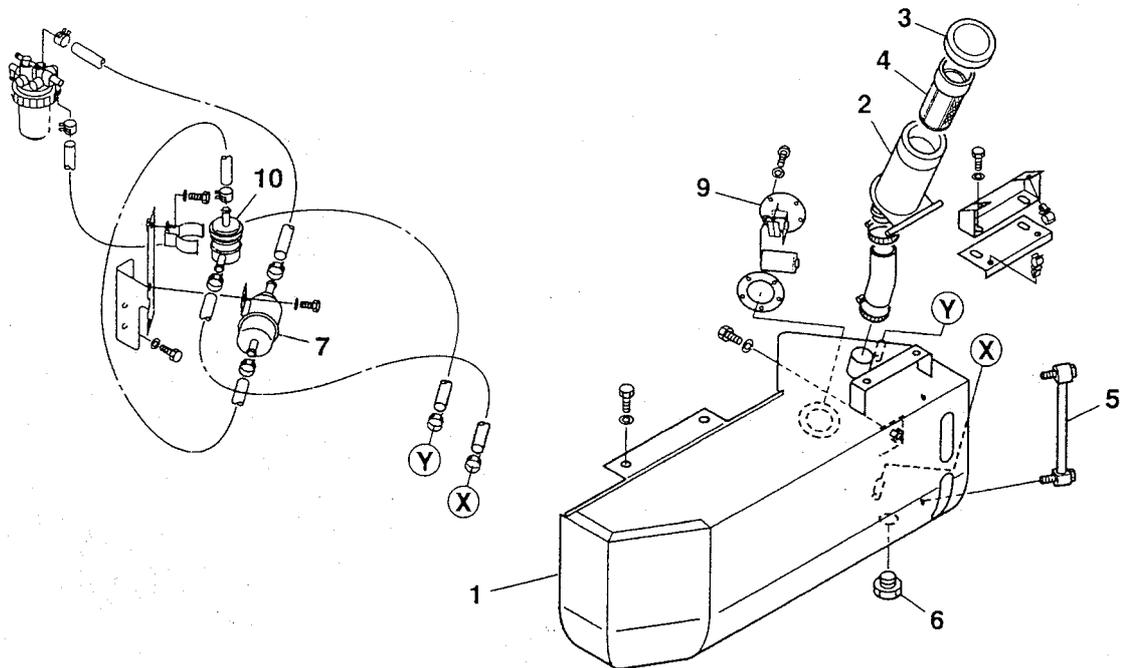
Fuel Tank

■ TB15FR



C5C103

■ TB25FR

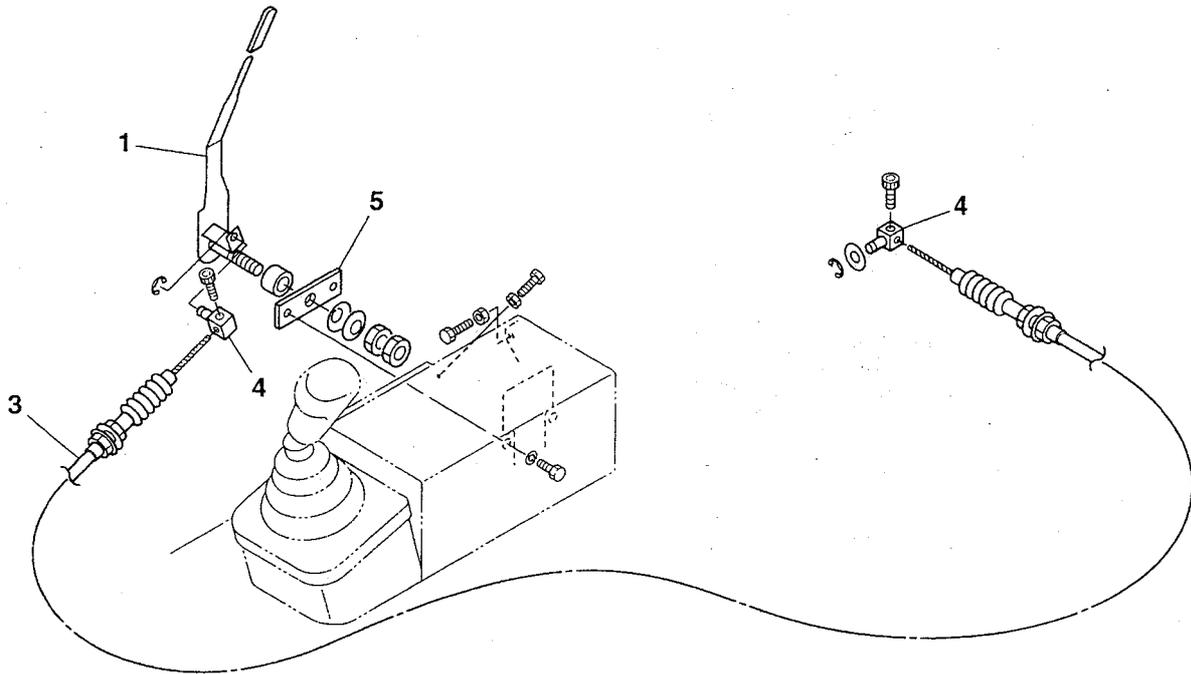


E4C103

- | | |
|----------------|--------------------|
| 1. Fuel Tank | 6. Drain Plug |
| 2. Filler Neck | 7. Feed Pump |
| 3. Cap | 8. Water Separator |
| 4. Strainer | 9. Fuel Sender |
| 5. Sight Gauge | 10. Fuel Filter |

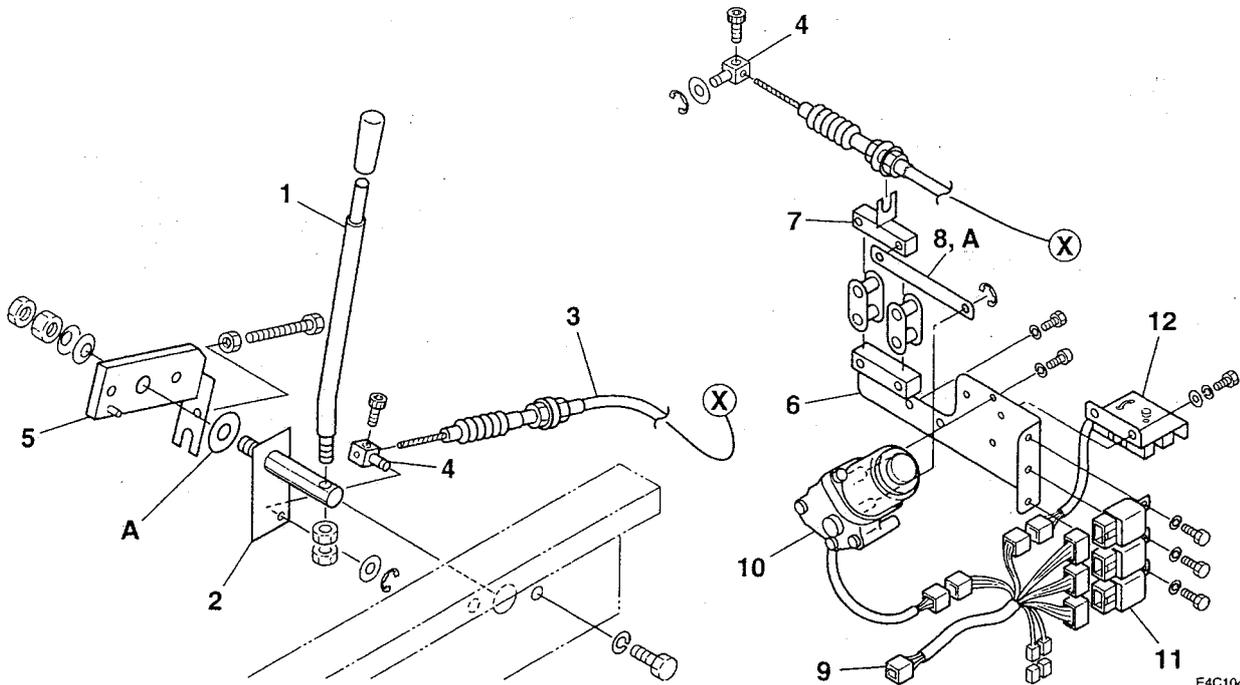
Engine Control

■ TB15FR



CSC104

■ TB25FR



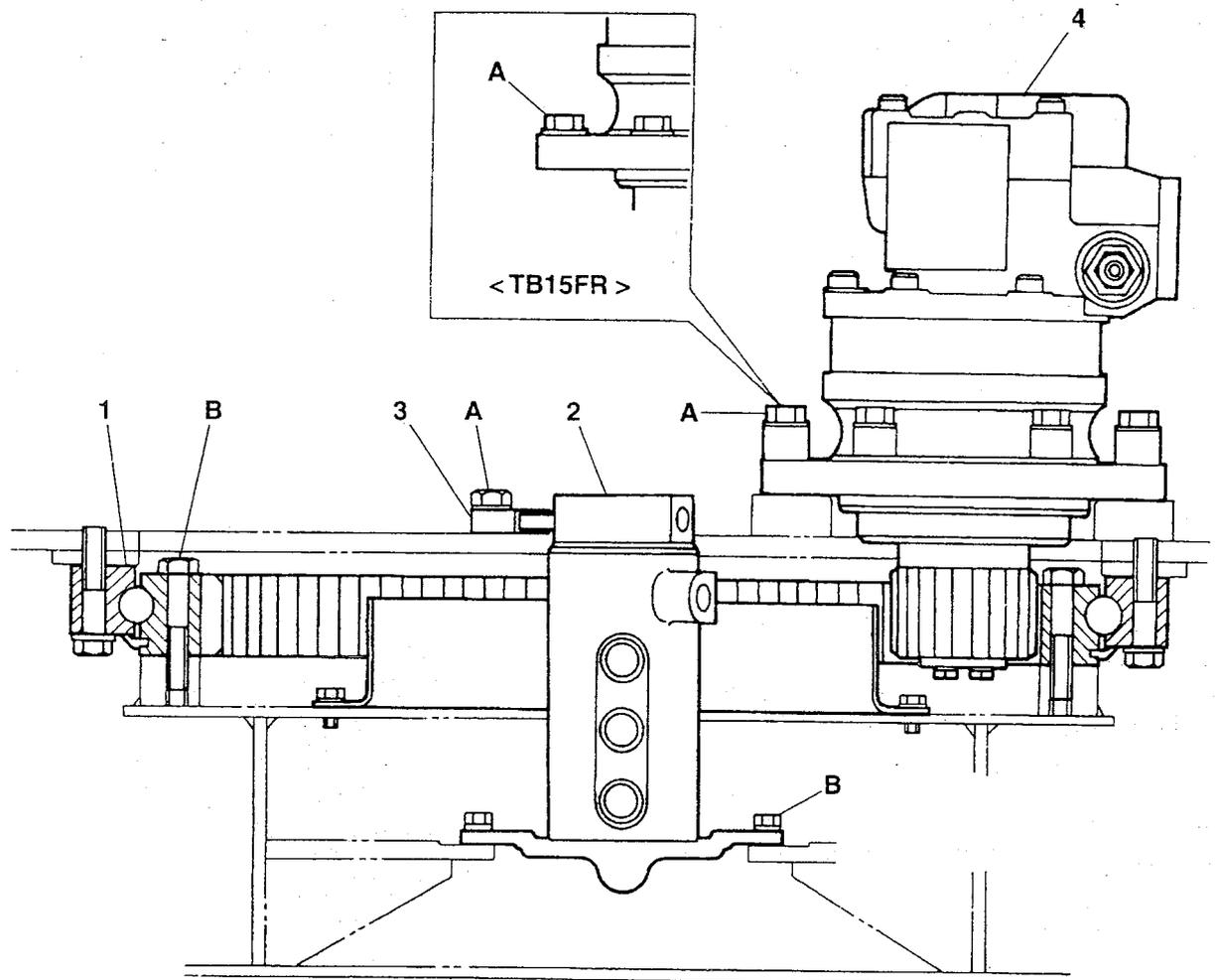
E4C104

A: Apply molybdenum disulfide grease on the both sides.

- | | |
|---------------------|-----------------------|
| 1. Lever | 7. Link |
| 2. Lever | 8. Plate |
| 3. Accelerator Wire | 9. Wiring Harness |
| 4. Wire Stopper | 10. Decelerator Motor |
| 5. Plate | 11. Relay |
| 6. Bracket | 12. Resistor |

SLEW SYSTEM

CONSTRUCTION

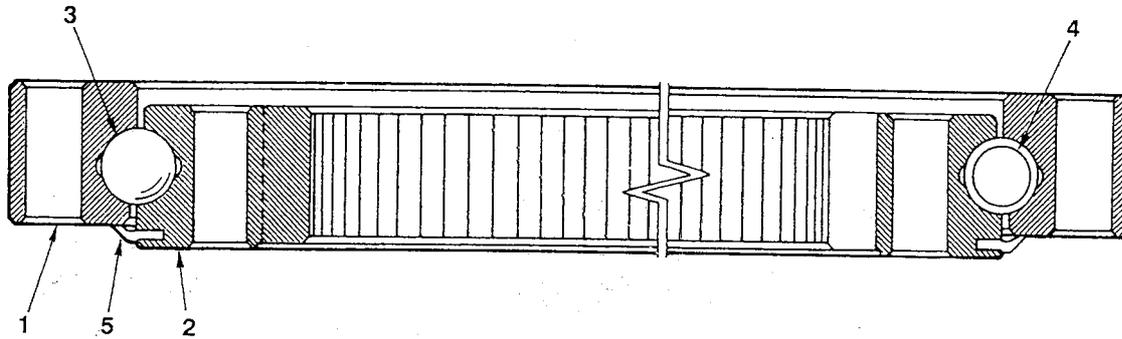


A: \Rightarrow 102 N·m; Apply thread-locking compound.
 B: \Rightarrow 26.5 N·m; Apply thread-locking compound.

C5C200

- 1. Slew Bearing
- 2. Swivel Joint
- 3. Stopper
- 4. Slew Motor

Slew Bearing

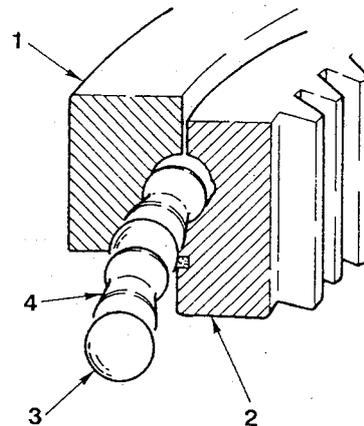


Y2-C201

- | | |
|---------------|-----------|
| 1. Outer Race | 4. Spacer |
| 2. Inner Race | 5. Seal |
| 3. Ball | |

The slew bearing is a ball type bearing, with balls (3) and spacers (4) aligned alternately in the groove between the outer race (1) and inner race (2). The slew bearing is installed by attaching the outer race to the turntable and the inner race to the lower frame using hex bolts.

The slew speed reducer's pinion, mounted on the turntable, engages with the gear formed on the inside of the inner race and rotates, slewing the machine's frame during operation.



Y2-C202

Product: Takeuchi TB15FR, TB25FR Mini Compact Excavator Service Repair Workshop Manual(Book No. CC5E000)
 Full Download: <https://www.arepairmanual.com/downloads/takeuchi-tb15frtb25fr-mini-compact-excavator-service-repair-workshop-manualbook-cc5e000/>