



Doosan Infracore
Construction Equipment

TEST & ADJUSTING

DX Model



2007. 7. 2
Overseas P/S team

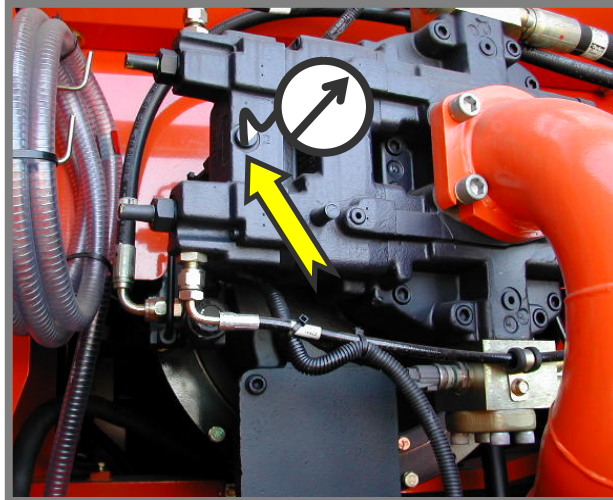
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6. PA/PT signal.
7. Auto speed signal.
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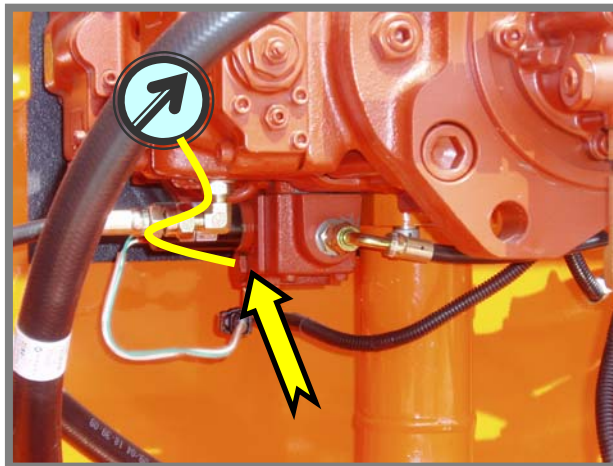


1. Power / Standard mode

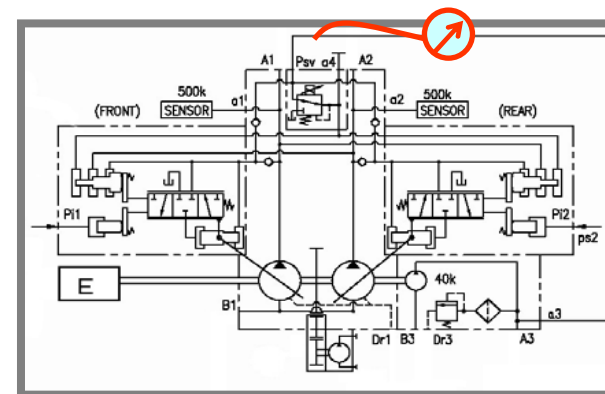
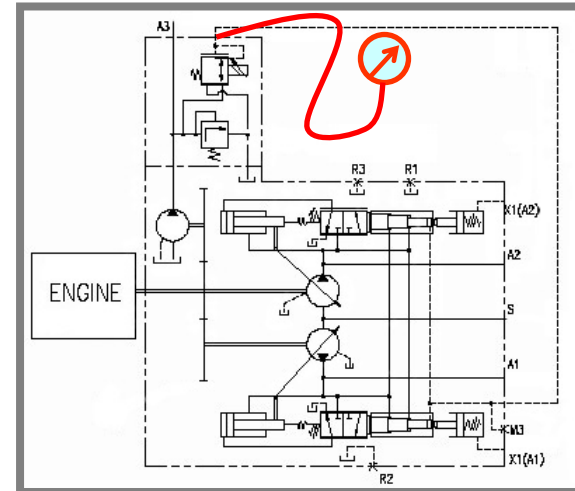
- Measuring point



Rexroth pump



Kawasaki pump



1. Power / Standard mode

1. Test Condition : Over 50 °C of hydraulic oil temp, Engine max speed.
2. Procedure
 - 1) Select Power Mode ,Standard mode and Low engine RPM.
 - 2) Measure power shift current and pressure value.
 - 3) Briefly operate boom up or arm dump, observe the pressure and current again.
 - 4) Select auto idling, low RPM, auxiliary mode.
 - 5) Measure and record the power shift pressure and current.

	Mode		Current (mA)	2 nd Pressure (bar)	Remarks
1	Power mode	With out load			
		Load			
2	Standard mode	With out load			
		Load			
3	Auto idle				
4	Low Idle (below 1000 R.P.M)				
5	Auxiliary mode				

1. Power / Standard mode

- 3. Tools : 60 bar gauge, Straight type test adapter, DMS (Multi meter and test harness)

Rexroth pump



Adapter M14 (2181-2201D3)

Kawasaki pump

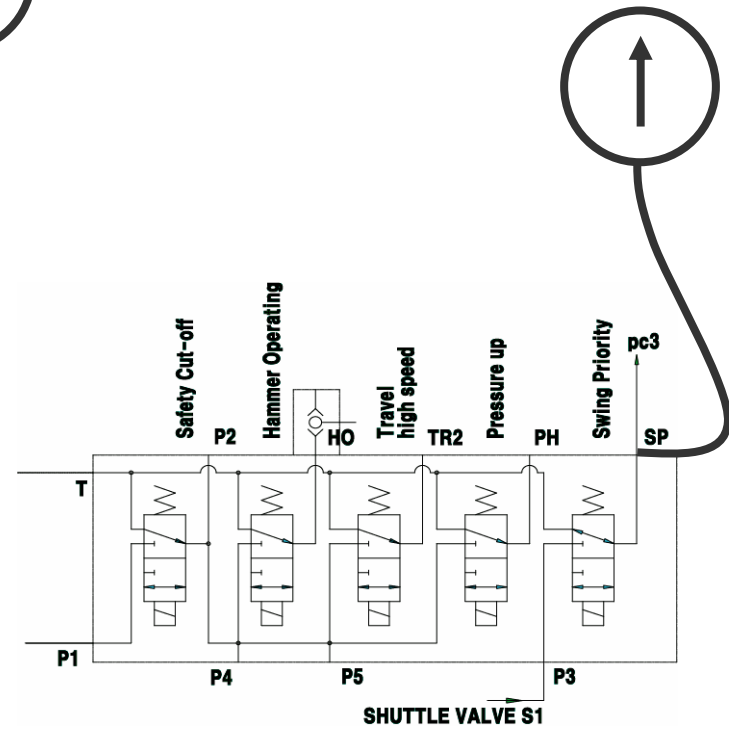
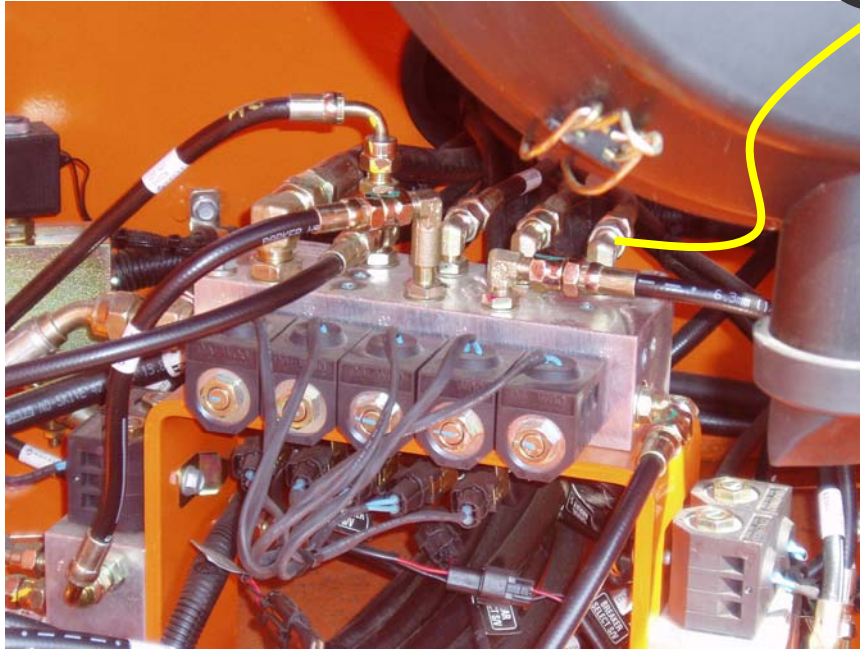


Adapter PF1/4 (2181-2201D1)

Screw coupling (120-00002)

2. Working mode (Digging/Trenching mode)

- Measuring point



2. Working mode (Digging/Trenching mode)

1. Test Condition : Over 50 °C of hydraulic oil temp.
2. Procedure
 - 1) Start the engine.
 - 2) With Trenching mode selected, doing swing operation or not ,observe the pressure on gauge.
 - 3) At Digging mode (Trenching mode switch off) , observe the pressure on gauge.

Mode		Trenching mode (Trenching mode S/W “on”)	Digging mode (Trenching mode S/W “off”)
Pressure	Swing		
	Without swing		

2. Working mode (Digging/Trenching mode)

3. Tools : 60 bar gauge, Tee type test adapter, DMS



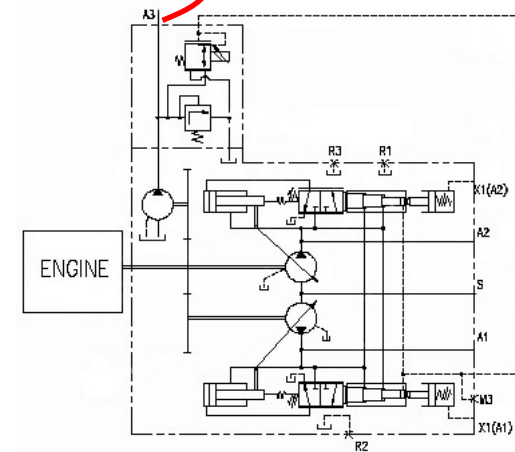
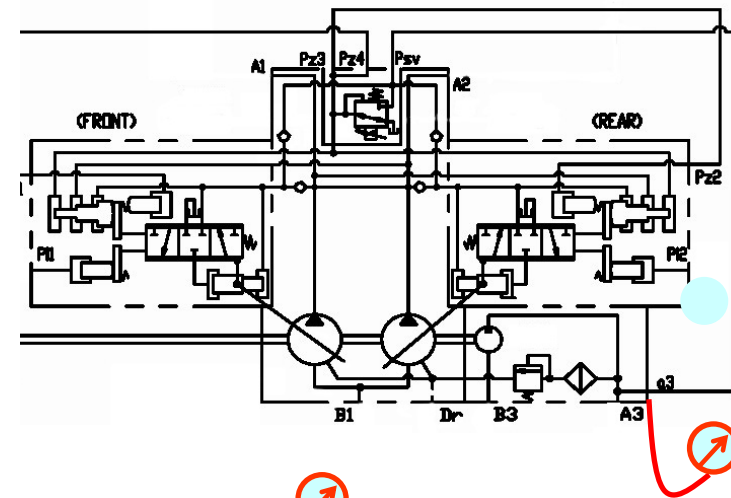
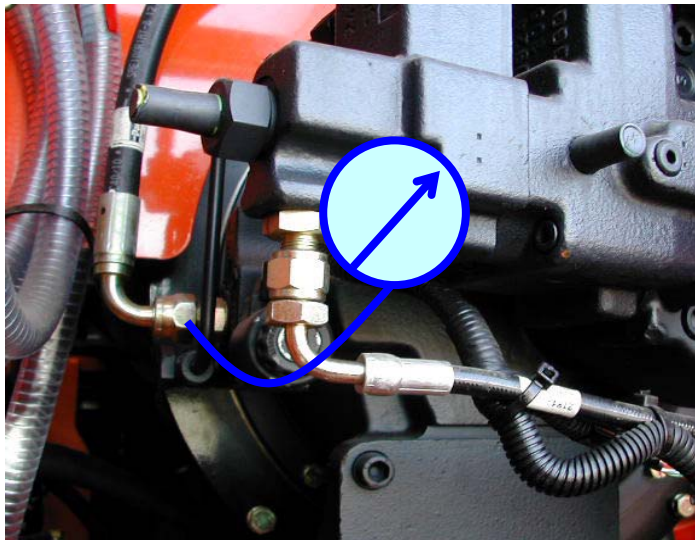
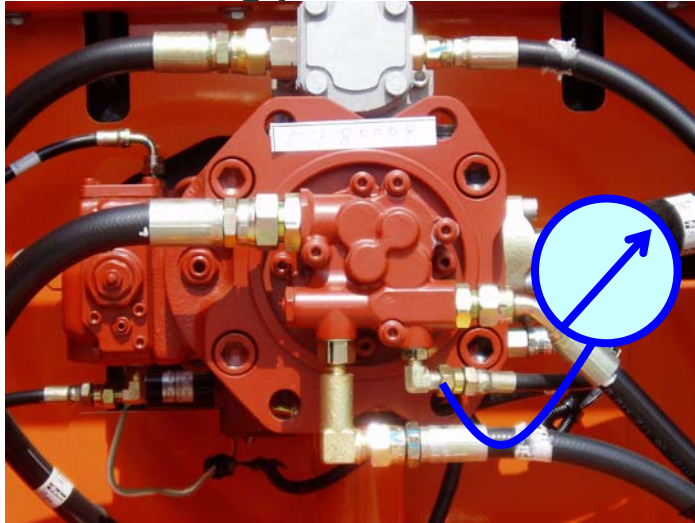
Screw coupling (120-00002)



Tee Adapter PF1/4 (2181-2366D1)

3. Pilot pressure

- Measuring point



3. Pilot pressure

1. Test Condition : Over 50 °C of hydraulic oil temp.
2. Procedure
 - 1) Turn the engine speed to “Min” and check the pressure.
 - 2) Turn the engine speed to “Max” and check the pressure.
 - 3) If necessary, adjust the pilot pump relief valve setting screw “A” after loosening the lock nut of its own.

	Measure pressure	Relief pressure
@ Min. engine speed		Above 35 bar
@ Max. engine speed		Low pressure value + 8 bar, max.

3. Pilot pressure

3. Tools : 60 bar gauge, Tee type test adapter

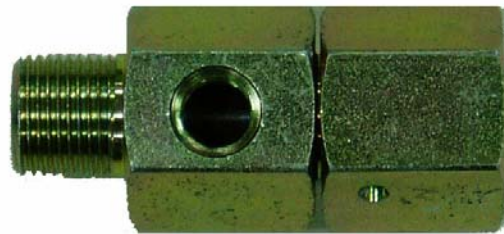
Rexroth pump



Kawasaki pump



Screw coupling (120-00002)



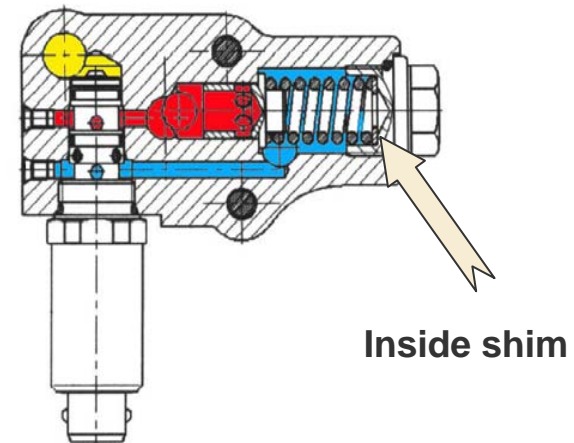
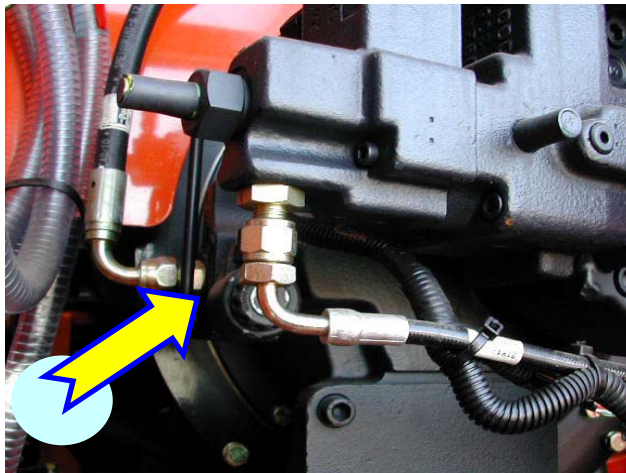
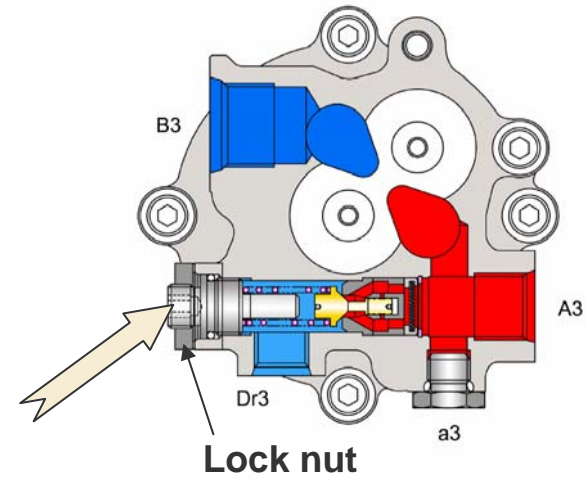
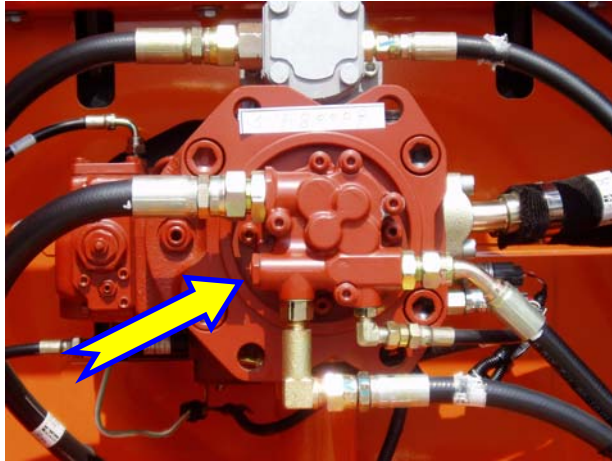
Tee Adapter PF3/8 (2181-2366D3)



Tee Adapter PF1/4 (2181-2366D1)

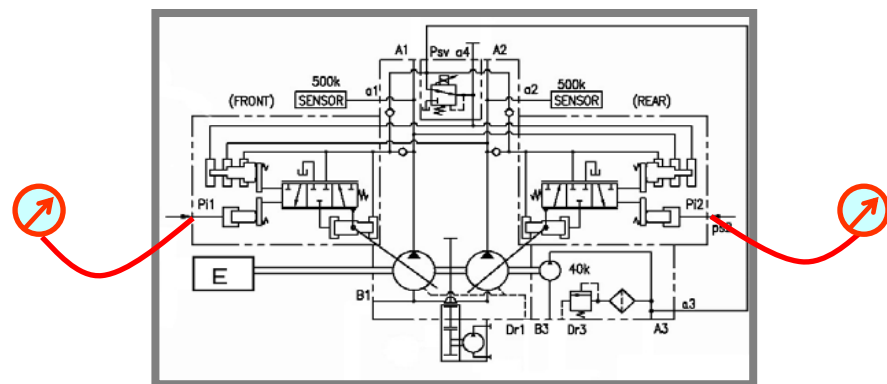
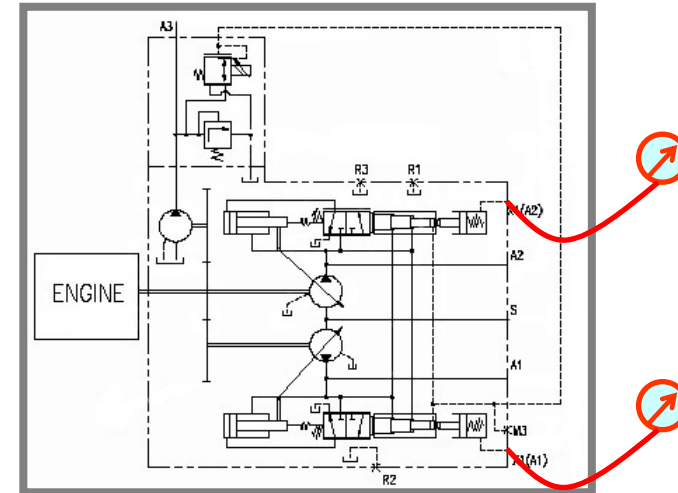
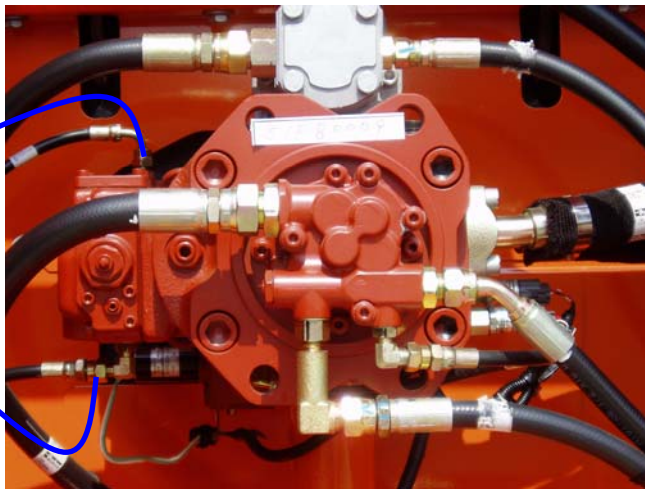
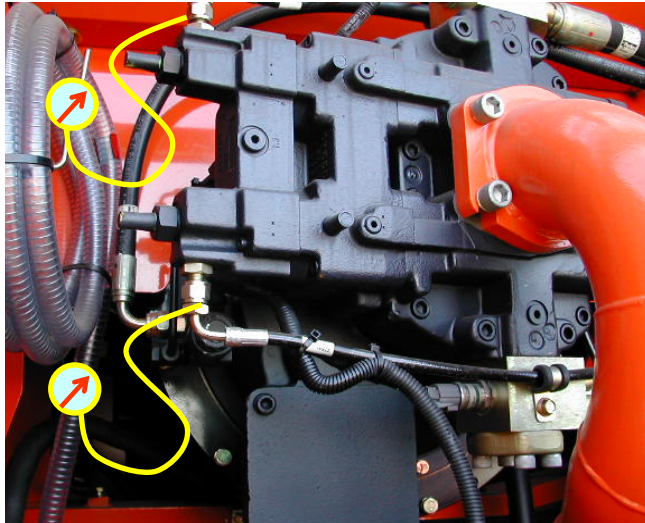
3. Pilot pressure

- Adjustment pilot pressure



4. Nega con pressure

- Measuring point



4. Negacon pressure

1. Test Condition : Over 50 °C of hydraulic oil temp.
2. Procedure
 - 1) Start the engine and Min or Max engine PRM.
 - 2) Observe and record the negacon pressure on the gauges.
 - 3) At arm crowd or boom up full and moving operation, observe and record the nega con pressures.

Condition		Nega con pressure (bar)
Max rpm	Neutral	
	Cyl. Moving	
	Cyl. stall	
Min rpm	Neutral	
	Cyl. Moving	
	Cyl.stall	

4. Negacon pressure

4. Tools : 60 bar gauge X 2, Tee type test adapter X 2



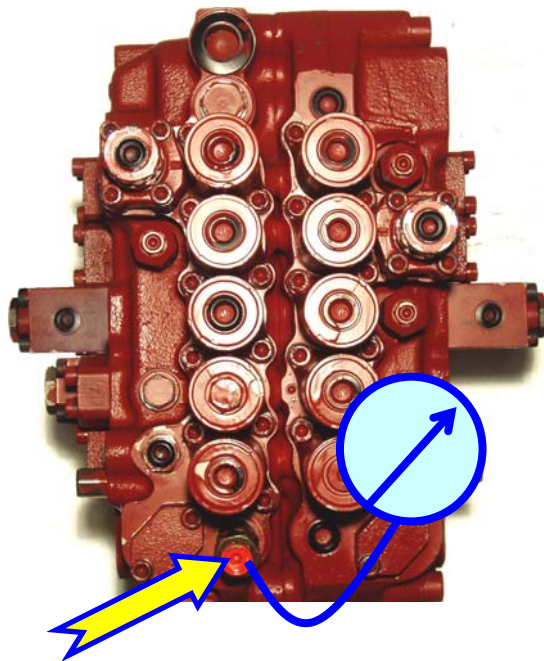
Screw coupling (120-00002)



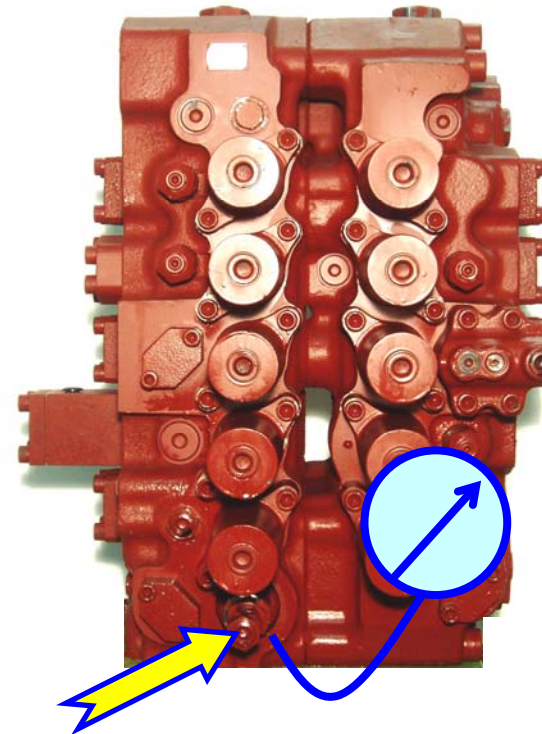
Tee Adapter PF1/4 (2181-2366D1)

5. Main relief pressure & pressure up

- Measuring point (Pressure up)

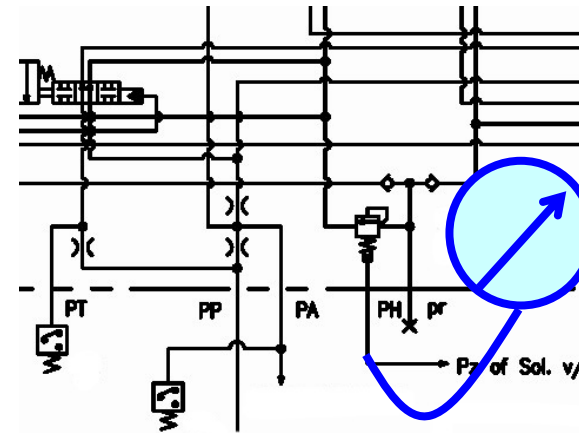
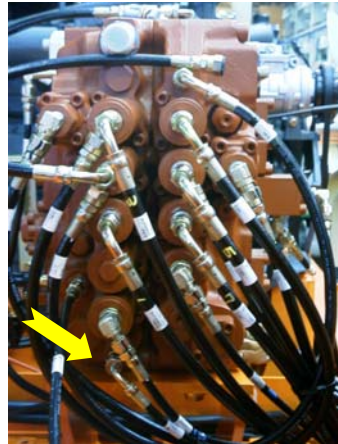


KVMG 270



KVMG 400

5. Main relief pressure & pressure up



1. Test Condition : Over 50 °C of hydraulic oil temp, Power up button "On", Engine max RPM
2. Procedure
 - 1) At boom up stall, record the main pressure on monitor panel & the pilot pressure on the gauge installed.
 - 2) With the pressure up button on the right joystick pressed, stall the boom cylinders and record the main pressure on monitor panel & the pilot pressure on the gauge.

Push Button	Operation	Main press (bar)	Pilot press (bar)
Released	Cyl Stall	330 ± 5 %	Near Zero
Pressed	Cyl Stall	350 ± 5 %	35 ~ 45

5. Main relief pressure & pressure up

3. Tools : 60 bar gauge, Tee type test adapter. DMS



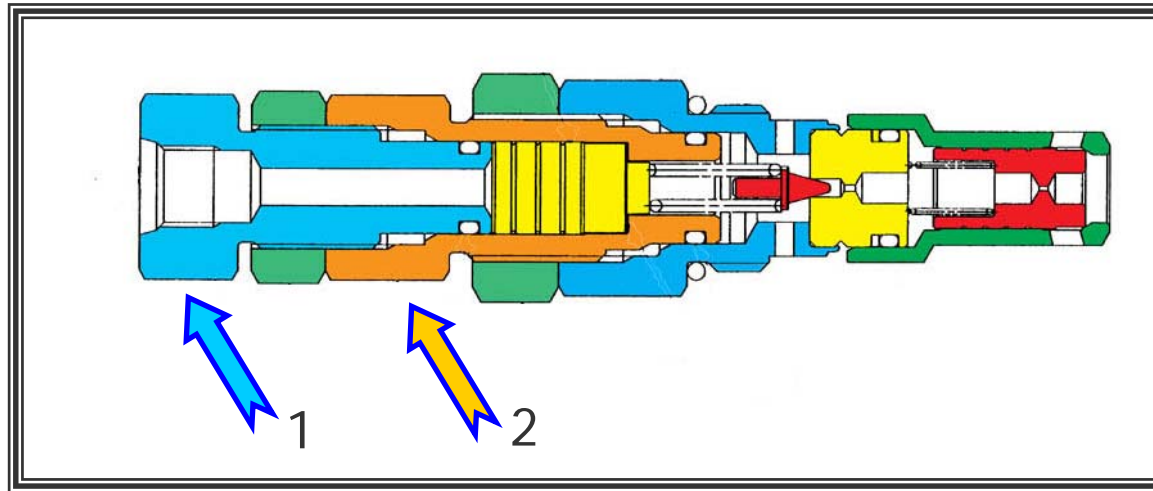
Screw coupling (120-00002)



Tee Adapter PF1/4 (2181-2366D1)

5. Main relief pressure & pressure up

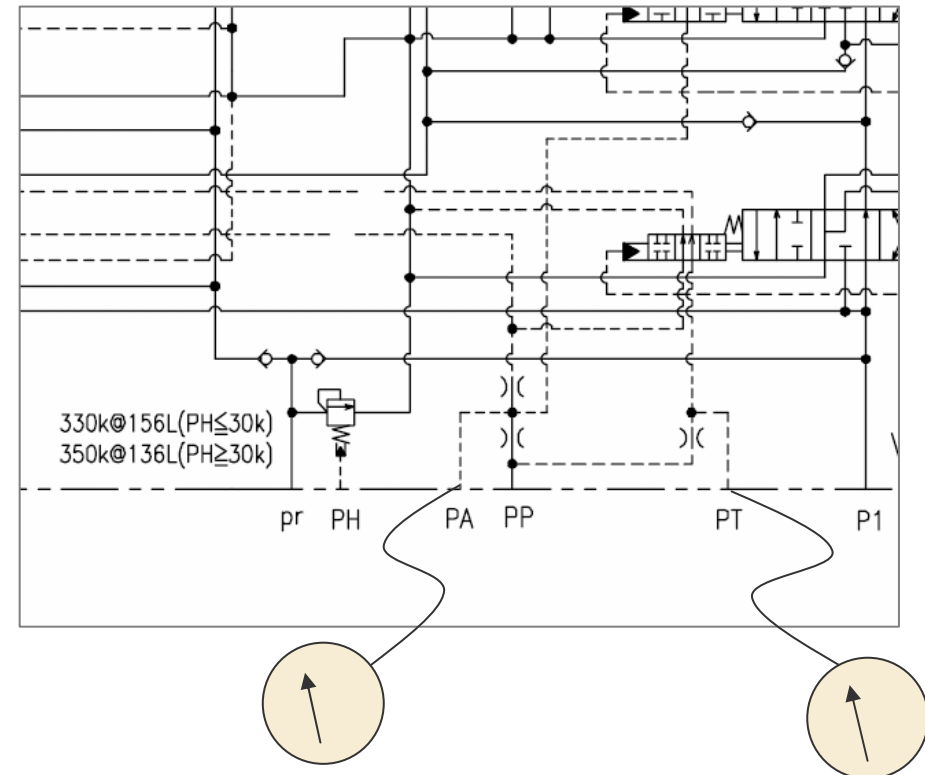
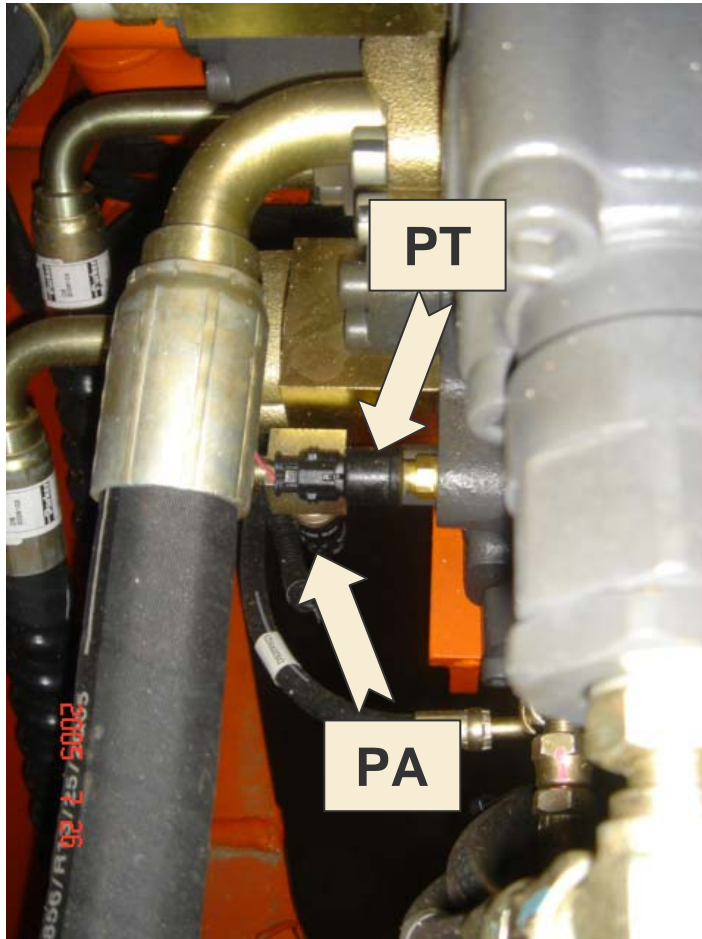
☞ Main Relief Valve Adjustment.



1. Loosen the upper jam nut and turn #1 clockwise till it is fully seated.
2. Loosen the lower jam nut and adjust #2 till the “Pressure – Up value” is obtained.
3. Set 350 bar and tighten the lower jam nut with #2 fixed.
4. Turn out #1 till the “Main relief pressure value” is obtained.
5. Set 330 bar and tighten the upper jam nut with #1 fixed.
6. Recheck if both pressures are correct and if necessary, make final adjustment.

6. PA/PT Signal

- Measuring point



6. PA/PT Signal

1. Test Condition : Over 50 °C of hydraulic oil temp., max engine RPM.
2. Procedure
 - 1) Start the engine and increase the engine speed to the max.
 - 2) Operate any of front actuators gradually while observing PA and PT. Record the values observed.
 - 3) Operate any of travel motors gradually while doing PA and PT. Record the values.

Note) PA and PT pressures should increase sharply just before the front or travel motors begin to move. They are very sensitive to the touch of joysticks or pedal valve.

Condition	PA (bar)	PT (bar)
Neutral		
Front Operation		
Travel Operation		

6. PA/PT Signal

3. Tools : 60 bar gauge, Tee type test adapter.

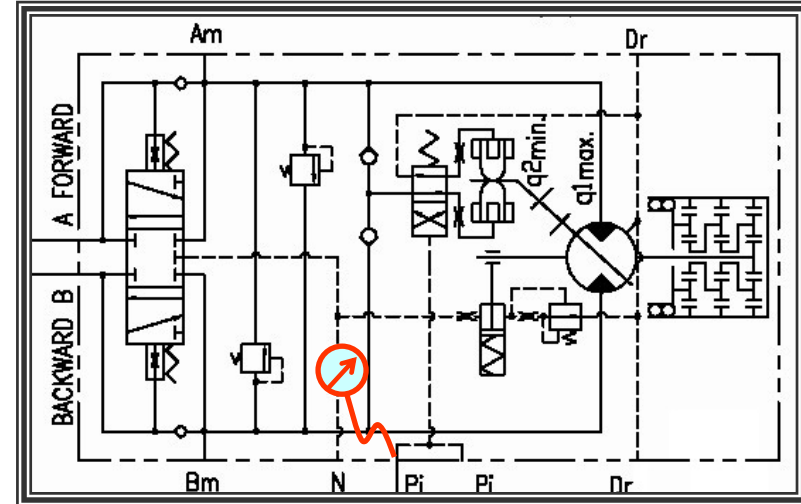
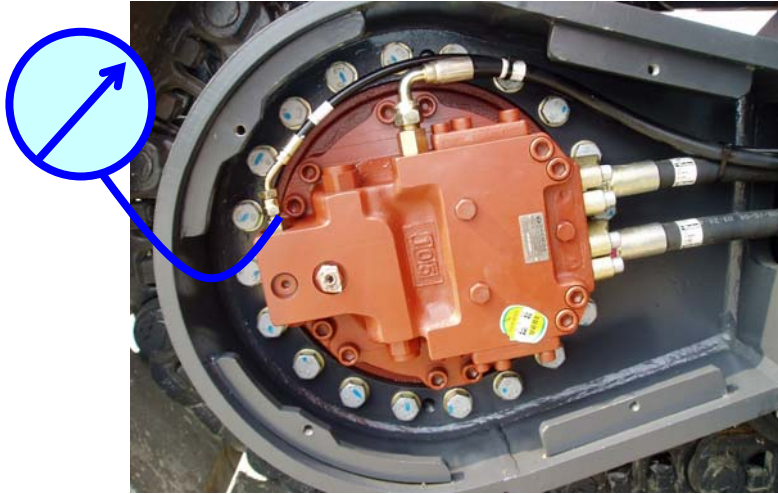


Screw coupling (120-00002)



Tee Adapter PF1/4 (2181-2366D1)

7. Auto speed (High/ Auto speed)



1. Test Condition : Over 50 °C of hydraulic oil temp., Auto or High Travel Speed Switch "On" .
2. Procedure
 - 1) Start the engine and increase the engine speed to the max.
 - 2) Operate travel motors slowly and record the pressure on the gauge.

Conditions Necessary for High speed travel	Pressure		
	Low speed	High speed	Auto speed
✓ Over 1400 rpm of engine speed			
✓ PT pressure switch energized			
✓ Both main pressure, below 300 bar			

7. Auto speed (High/ Auto speed)

3. Tools : 60 bar gauge, Tee type test adapter, DMS

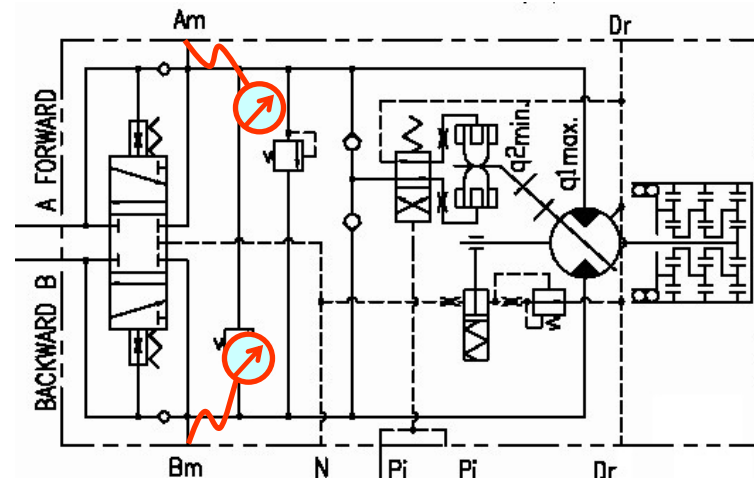
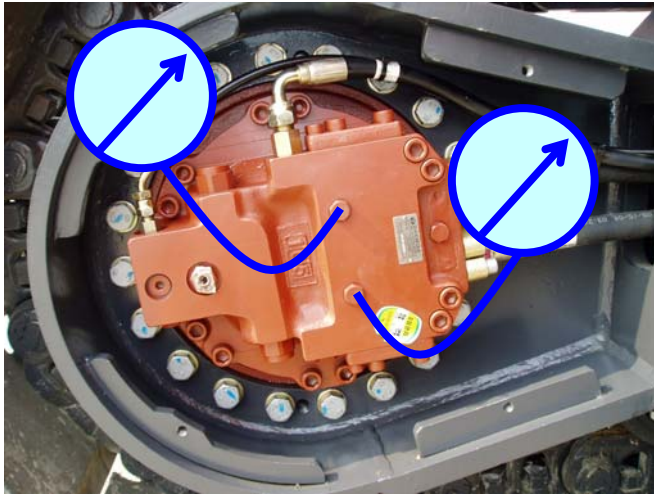


Screw coupling (120-00002)



Tee Adapter PF1/4 (2181-2366D1)

8. Travel motor pressure



1. Test Condition : Over 50 °C of hydraulic oil temp., Traveling stall
2. Procedure
 - 1) Fix the position of machine by pin or pushing the bucket teeth into the ground to make a travel stall condition.
 - 2) Operate travel motors smoothly forward and reverse and record the pressure on the gauge.

Condition	Inlet Pressure (bar)	Outlet Pressure (bar)
Traveling stall		

8. Travel motor pressure

3. Tools : 600 bar gauge, Straight type test adapter. Big diameter pin.

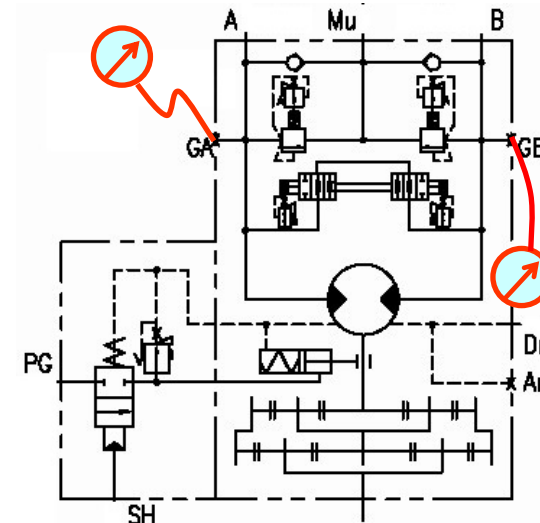
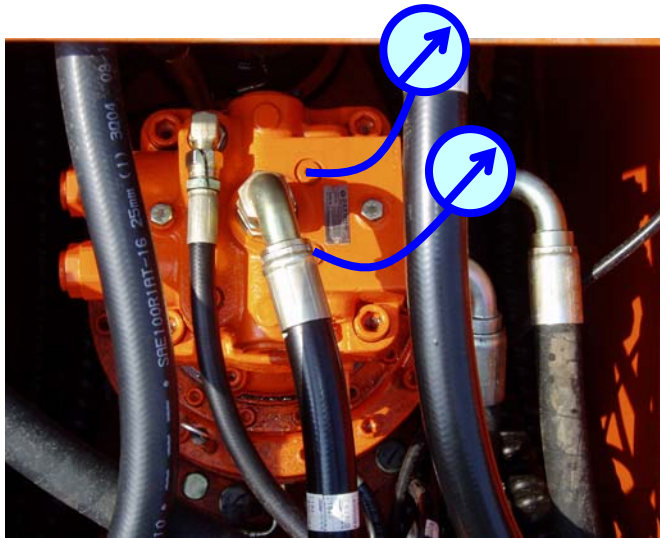


Screw coupling (120-00002)



Adapter PF1/4 (2181-2201D1)

9. Swing pressure



1. Test Condition : Over 50 °C of hydraulic oil temp., Swing stall
2. Procedure
 - 1) Fix the position of upper structure by pushing the bucket teeth into the ground to make a swing stall condition.
 - 2) Operate swing motors smoothly left and right and record the pressure on the gauge.

Condition	Inlet Pressure (bar)	Outlet Pressure (bar)
Stall	Relief Pressure (Varies by model)	Approx 10

9. Swing pressure

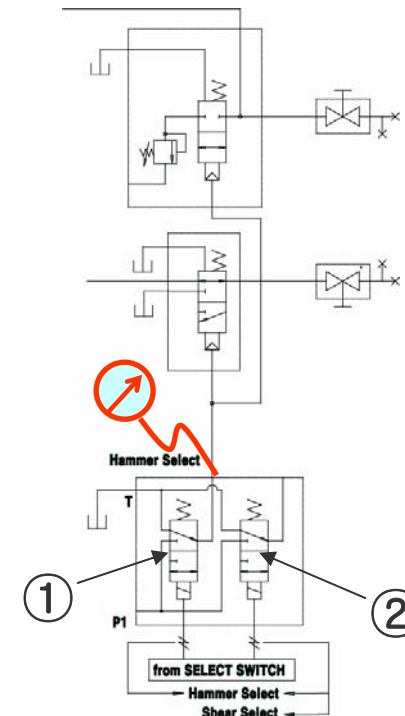
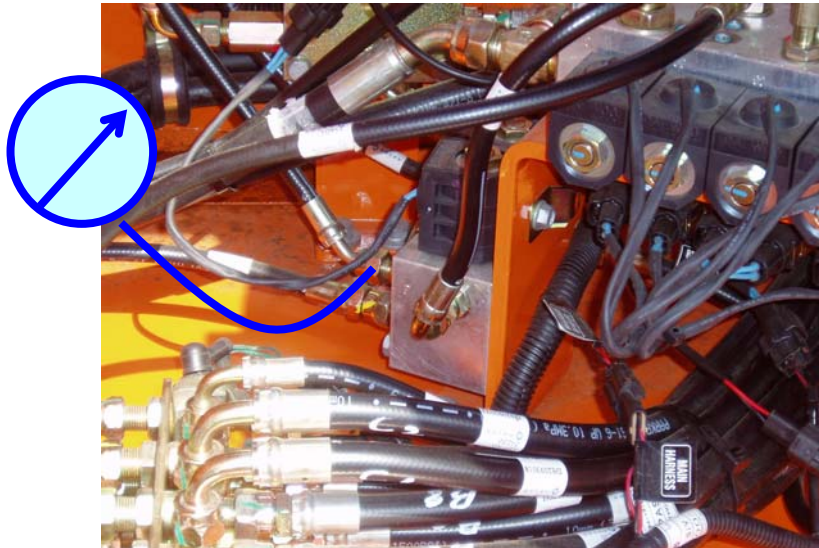
- Tools : 600 bar gauge X 2, Straight type test adapter X 2



Screw coupling (120-00002)

Adapter PF1/4 (2181-2201D1)

10. One / two way signal



1. Test Condition : Over 50°C of hydraulic oil temp, Breaker or shear selection switch “On”, max engine RPM.
2. Procedure : Check pressure and energized solenoid when breaker or shear selection switch is selected.

Switch condition	Inlet pressure (bar)	Energized solenoid
Breaker		,
Shear (Crusher)		,

10. One / two way signal

3. Tools : 60 bar gauge, Tee type test adapter,



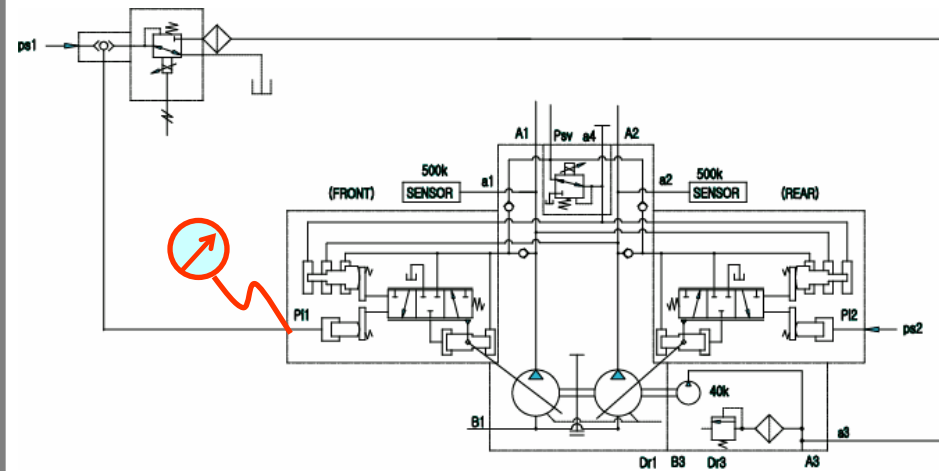
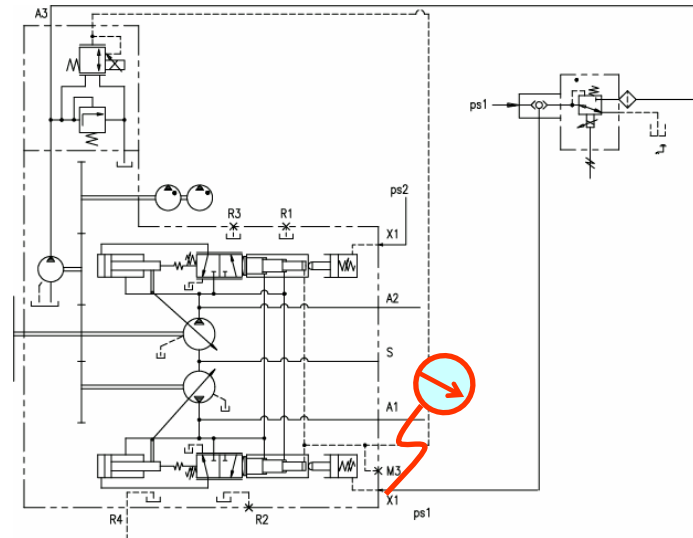
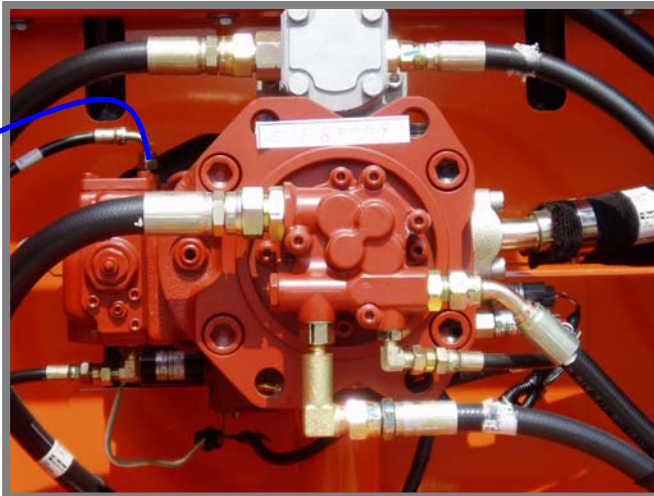
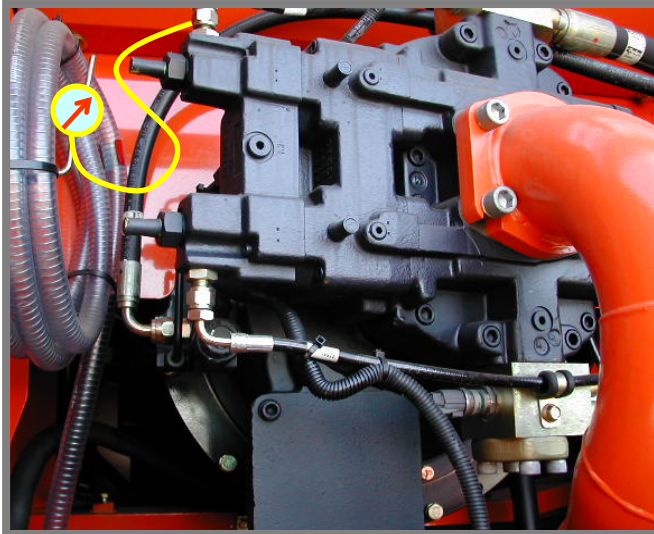
Screw coupling (120-00002)



Tee Adapter PF1/4 (2181-2366D1)

11. Flow control

- Measuring point



11. Flow control

1. Test Condition : Over 50 °C of hydraulic oil temp., max engine RPM.
2. Procedure
 - 1) Start the engine and Max engine speed.
 - 2) Adjusting flow on LCD panel, record the related negacon pressure on the gauges and current for front work (without breaker or crusher)
 - 3) Adjusting flow on LCD panel and observe and record the related negacon pressure on the gauges and current for breaker or crusher.

Condition		2 nd pressure (bar)	Current (mA)
Front work without breaker or crusher	Minimum flow		
	Maximum flow		
Breaker or Crusher	Minimum flow		
	Maximum flow		

11. Flow control

3. Tools : 60 bar gauge, Tee type test adapter, DMS



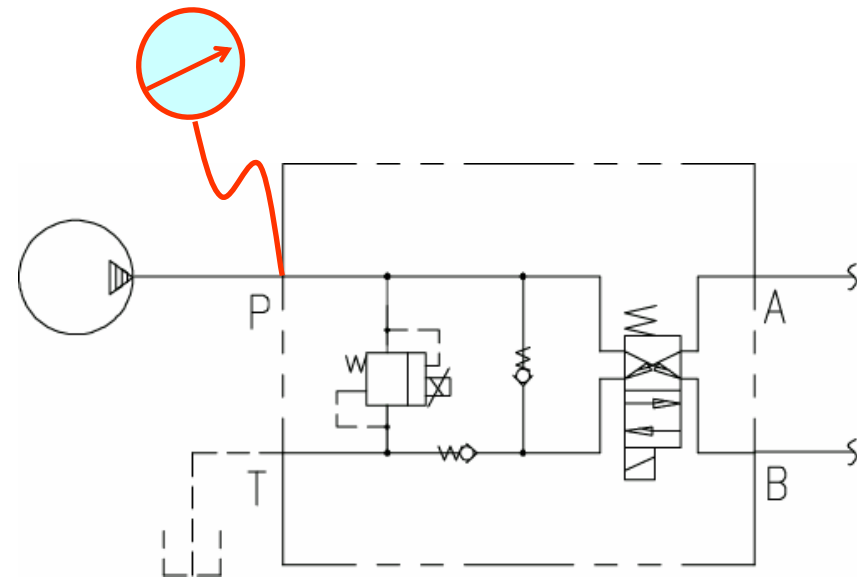
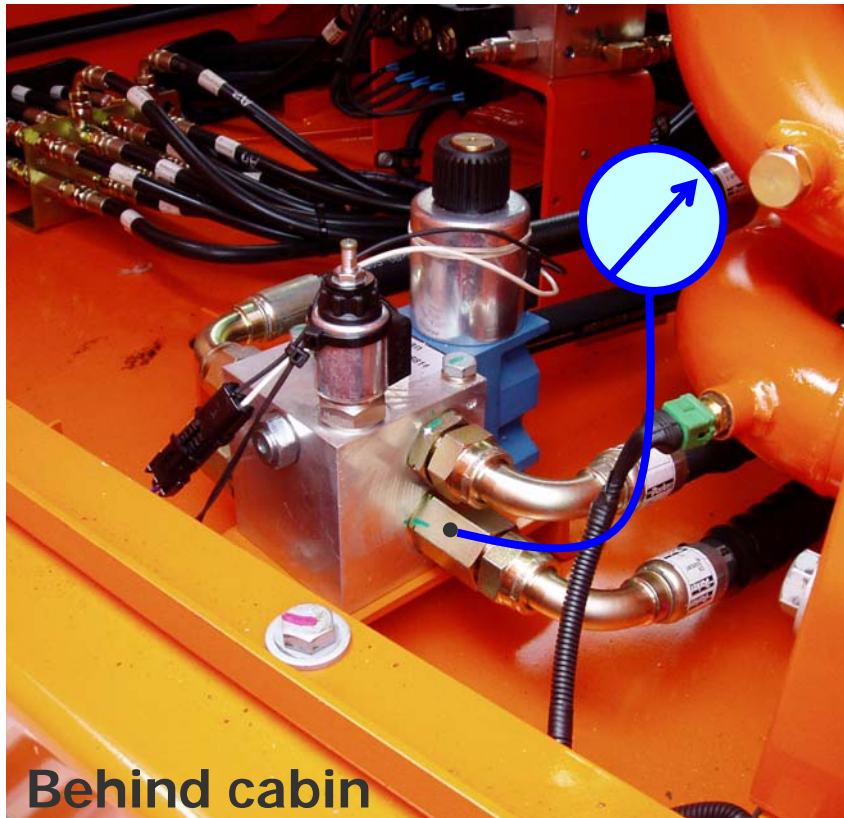
Screw coupling (120-00002)



Tee Adapter PF1/4 (2181-2366D1)

12. Cooling fan RPM (DX420,DX480)

- Measuring point



12. Cooling fan RPM (DX420,DX480)

1. Test Condition : 50 °C of hydraulic oil temp., max engine RPM.
2. Procedure
 - 1) Start the engine.
 - 2) Disconnect proportional valve harness and Max engine speed.
 - 3) Measuring fan speed and adjusting pressure on proportional valve.



Condition	Fan RPM	Pressure
Max engine RPM		

12. Cooling fan RPM (DX420,DX480)

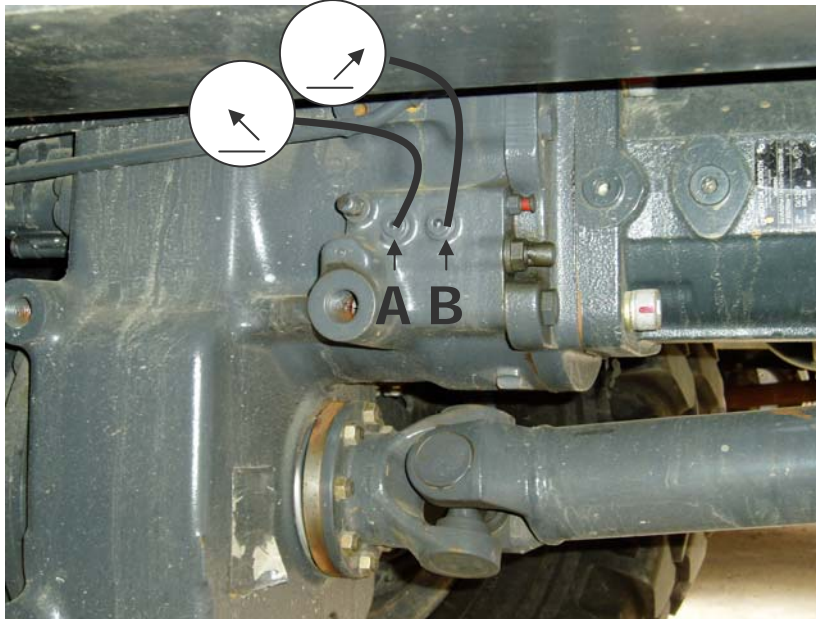
4. Tools : 600 bar gauge, Screw coupling, Speed meter.



Screw coupling (120-00002)

13. Transmission pilot pressure

- Measuring point



1. Test Condition : Over 50 °C of hydraulic oil temp., Braking machine without parking brake.
2. Procedure
 - 1) Start the engine and Low engine speed
 - 2) Select travel speed switch Low (I,II position) or High (III position) speed.
 - 3) Measure each port pressure.

Travel speed switch	A Port, High speed (bar)	B Port, Low Speed(bar)
I (Inching travel)		
II		
III		

13. Transmission pilot pressure

3. Tools : 60 bar gauge X 2, Straight type test adapter X 2



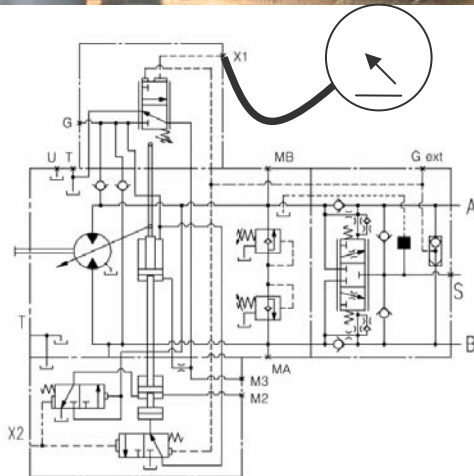
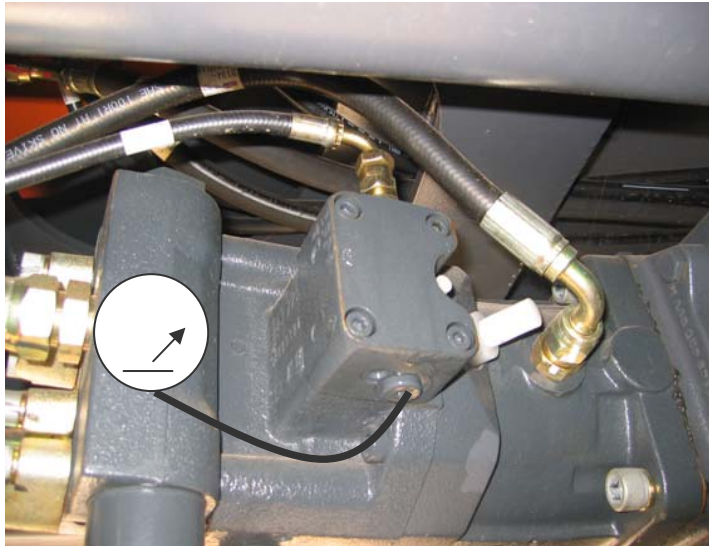
Screw coupling (120-00002)



Adapter M14 (2181-2201D3)

14. Inching traveling

- Measuring point



1. Test Condition : Over 50 °C of hydraulic oil temp., Braking machine without parking brake.
2. Procedure
 - 1) Start the engine and Low engine speed
 - 2) Select travel speed switch Low (I,II position) or High (III position) speed.
 - 3) Measure check port pressure.

Travel select switch	Pressure (bar)
I (Inching travel)	
II	
III	

14. Inching traveling

4. Tools : 60 bar gauge, Straight type test adapter

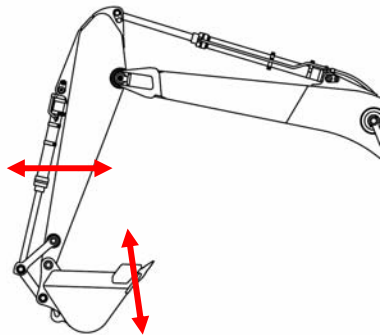


Screw coupling (120-00002)

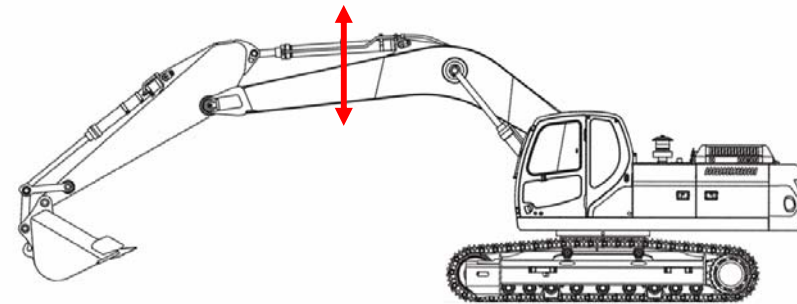


Adapter M14 (2181-2201D3)

15. Cycle times – Cylinder speed



Checking speed for bucket & arm



Checking speed for boom

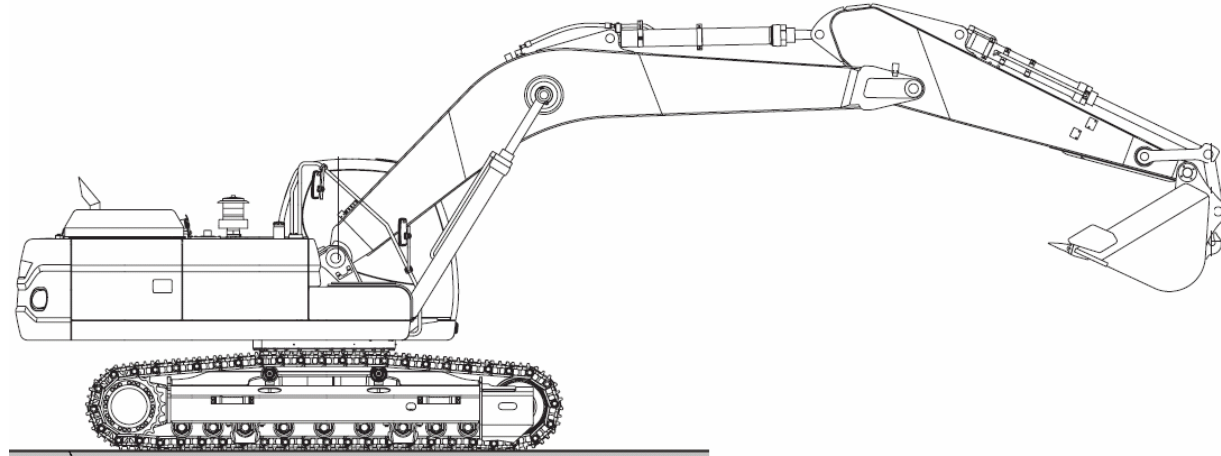
1. Objective : To measure the cycle times of the boom, arm and bucket cylinder functions.
2. Preparation and test condition
 - 1) Warm the hydraulic oil over 50°C.
 - 2) Power Mode, Digging mode and max engine speed.

15. Cycle times – Cylinder speed

3. Procedure

- 1) To measure the boom cylinder cycle time, roll out arm, roll in the empty bucket and lower the boom to the ground.
- 2) To measure the cycle time of the arm, roll in the bucket, the arm is placed vertical and the boom is lowered so the bucket is 0.5m above the ground.
- 3) To measure the bucket cylinder speed, have the side plate edges are vertical as shown.
- 4) Measure the cycle time of each front implements.
- 5) Repeat the measurements three times and calculate the average values.

15. Cycle times – Swing speed



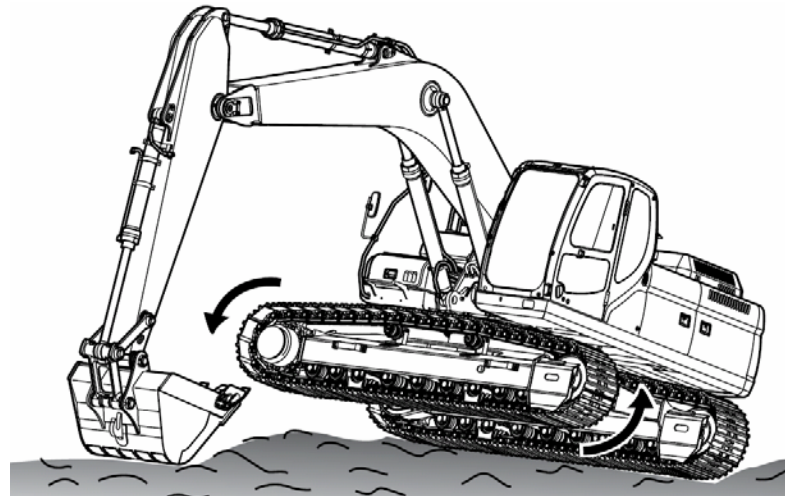
1. Objective : To measure the time required to make three full revolutions.
2. Preparation and test condition
 - 1) A flat level surface where there is ample room to safely swing the machine in a full 360 degree circle.
 - 2) Warmed machine with hydraulic oil over 50°C.
 - 3) With the are rolled out and the bucket rolled in, hold the bucket so that the height of the bucket pin is the same height as the boom foot pin. The bucket should be empty.

15. Cycle times – Swing speed

3. Procedures

- 1) Set the power mode to be Power Mode and work mode, Digging.
- 2) Set the engine speed to the maximum.
- 3) Operate the swing control lever fully. After completing the first revolution begin timing the duration required to complete exactly three full additional revolutions.
- 4) Operate the swing control lever fully in the opposite direction in the manner described above.
- 5) Perform the test three times and average the results to arrive at performance data.

15. Cycle times – Travel speed



1. Objective : To measure the track operation speed with the track raised off the ground.
2. Preparation and test condition
 - 1) On the track to be measured, mark one shoe with chalk or paint.
 - 2) Equally adjusted track tension.
 - 3) Warmed machine with hydraulic oil over 50°C.
 - 4) Swing the upper structure 90 degrees and lift up the machine using fronts like as figure.

15. Cycle times – Travel speed

3. Procedures

- 1) Set the power mode to be Power mode and work mode, Digging.
- 2) Set the Auto Travel switch to be “Off”.
- 3) Set the engine speed to the maximum.
- 4) Operate the travel control lever of the raised track in either full forward or reverse. After one revolution begin measuring the time required for the track to complete exactly three more revolutions.
- 5) Perform the procedure three times. Average the results to arrive at a performance data value. Record the average value.
- 6) Repeat the same for the opposite direction of travel.
- 7) Turn the travel auto switch to the “On” position and repeat the above.
- 8) Repeat the entire process for the opposite track.

15. Cycle times – Traveling speed



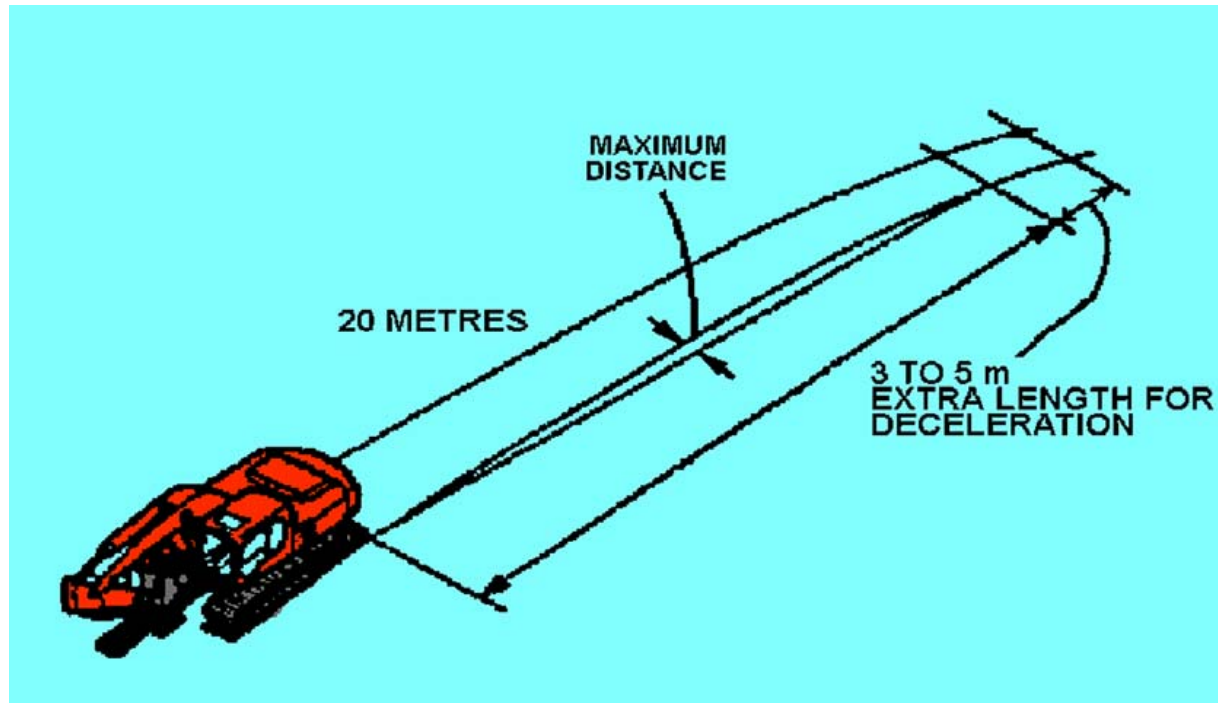
1. Objective : To measure the time required for 20 meter traveling of machine.
2. Preparation and test condition
 - 1) Flat ground longer than 26 meters.
 - 2) Equally adjusted track tension.
 - 3) Warm the machine till hydraulic oil temperature is over 50 °C .
 - 4) Position the arm and bucket so that the bucket is 0.4 to 0.5 meters above the ground like as the figure.

15. Cycle times – Traveling speed

3. Procedures

- 1) Set the power mode to be Power Mode and work mode, Digging.
- 2) Set the Auto Travel Switch to be “Off”.
- 3) Set the engine speed to the maximum.
- 4) Begin traveling the machine in the “acceleration zone” making sure both travel levers are in the full stroked position.
- 5) Begin timing the travel when the machine just passes the start line of the 20 meter test course.
- 6) End timing the travel when the machine just touches the end line of the 20 meter test course.
- 7) Record the results of the test.
- 8) Rotate the upper structure 180 degrees and repeat the procedure in reverse.
- 9) Perform travel speed measurements three times for each direction. Average the three results for a performance data measurement value.
- 10) Set the Auto Travel Switch to be “On” and repeat the process.

15. Cycle times – Travel deviation



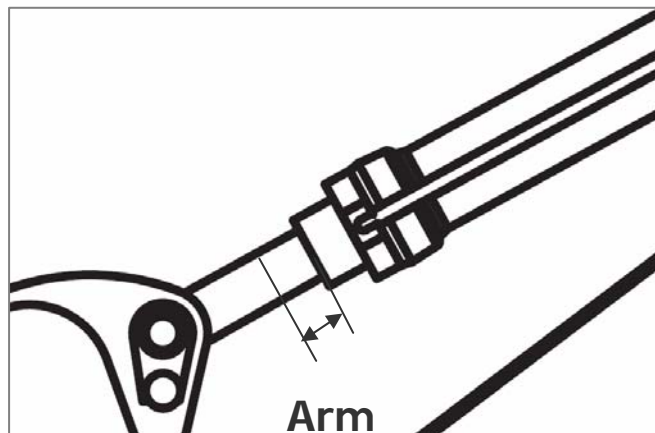
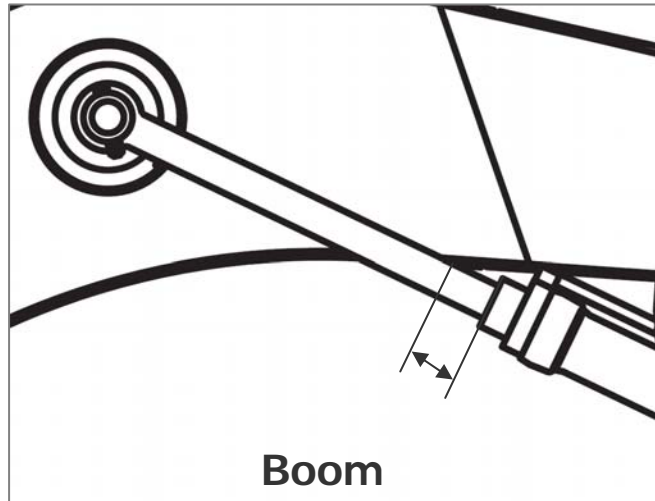
1. Objective : To check how far the machine deviates from straight.
2. Preparation and test condition
 - 1) Flat ground longer than 26 meters.
 - 2) Equally adjusted track tension.
 - 3) Warmed machine with hydraulic oil over 50 °C .
 - 4) Position the arm and bucket so that the bucket is 0.4 to 0.5 meters above the ground like as the figure.

15. Cycle times – Travel deviation

3. Procedures

- 1) Set the power mode to be Power Mode and work mode, Digging.
- 2) Set the Auto Travel Switch to be “Off”.
- 3) Set the engine speed to the maximum.
- 4) Begin traveling the machine in the “acceleration zone” making sure both travel levers are in the full stroked position.
- 5) Begin timing the travel when the machine just passes the start line of the 20 meter test course.
- 6) Trace the path of the track over the 20 meter test course using a taught string or by tracing a line with a stick.
- 7) Measure the distance off from a straight course and the machine’s actual course over the 20 meter test course.
- 8) Record the results of the test.
- 9) Rotate the upper structure 180 degrees and repeat the procedure operating the tracks in reverse.
- 10) Perform travel speed measurements three times for each direction. Average the three results for a performance data measurement value.
- 11) Set the Auto Travel Switch to the “On” position and repeat the process.

15. Cycle times – Cylinder creep



1. Objective : To measure cylinder creep which can be caused by oil leakage in the control valve or cylinders.
2. Preparation and test condition
 - 1) Warm the hydraulic oil over 50°C .
 - 2) Load the bucket fully.
3. Procedure
 - 1) Load the bucket fully with the arm rolled out, position the bucket so that the height of the bucket is equal to the boom foot pin.
 - 2) Stop the engine and use a grease pencil or marker to make marks on the cylinder rods.
 - 3) After five minutes, measure and record the distance the marks have moved.
 - 4) Repeat all measurements three times and calculate the average values.

16. Checking machine condition

1. Engine Speed.

Mode	Specifications (rpm)		Measured (rpm)	
	No load	Loaded	No load	Loaded
Low RPM				
Auto Idle				
Standard mode				
Power mode				

2. Relief Pressure and Negative Control (Negacon) Pressure.

Engine Speed	Main pump	Main pump pressure		Negacon pressure	
		Neutral	Joystick Max stroke	Neutral	Joystick Max stroke
Low speed	Front pump				
	Rear pump				
Max speed	Front pump				
	Rear pump				

16. Checking machine condition

3. Main pump pressures (Relief condition) and Negacon Pressures.

Function	Front pump	Rear pump	Front negacon	Rear negacon
Boom up				
Boom down				
Arm crowd				
Arm dump				
Bucket crowd				
Bucket dump				
Left swing				
Right swing				
Travel forward				
Travel backward				

16. Checking machine condition

4. PA and PT Pressure.

	Front operation		Travel operation	
	PA	PT	PA	PT
Min engine speed				
Max engine speed				

5. Work mode valve secondary pilot pressure.

Work mode	Swing priority solenoid valve
Digging	
Trenching	

6. Power shift valve current and pressure.

Mode	Standard mode		Power mode	
	No load	Full load	No load	Full load
Current (mA)				
Secondary pressure				
Engine speed				

16. Checking machine condition

7. Power shift valve as per each operation

		Arm cd	Boom up	Travel	Bucket cd	Arm cd + swing
Standard Mode	Current					
	2 nd pressure					
Power mode	Current					
	2 nd pressure					

8. Joystick secondary pressure at boom up operation

	Neutral	Slight operation	Max operation
Secondary pressure			

9. Swing motor pressures

	Left swing stall			Right swing stall		
Min engine speed	Pump	Pa port	Pb port	Pump	Pa port	Pb port
Max engine speed						

16. Checking machine condition

10. Travel motor pressure

		Forward Stall			Reverse Stall		
		Pump	Pa	Pb	Pump	Pa	Pb
Min engine speed	Left motor						
	Right motor						
Max engine speed	Left motor						
	Right motor						

11. Restriction valve pressure of return line

	Neutral	During swing	Swing stop	Arm dump
Min engine speed				
Max engine speed				

16. Checking machine condition

12. Flow control proportional valve current and pressure

Mode		Breaker (One line)		Shear (Two way)	
		Not working	Full working	Not working	Full working
Set Low flow	Current (mA)				
	Secondary pressure				
Set High flow	Current (mA)				
	Secondary pressure				

13. Fan speed and system pressure.

Engine speed	Fan speed	Current	Pressure
Low speed			
Max speed			