



# Flameproof Rubber Tyred Vehicles Technical Bulletin

Bulletin Number: TB0918

Date: 17/12/2009

Subject: Pressure Compensated Pump Adjustment Procedures

## **Purpose**

To inform the industry of revised pressure compensated pump adjustment procedures for the Sandvik Loaders and Shield Haulers.

## **Applicable to**

Revised procedures are provided for adjustment of pressure compensated pumps on the 130, LS160 (former name ED6), LS170 (former name ED7), LS170L (former name ED7LP), Pressure Compensated LS190 (former name ED10) Loaders and 936, TS490 (former name 940), TS495 Shield Haulers.

## **Description**

The pressure compensated pump setting procedures have been revised for the following pumps:

<b>Vehicle</b>	<b>Pump</b>
Pressure Compensated LS190 (former name Pressure Compensated ED10)	Bucket
130, 936, LS160 (former name ED6)	Brake/Steer
LS170 (former name ED7)	Brake/Steer
LS170L (former name ED7LP)	Brake/Steer
TS490 (former name 940)	Brake/Steer
TS495	Brake/Steer

## **Recommendations**

Place copies of the revised setting procedures into the vehicle service manuals and remove or mark-up the old procedures to identify they have been superseded.

Communicate to service personnel that the procedures have been revised.

## **Contact**

Contact your Sandvik representative for further information or any questions you may have.

## **Attachments**

- LS190 Pressure Compensated Bucket Pump Pressure Setting Procedure
- 130, 936, LS160 Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments Procedure
- LS170 Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments Procedure
- LS170L Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments Procedure
- TS490 Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments Procedure
- TS495 Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments Procedure

## ADJUSTMENTS: Pressure Compensated Bucket Pump Pressure Setting

### Special Tools Required

- 0 - 210 Bar test gauge
- Workshop hand tools
- Wheel chocks

### PPE Required

- Safety glasses
- Workshop Gloves

### Setup for Pump Pressure Setting Adjustments

1. The hydraulic oil should be at normal operating temperature before beginning any adjustments.
2. Set up the machine for service, ensuring that is parked correctly, shut down and isolated, stored hydraulic pressure has been drained, wheels are chocked and centre pivot safety link is connected.
3. Due to the number of shutdowns and re-starts during the adjustment procedures, it is advantageous to connect an external air supply to the air receiver. Ensure the external air supply pressure does not exceed 860kPa.
4. Ensure the top of the machine is clean and free of debris and oil.

### DANGER



#### FALLING HAZARD!

1. Working at heights can result in falling injuries.
2. ALWAYS maintain 3 points of contact with the machine.
3. DO NOT climb on the machine unless it is on level ground, has been correctly parked, the articulation lock is securely in place, and the steering accumulators have been drained.
4. DO NOT ride on the machine.

5. Access the top of the machine and carefully open the transmission bay cover.

### DANGER



#### ENTANGLEMENT HAZARD!

- DO NOT work in the transmission bay when the engine is running. Entanglement in the driveline and serious injury may result. ALWAYS maintain a safe distance to the transmission driveline when the engine is operating.**

6. Connect a 0 - 210 Bar test gauge to the "System 20" in-line sensor or a test gauge teed off the line from the bucket pump to the bucket control valve. Position the gauge line well clear of the drive lines. Use a "System 20" monitor where available.

**NOTICE**

Release any stored air pressure in the hydraulic tank prior to disconnecting hydraulic lines to minimise oil leakage.

 **WARNING****FLUID INJECTION HAZARD!**

**DO NOT disconnect hydraulic hoses whilst the engine is running or the system is pressurised. Hydraulic fluid injection injury may result. ALWAYS ensure the machine has been shutdown and hydraulic pressure drained before disconnecting any hoses. ALWAYS wear safety glasses when disconnecting hoses**

**Setting Pump Working Pressures**

1. Disconnect pilot line between pump [1] and bucket valve at the pump. Cap this pilot line and fitting on pump [1]. Clear the transmission bay area.
2. Start the engine and bring the engine rpm to approximately half throttle. Check the pump pressure on the test gauge or system 20 monitor, whichever is applicable. Refer to the schematic for system pressures.
3. If the system pressure requires adjustment shut down and isolate the machine. Adjust the working pressure compensator on pump [1]. Loosen the lock nut on the pump and turn the adjusting screw clockwise to increase pressure, or anti-clockwise to decrease pressure. Each full turn of the compensator screw changes the setting by approximately 52 bar. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.
4. Restart the engine, bring the engine rpm to approximately half throttle, and recheck the pressure. If required, repeat step 3 until the correct pressure is achieved.
5. Shut down and isolate the machine.
6. Reconnect pilot line from bucket valve to pump [1].
7. Disconnect pilot line at between pump [2] and bucket valve at pump. Cap this pilot line and fitting on pump [2]. Clear the transmission bay area.
8. Start the engine and bring the engine rpm to approximately half throttle. Check the pump pressure on the test gauge or system 20 monitor, whichever is applicable.
9. If the system pressure requires adjustment shut down and isolate the machine. Adjust the working pressure compensator on pump [2]. Loosen the lock nut on the pump and turn the adjusting screw a quarter turn clockwise to increase pressure, or a quarter turn anti-clockwise to decrease pressure. Each full turn of the compensator screw changes the setting by approximately 52 bar. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.

10. Restart the engine, bring the engine rpm to approximately half throttle, and recheck the pressure. If required, repeat step 3 until the correct pressure is achieved.
11. Shut down and isolate the machine.
12. Reconnect pilot line from bucket valve to pump [2].

### Setting Pump Standby Pressures

1. Loosen locknut on Standby Pressure Compensator on pump [2] and adjust standby pressure compensator anti-clockwise to reduce standby pressure on pump [2]. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.

**NOTICE**

**Count and record the number of turns on the adjustment screw. This will assist later in the procedure when resetting pump [2].**

2. Start machine and run at idle. Check the pump pressure on the test gauge or system 20 monitor, whichever is applicable. Refer to the schematic for system standby pressures.
3. If the system pressure requires adjustment shut down and isolate the machine. Adjust the standby pressure compensator on pump [1]. Loosen the locknut on the Standby Pressure Compensator on pump [1] and turn the adjusting screw clockwise to increase pressure, or anti-clockwise to decrease pressure. Each full turn of the standby compensator screw changes the setting by approximately 10.7 bar. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.
4. Restart the engine, leave the engine at idle rpm, and recheck the pressure. If required, repeat step 3 until the correct pressure is achieved.
5. Shut down and isolate the machine.
6. Loosen locknut on Standby Pressure Compensator on pump [2] and turn the adjustment screw clockwise (increase pressure) the number of turns noted in step 1 plus an additional turn. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.
7. Restart the engine, leave the engine at idle rpm, and recheck the pressure. It should be above 35 bar due to the additional turn in step 6.
8. Shut down and isolate the machine. Adjust the standby pressure compensator on pump [2]. Loosen the locknut on the Standby Pressure Compensator on pump [2] and turn the adjusting screw clockwise to increase pressure, or anti-clockwise to decrease pressure to 35 bar. Each full turn of the standby compensator screw changes the setting by approximately 10.7 bar. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.
9. Restart the engine, leave the engine at idle rpm, and recheck the pressure. If required, repeat step 8 until the correct pressure is achieved.
10. Shut down and isolate the machine.

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When pump standby pressure(s) are correct:

11. Disconnect the test gauge, clean the work area and close the transmission bay cover.
12. If no additional maintenance on the machine is required, remove the centre pivot safety link and wheel chocks, close the steering accumulator drain valve, and close the air vent on the hydraulic tank.

## Pressure Adjustments

### Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments

#### Special Tools Required

- 0 - 210 Bar test gauge
- Workshop hand tools
- Wheel chocks

#### PPE Required

- Safety glasses
- Workshop Gloves

#### Setup for Pump Pressure Setting Adjustments

1. The hydraulic oil should be at normal operating temperature before beginning any adjustments.
2. Set up the machine for service, ensuring that is parked correctly, shut down and isolated, stored hydraulic pressure has been drained, wheels are chocked and centre pivot safety link is connected.
3. Due to the number of shutdowns and re-starts during the adjustment procedures, it is advantageous to connect an external air supply to the air receiver. Ensure the external air supply pressure does not exceed 860kPa.
4. Ensure the top of the machine is clean and free of debris and oil.

#### DANGER



#### FALLING HAZARD!

1. Working at heights can result in falling injuries.
2. **ALWAYS** maintain 3 points of contact with the machine.
3. **DO NOT** climb on the machine unless it is on level ground, has been correctly parked, the articulation lock is securely in place, and the steering accumulators have been drained.
4. **DO NOT** ride on the machine.

5. Access the top of the machine and carefully open the transmission bay cover.

#### DANGER



#### ENTANGLEMENT HAZARD!

- DO NOT** work in the transmission bay when the engine is running. Entanglement in the driveline and serious injury may result. **ALWAYS** maintain a safe distance to the transmission driveline when the engine is operating.

6. Connect a 0 - 210 Bar test gauge to the “System 20” in-line sensor or a test gauge teed off the line from the brake / steer pump. Position the gauge line well clear of the drive lines. Use a “System 20” monitor where available.

**NOTICE**

Release any stored air pressure in the hydraulic tank prior to disconnecting hydraulic lines to minimise oil leakage.


**WARNING**

**FLUID INJECTION HAZARD!**

**DO NOT** disconnect hydraulic hoses whilst the engine is running or the system is pressurised. Hydraulic fluid injection injury may result. **ALWAYS** ensure the machine has been shutdown and hydraulic pressure drained before disconnecting any hoses. **ALWAYS** wear safety glasses when disconnecting hoses

### Setting Pump Working Pressures

1. Start the engine and bring the engine rpm to approximately half throttle. Cycle the pump several times by pumping the brake pedal. Check the pump pressure on the test gauge or system 20 monitor, whichever is applicable. Refer to the schematic for system pressures.
2. If the system pressure requires adjustment, shut down and isolate the machine. Loosen the lock nut on the pump compensator and turn the adjusting screw a quarter turn clockwise to increase pressure, or a quarter turn anti-clockwise to decrease pressure. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.
3. Restart the engine, and bring the engine rpm to approximately half throttle. Cycle the pump several times by pumping the brake pedal, and recheck the pressure. Note the change in pressure due to the quarter turn. If required, repeat step 2 until the correct pressure is achieved. Increase or decrease the turn amount on the adjustment screw as required.
4. Shut down and isolate the machine.
5. Disconnect the test gauge, clean the work area and close the transmission bay cover.
6. If no additional maintenance on the machine is required, remove the centre pivot safety link and wheel chocks, close the steering accumulator drain valve, and close the air vent on the hydraulic tank.

## Adjustments

### Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments

#### Special Tools Required

- 0 - 210 Bar test gauge
- Workshop hand tools
- Wheel chocks

#### PPE Required

- Safety glasses
- Workshop Gloves

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### Setting Pump Working Pressures

1. Start the engine and bring the engine rpm to approximately half throttle. Cycle the pump several times by pumping the brake pedal. Check the pump pressure on the test gauge or system 20 monitor, whichever is applicable. Refer to the schematic for system pressures.

2. If the system pressure requires adjustment shut down and isolate the machine. Loosen the lock nut on the pump compensator and turn the adjusting screw a quarter turn clockwise to increase pressure, or a quarter turn anti-clockwise to decrease pressure. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.

3. Restart the engine, and bring the engine rpm to approximately half throttle. Cycle the pump several times by pumping the brake pedal, and recheck the pressure. Note the change in pressure due to the quarter turn. If required, repeat step 2 until the correct pressure is achieved. Increase or decrease the turn amount on the adjustment screw as required.

4. Shut down and isolate the machine.

5. Disconnect the test gauge, clean the work area and close the transmission bay cover.

6. If no additional maintenance on the machine is required, remove the centre pivot safety link and wheel chocks, close the steering accumulator drain valve, and close the air vent on the hydraulic tank.



**UCC Inline Sensor Test Point**

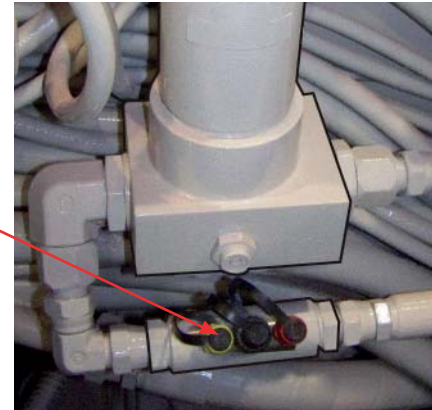
## Pressure Adjustments

### Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments

#### Special Tools Required

- 0 - 210 Bar test gauge
- Workshop hand tools
- Wheel chocks

UCC Inline Sensor  
Test Point



#### PPE Required

- Safety glasses
- Workshop Gloves

#### Setup for Pump Pressure Setting Adjustments

1. The hydraulic oil should be at normal operating temperature before beginning any adjustments.
2. Set up the machine for service, ensuring that it is parked correctly, shut down and isolated, stored hydraulic pressure has been drained, wheels are chocked and centre pivot safety link is connected.
3. Due to the number of shutdowns and re-starts during the adjustment procedures, it is advantageous to connect an external air supply to the air receiver. Ensure the external air supply pressure does not exceed 860kPa.
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6. Connect a 0 - 210 Bar test gauge to the “System 20” in-line sensor or a test gauge teed off the line from the bucket pump to the bucket control valve. Position the gauge line well clear of the drive lines. Use a “System 20” monitor where available.

**NOTICE**

**Release any stored air pressure in the hydraulic tank prior to disconnecting hydraulic lines to minimise oil leakage.**

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**Setting Pump Working Pressures**

1. Start the engine and bring the engine rpm to approximately half throttle. Cycle the pump several times by pumping the brake pedal. Check the pump pressure on the test gauge or system 20 monitor, whichever is applicable. Refer to the schematic for system pressures.
2. If the system pressure requires adjustment, shut down and isolate the machine. Loosen the lock nut on the pump compensator and turn the adjusting screw a quarter turn clockwise to increase pressure, or a quarter turn anti-clockwise to decrease pressure. Tighten the lock nut on the adjusting screw. Clear the transmission bay area.
3. Restart the engine, and bring the engine rpm to approximately half throttle. Cycle the pump several times by pumping the brake pedal, and recheck the pressure. Note the change in pressure due to the quarter turn. If required, repeat step 2 until the correct pressure is achieved. Increase or decrease the turn amount on the adjustment screw as required.
4. Shut down and isolate the machine.
5. Disconnect the test gauge, clean the work area and close the transmission bay cover.
6. If no additional maintenance on the machine is required, remove the centre pivot safety link and wheel chocks, close the steering accumulator drain valve, and close the air vent on the hydraulic tank.

## Adjustments

### Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments

#### Special Tools Required

- 0 - 240 Bar test gauge
- Workshop hand tools
- Wheel chocks

#### PPE Required

- Safety glasses
- Workshop Gloves

#### Setup for Pump Pressure Setting Adjustments

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6. Connect a 0 - 240 Bar test gauge to the “System 20” in-line sensor or a test gauge teed off the line from the brake / steer pump. Position the gauge line well clear of the drive lines. Use a “System 20” monitor where available.

**NOTICE**

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**Location of Pressure Adjustment**

## Pressure Adjustments

### Pressure Compensated Brake/Steer Pump Pressure Setting Adjustments

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- 0 - 210 Bar test gauge
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