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◀Product: COMPACT TRACK LOADER

Model: 279C COMPACT TRACK LOADER MBT

Configuration: 279C Compact Track Loader MBT00001-UP (MACHINE) POWERED BY 3044C Engine

Testing and Adjusting

279C, 279C2, 289C, 289C2 and 299C Compact Track Loaders Machine Systems

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i04717461

Line Relief Valve - Test and Adjust

SMCS - 5117-025-L9; 5117-081-L9

Table 1

Required Tools		
Part Number	Description	Qty
177-7861	Hose As	1
3S-6224	Electric Hydraulic Pump Gp	1
299-1731	Test Manifold Gp	1
1P-2375	Quick Connect Coupler	2
1P-2376	Quick Connect Coupler	2
1P-2377	Plug As	2
177-7860	Hose As	1
3B-7722	Pipe Bushing	2
7J-8611	Pipe Elbow	1
8F-0024	Hose As	1
030-8370	Pipe Adapter	2

Before any tests are performed, prepare the machine for troubleshooting. Refer to Testing and Adjusting, "Machine Preparation". Before any tests are performed, visually inspect the complete hydraulic system. Refer to the Testing and Adjusting, "Visual Inspection".

Note: The oil in the hydraulic system must be at an operating temperature of $50^{\circ} \pm 10^{\circ}\text{C}$ ($122^{\circ} \pm 18^{\circ}\text{F}$). In order to increase the oil temperature, start the engine and operate all the cylinders for at least five cycles. Also, drive the machine forward and drive the machine rearward for a few minutes.

The following test determines if a line relief valve for the work tool is damaged or improperly set below the main relief valve setting.

Machine Test (Pressure)



Personal injury or death can result from escaping fluid under pressure.

Escaping fluid under pressure, even a very small pin-hole size leak, can penetrate body tissue and cause serious injury and possible death. If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

Always use a board or cardboard when checking for a leak.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Do not adjust the main relief valve above the specified pressure. Adjustment of the main relief valve above the specified pressure may cause damage to the gear pump.

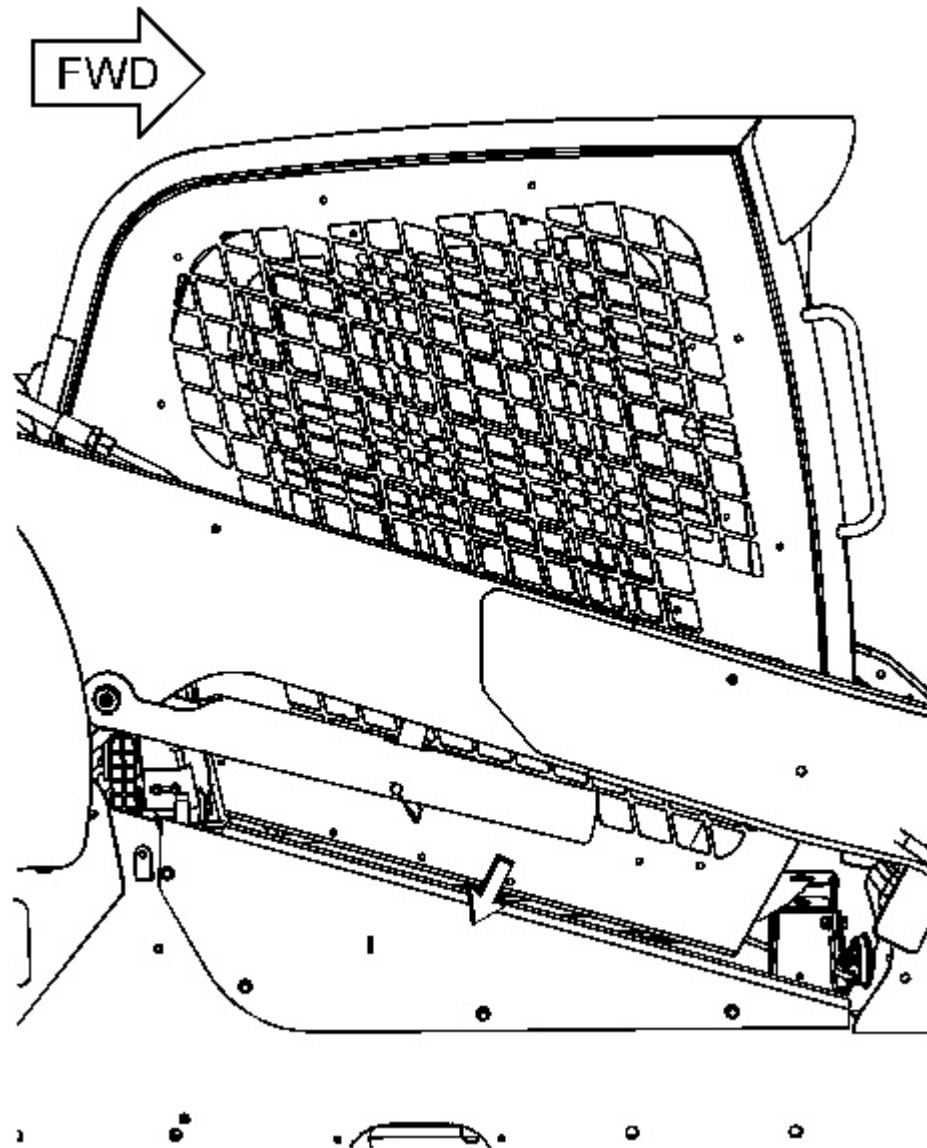


Illustration 1

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Note: Remove four bolts in order to remove the cover plate on the right-hand side of the machine. Removing the plate will allow safe routing of the hydraulic test hoses when the cab is lowered. Refer to Illustration 1.

Table 2

Required Tools			
Tool	Part Number	Description	Qty

A	177-7860	Hose As	1
	6V-4143	Quick Connect Coupler	2
	8T-0860	Pressure Gauge 0 to 40000 kPa (0 to 5800 psi)	1
	6V-3989	Fitting	1

Perform the "Machine Test (Pressure)" in order to determine if the line relief valve is improperly set below the main relief valve setting.

Stall Test (Boom Lower)

This test is performed in order to set a baseline for following tests on the line relief valve.

1. Perform the Testing and Adjusting, "Main Relief Valve - Test and Adjust" if the machine is equipped with standard flow.

Note: Perform the Testing and Adjusting, "High Flow Hydraulic System - Test and Adjust" if the machine is equipped with high flow.

2. Record the main relief valve pressure setting if the machine is equipped with standard flow. The main relief pressure should be 23000 ± 700 kPa (3335 ± 102 psi).

Note: Record the pump discharge pressure, if the machine is equipped with high flow. The pump discharge pressure should be 23000 ± 1000 kPa (3335 ± 145 psi).

3. Do not disconnect the Tooling (A) .

Stall Test (Boom Raise)

The following test is performed in order to determine if the line relief valve is improperly set below the main relief valve setting.

1. If the pressure gauge is not attached, attach the pressure gauge. Refer to Testing and Adjusting, "Main Relief Valve - Test and Adjust", if the machine is equipped with standard flow.

Note: If the pressure gauge is not attached, attach the pressure gauge. Refer to Testing and Adjusting, "High Flow Hydraulic System - Test and Adjust", if the machine is equipped with high flow.

2. Sit in the operator seat. Fasten the seat belt. Lower the armrest. Start the engine. Disengage the parking brake.
3. Run the engine at HIGH Idle.

Note: Do not stall the hydraulic system for more than 10 seconds. If additional time is necessary, release the work tool from the stall condition. Wait at least 30 seconds and repeat the following step.

4. Move the electrohydraulic operated control (work tool) to the full RAISE position. Hold the electrohydraulic operated control (work tool) in the RAISE position until a stall condition exists.
5. Record the pressure on the pressure gauge.
6. Compare the test pressure to the main relief valve pressure setting. If the machine is equipped with standard flow, the main relief pressure should be 23000 ± 700 kPa (3335 ± 102 psi). If the machine is equipped with high flow, the pump discharge pressure should be 23000 ± 1000 kPa (3335 ± 145 psi).
 - If the test pressure is less than the main relief valve pressure setting, then the line relief valve is set too low. Perform the "Bench Test and Adjust" in order to adjust the line relief valve pressure setting.
 - Check if the test pressure is equal to the main relief valve pressure setting. If the pressure is equal, then the line relief valve pressure setting may be correct or the setting may be too high. Perform the "Bench Test and Adjust" in order to adjust the line relief valve pressure setting.
7. Repeat the "Stall Test (Boom Raise)" process for the Tilt Forward, for the Tilt Back, and for the Auxiliary circuit.

Bench Test and Adjust

Perform the "Bench Test and Adjust" in order to adjust the line relief valve pressure setting.

Table 3

Required Tools			
Tool	Part Number	Description	Qty
B	3S-6224	Electric Hydraulic Pump Gp	1
	3B-7722	Pipe Bushing	2
	7J-8611	Pipe Elbow	1
	8F-0024	Hose As	2
	8T-0820	Pressure Gauge 0 to 70000 kPa (10000 psi)	1
	6V-4144	Quick Connect Coupler	3
	299-1731	Test Manifold Gp	1

	6V-3965	Fitting As	2
	6V-8398	O-Ring Seal	3
E	8T-0861	Pressure Gauge 0 to 60000 kPa (8700 psi)	1
	6V-3965	Fitting As	1


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Dispose of all fluids according to local regulations and mandates.

NOTICE

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1. Lower the boom to the ground.
 2. Engage the parking brake. Stop the engine.
 3. Release the hydraulic system pressure. Refer to Testing and Adjusting, "Hydraulic System Pressure - Release" for the correct procedure.
 4. Turn the key to the OFF position.
 5. Raise the cab. Refer to Operation and Maintenance Manual, "Cab Tilting" for the proper procedure.

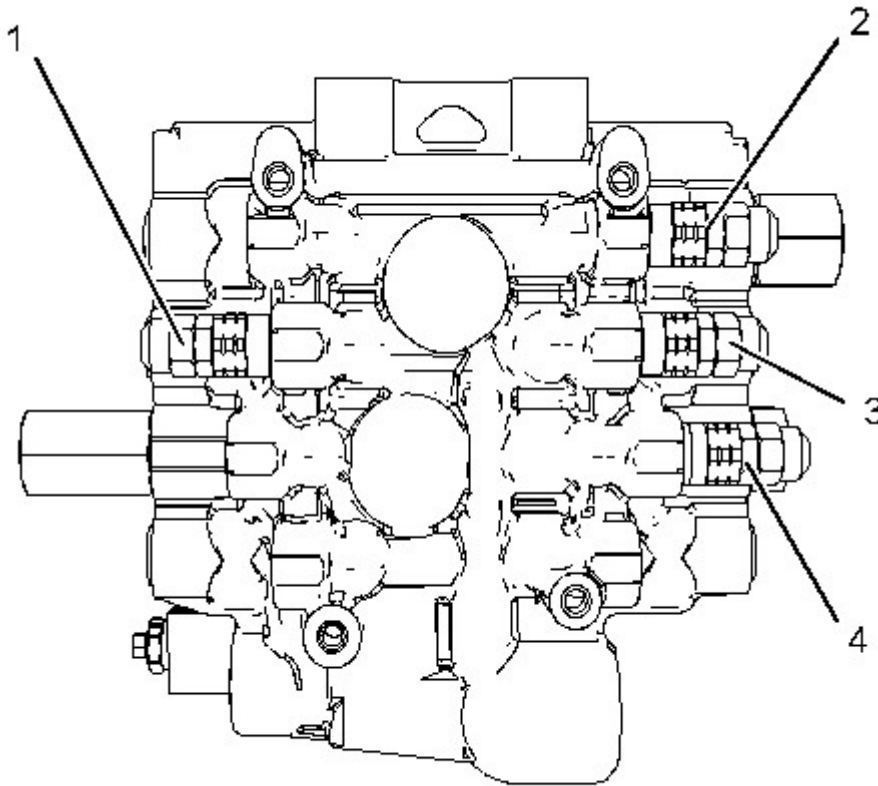


Illustration 2

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Typical example

High flow control valve (work tool)

(1) Line relief valve (tilt cylinder rod)

(2) Line relief valve (auxiliary circuit)

(3) Line relief valve (tilt cylinder head)

(4) Line relief valve (lift cylinder head)

6. Remove the line relief valve that will be tested.

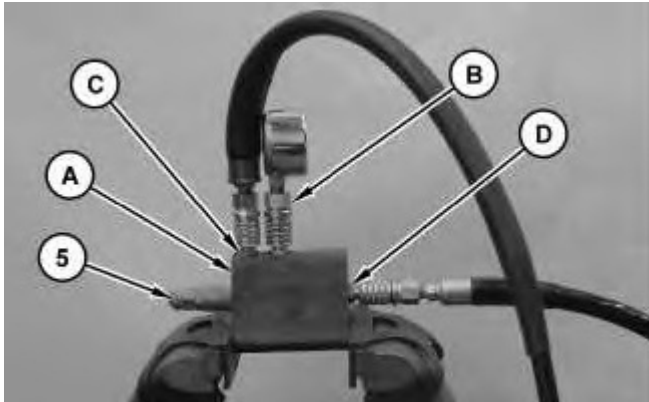


Illustration 3

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(5) Line relief valve

(B) Tooling

(C) Drain port

(D) Pressure port

(E) Tooling

7. Assemble Tooling (B), as shown. Secure tooling (B) in a suitable holding device.

8. Install Tooling (E) to Tooling (B), as shown.

9. Install the line relief valve (5) that will be tested. Install relief valve (5) to Tooling (B). Tighten the relief valve (5) to a torque of $45 \pm 5 \text{ N}\cdot\text{m}$ ($33 \pm 4 \text{ lb ft}$).

10. Turn the electric hydraulic pump to the ON position. Check for leaks at the connection.

NOTICE

The 3S-6224 Electric Hydraulic Pump only has a 7.6 L (2 US gal) reservoir. Pump damage may result if the pump is operated with an empty reservoir.

11. Slowly increase the pressure. Record the pressure, when the line relief valve opens. Compare this pressure to Table 4.
12. Stop the pump.

Table 4

Work Tool Function	279C/ 279C2	289C/ 289C2/ 299C
Lift	24500 ± 700 kPa (3553 ± 102 psi)	27600 ± 700 kPa (4003 ± 102 psi)
Rack Back	27600 ± 700 kPa (4003 ± 102 psi)	27600 ± 700 kPa (4003 ± 102 psi)
Tilt	24500 ± 700 kPa (3553 ± 102 psi)	24500 ± 700 kPa (3553 ± 102 psi)
Auxiliary (standard)	24500 ± 700 kPa (3553 ± 102 psi)	24500 ± 700 kPa (3553 ± 102 psi)
Auxiliary (High Flow XPS)	31000 ± 700 kPa (4496 ± 102 psi)	31000 ± 700 kPa (4496 ± 102 psi)

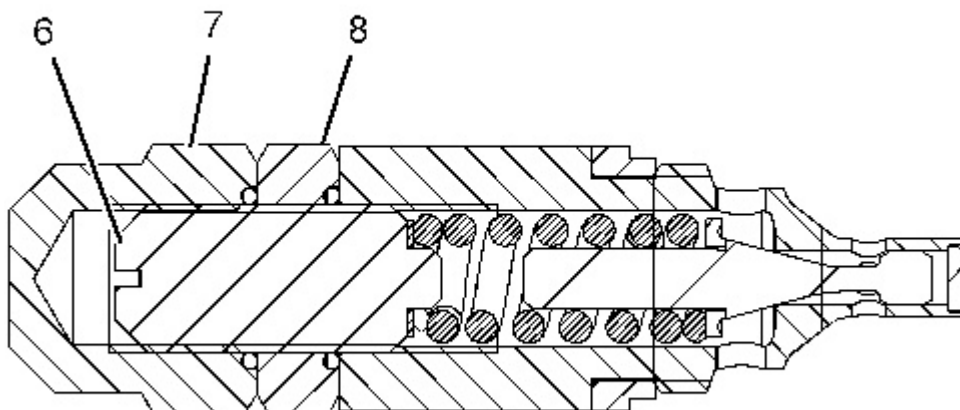


Illustration 4

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Typical line relief valve

(6) Cap

(7) Adjustment screw

(8) Locknut

13. If the line relief valve is within the specification, then go to Step 15. If the line relief valve is not within the specification, then an adjustment is required.
 - a. Remove cap (6). Loosen locknut (8) and turn adjustment screw (7) clockwise in order to increase pressure. Turn adjustment screw (7) counterclockwise in order to decrease pressure.
 - b. Check the oil level in the electric hydraulic pump and refill the oil if necessary. Repeat Steps 10, 11, 12, and 13.

Note: If unable to adjust the line relief valve to the correct specification, replace the old line relief valve with a new line relief valve.

14. Tighten locknut (8). Install the cap (6) and tighten the cap.
15. Remove line relief valve (5) from Tooling (B) .
16. Install a new seal on the relief valve (5) .
17. Install the line relief valve to a torque of $45 \pm 5 \text{ N}\cdot\text{m}$ ($33 \pm 4 \text{ lb ft}$).