21F
121F
221F
321F
Tier 4B (final)

Compact Wheel Loader

SERVICE MANUAL

Part number 51650967
English
May 2019

CASE CONSTRUCTION

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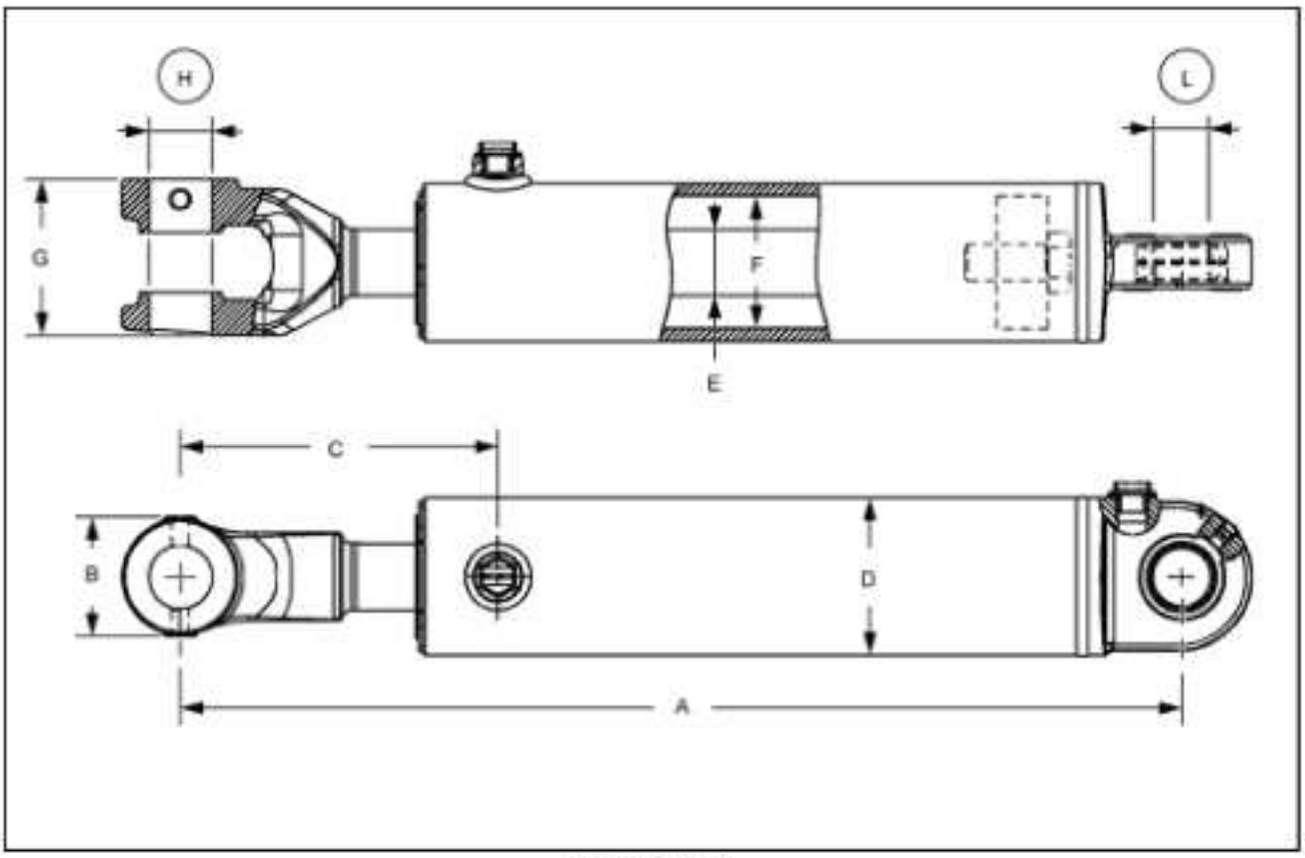
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Steering cylinder - Dimension

Ref.	Dimension
A	604 mm (23.78 in)
B	72 mm (2.83 in)
C	191.5 mm (7.54 in)
D	95 mm (3.74 in)
E	40 mm (1.57 in)
F	80 mm (3.15 in)
G	94 mm (3.70 in)
H	38.2 mm (1.50 in)
L	35 mm (1.38 in)

Stroke: 300 mm (11.8 in)



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3108 - Fuel Metering Unit - Short Circuit to Ground

Context:
The engine control unit (ECU) has determined that a short to low source circuit condition exists in the fuel high pressure pump low side circuit. The metering unit of the fuel high pressure pump regulates the pressure in the common rail. The metering unit is closed-loop controlled by both main relay 1 (high side) and a low side power stage (main relay 1 is an electronic control circuit within the ECU, providing source voltage to devices external to the ECU. The low side power stage works in conjunction with the Main Relay 1 source, providing sensing and current limiting for the circuit). The monitoring at low side is stopped if a short circuit to ground at the high side (main relay 1) is detected or it is switched off for some reason. Failure detection of is only possible if the low side power stage is switched off. With the current settings, the monitoring is shut off during after-run. This error is the result of the power stage hardware report of 'short circuit to ground' (on the low side of the metering unit) longer than 0.28 seconds and the power stage has most likely switched off.

Cause:
Fuel high pressure pump circuit is shorted to a low source.

Possible failure modes:

1. Faulty fuel high pressure pump control circuit, shorted to a low source.
2. Faulty ECU, hardware or software.

Solution:

1. Verify this error code is still present and in an active state.
   A. If the error is still present and active, continue with Step **2**.
   B. If the error is no longer present or is in an inactive state, continue with Step **4**.
2. Disconnect the Engine Injector harness from the ECU at connector X-078. Use a multi-meter to test for continuity from the Engine Injector harness side of connector X-078, pin 60 to ground. There should be no continuity.
   A. If there is continuity, continue with Step **3**.
   B. If there is no continuity, try reloading the ECU software and if the error reoccurs, replace the ECU.
3. Disconnect the Engine Injector harness from the Fuel high pressure pump at connector ZME and use a multi-meter to check for continuity on the fuel high pressure pump side of connector ZME, pins 1 and 2 to chassis ground. There should be no continuity on either pin to ground.
   A. If there is continuity on either pin, the fuel high pressure pump solenoid coil has failed, replace the solenoid.
   B. If there is no continuity on either pin, there is a short to low source in the Engine Injector harness, locate and repair the short to ground.
4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while monitoring the Display.
   A. If damage is found or other than normal display readings are indicated, repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.
   B. If no damage or other than normal display readings are indicated, erase the fault code and continue operation.

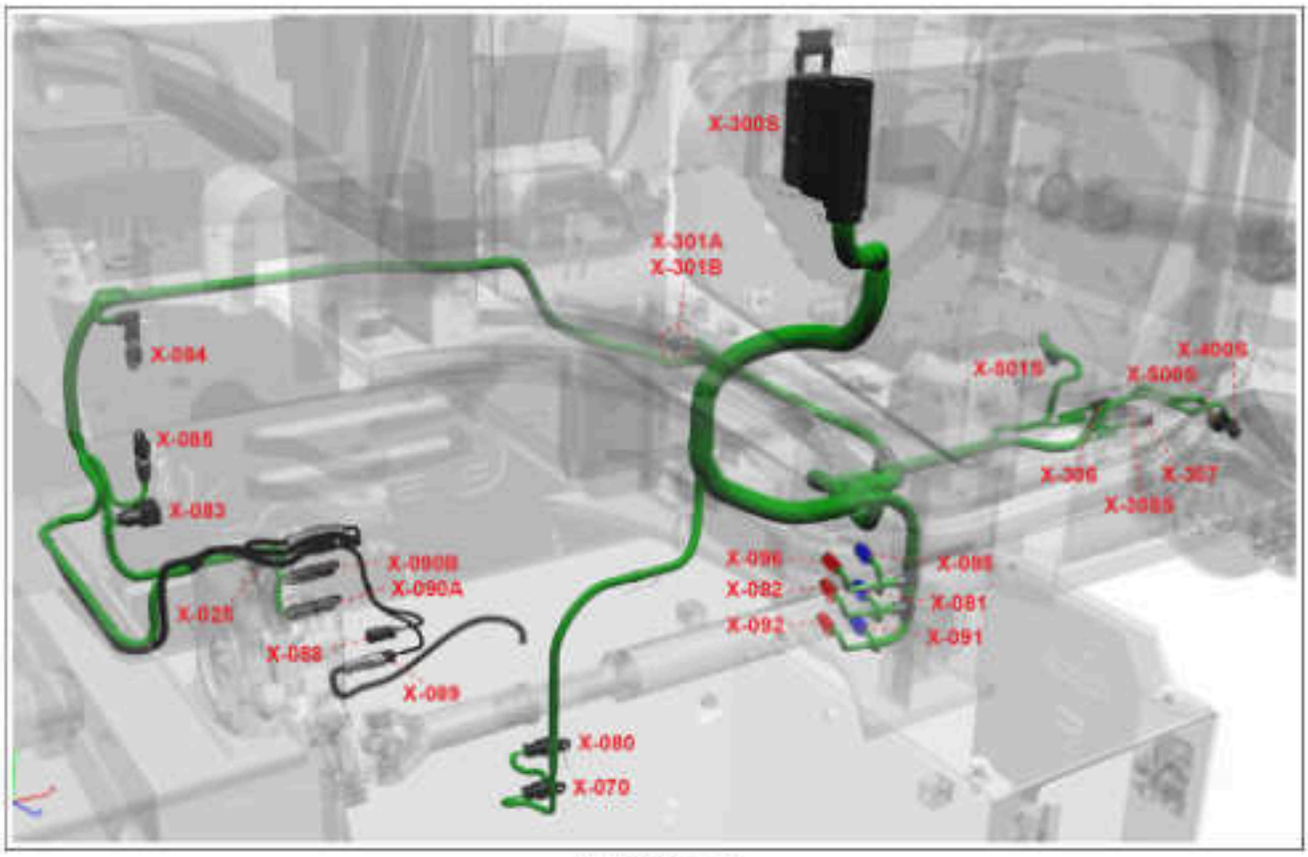
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Wiring harnesses - Electrical schematic sheet 13 (55.100)

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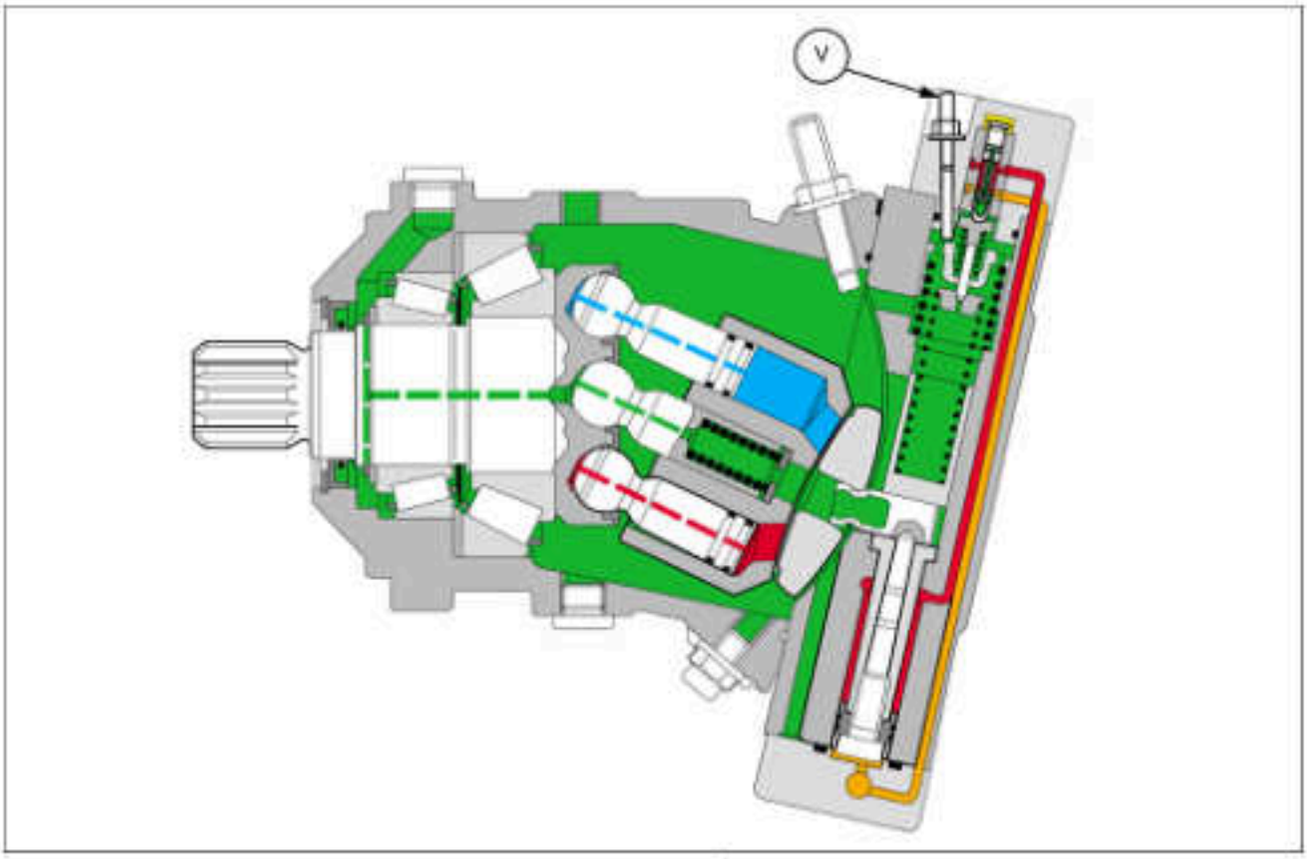
Wire connectors - Component localization - Rear chassis harness

221F HS CWL TIER4 XT [FNH221FHNKP01186 -]	NA
221F STD CWL TIER4 Z-BAR [FNH221FHNKP01186 -]	NA
321F HS CWL TIER4 XT [FNH321FHNKP01189 -]	NA
321F STD CWL TIER4 Z-BAR [FNH321FHNKP01189 -]	NA



CONNECTOR	DESCRIPTION
X-089	Y21.6 SOLENOID (DIRECTION CONTROL)
X-088	TURTLE/RABBIT SOLENOID
X-090A	RIDE CONTROL SOLENOID (A)
X-090B	RIDE CONTROL SOLENOID (B)
X-025	SPEED TRANS SENSOR A (STD)
X-083	DIFF LOCK SOLENOID
X-085	2ND SPEED GEAR SOLENOID
X-084	1ST SPEED GEAR SOLENOID
X-070	HIGH FLOW ACTIVATION SOLENOID
X-080	HIGH FLOW SOLENOID
X-301A	GROUND
X-301B	GROUND
X-300S	FRAME-CAB INTERFACE CONNECTOR
X-081	BOOM RISING SOLENOID
X-082	BOOM LOWERING SOLENOID
X-091	BUCKET DUMP SOLENOID
X-092	BUCKET ROLL BACK SOLENOID
X-095	3TH FUNCTION SOLENOID VALVE PORT B1(PWM)
X-096	3TH FUNCTION SOLENOID VALVE PORT B2(PWM)
X-501S	JUMPER LIGHT LH
X-306	RIDE CONTROL UNLOCK SOLENOID VALVE (1)
X-307	RIDE CONTROL UNLOCK SOLENOID VALVE (2)
X-308S	TO JUMPER - RETURN TO DIG NPN PROXIMITY SENSOR
X-400S	TO ARM JUMPER

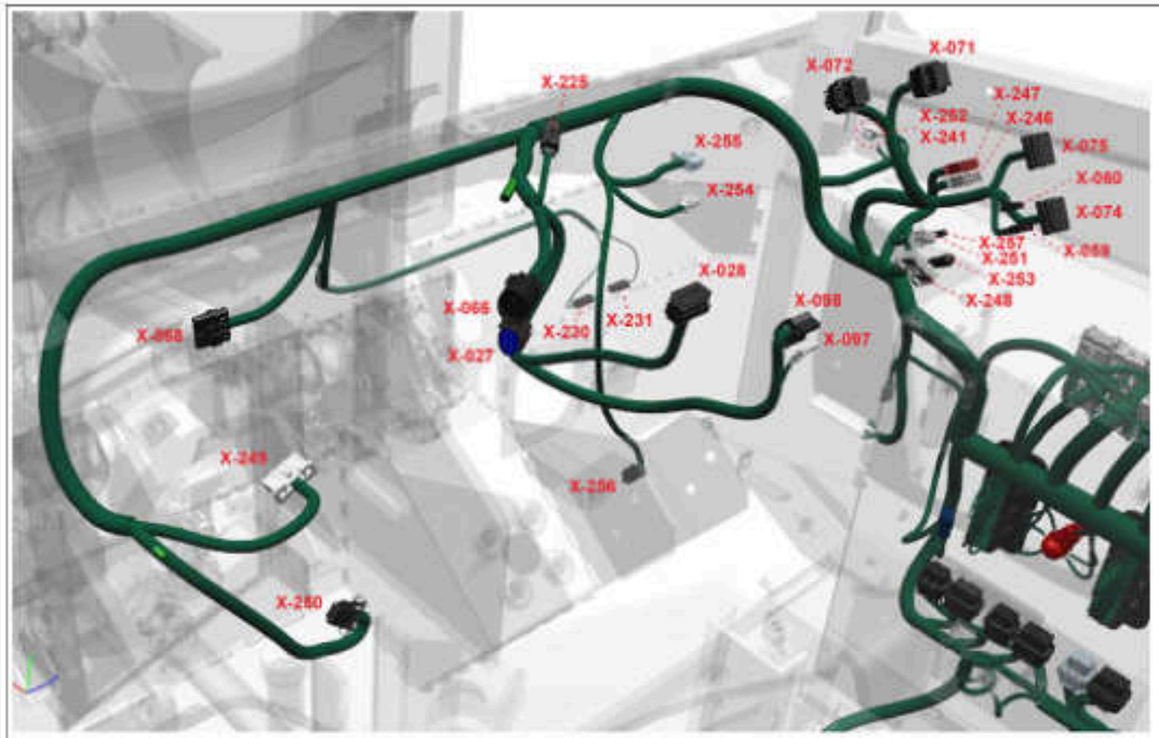
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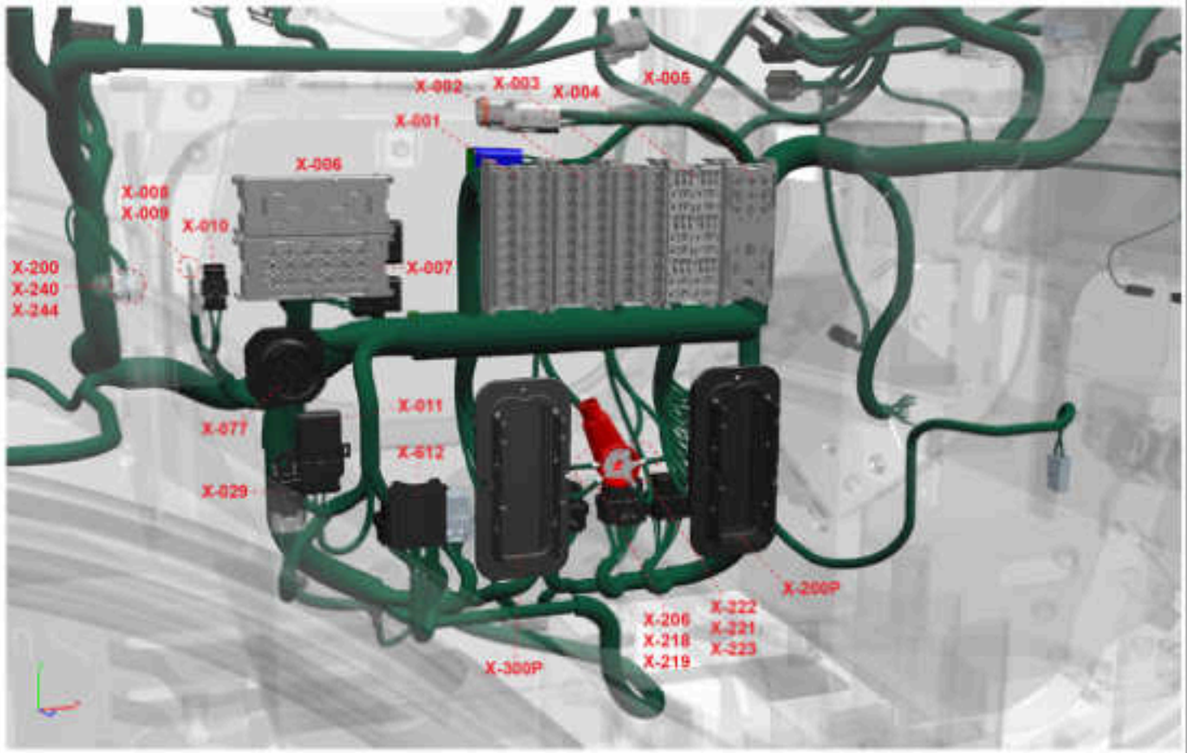


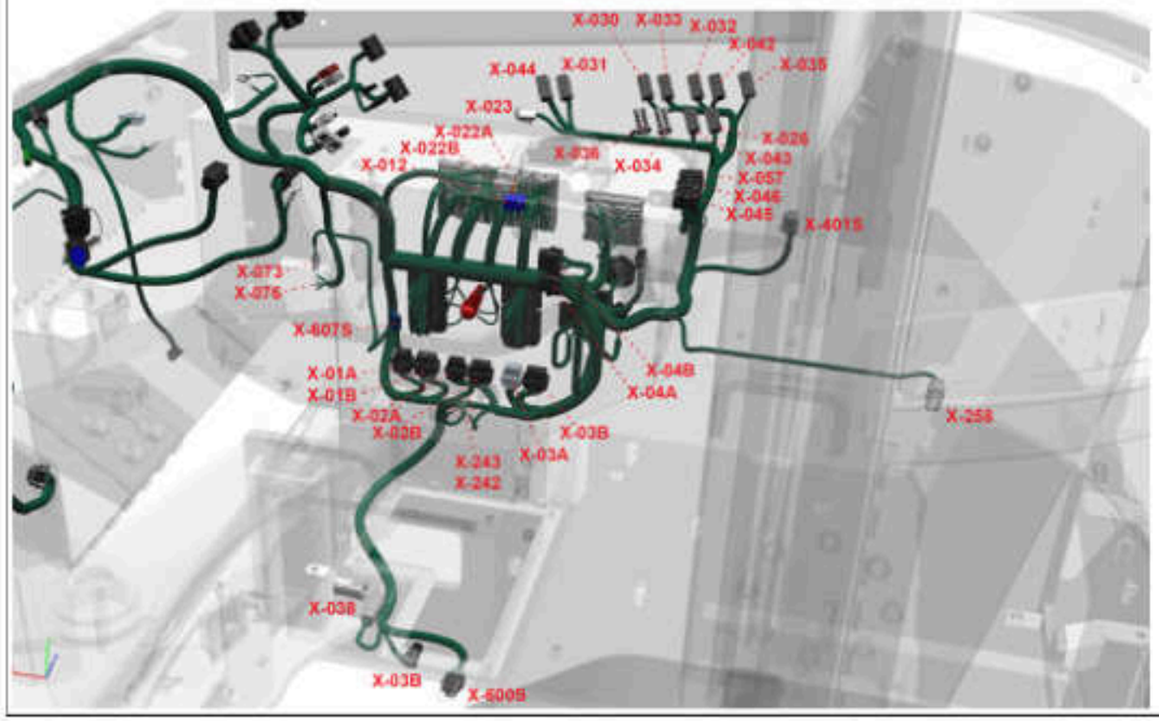
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4. With the engine on and gear engaged, push the throttle pedal at full throttle.
5. Unscrew the setting screw **(V)**.
6. Read the pressure values at the **(G)** and **(M1)** ports. Verify that the **(M1)** port pressure is half of the **(G)** pressure. The ratio between the **(G)** port pressure and **(M1)** port pressure must be 1 to 2.
7. Adjust the setting screw **(V)** until the pressure values comply with the ratio between **(G)** and **(M1)** described in step **6**.
8. At the end of the procedure, tighten the setting screw **(V)**.

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