THERMO KING

Service Bulletin

SB2035

Date: August 27, 2026

Subject: Precedent High-Pressure Common Rail (HPCR) Fuel System Diagnostics

Location: e-Tech Library

Units: Precedent S-600, S-610DE, S-610M, S-700, S-750i, GenSet SG5000, Advancer S-DRC

Description: This bulletin provides a systematic approach to diagnosing issues related to the HPCR pump and other HPCR system components. By following the recommended diagnostic process, a technician can efficiently identify the root cause, including fuel contamination and other potential causes, perform the appropriate inspections, and make informed repair decisions.

Summary: The HPCR system stores fuel at high pressure and delivers it precisely to each injector under electronic control, enabling efficient combustion and reduced emissions. Its precision components rely on fuel for both injection and lubrication, making them sensitive to fuel quality.

Many fuel system failures result from water or other contaminants in diesel fuel. Failures caused by lack of lubrication, rust, algae growth, or unapproved fuel additives are considered fuel contamination.

If a unit has an HPCR fuel pump (PN 100565) leaking from the weep hole, submit a video or picture with the warranty claim. If a video or picture is not attached with the warranty claim, the claim will be denied. Refer to Service Bulletin SB975 located in e-Tech Library.

Warranty: Refer to Warranty Bulletin WB537-1 located in Asset Library.

Section 1 - Diagnostic Flow for HPCR Pump Failures:

- Scope of diagnosis: HPCR pump failures in general, including electrical failures with error codes and mechanical failures without error codes.
- Electrical symptoms: Unit error code 42, 615, 627, 699.
- Leak symptoms: Fuel leakage, oil leakage.
- Mechanical symptoms: Starting failure, engine speed fluctuation, white smoke, black smoke, excessive vibration, abnormal noise.

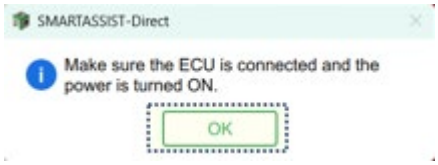
If any of the above engine symptoms are observed, proceed below.

1. Connect YSAD to the engine.
2. Save ECU data using YSAD. If ECU data is requested, export the ECU data file in .ecu format.

   Note: ECU Data Save will be required for all warranty claims excluding oil/fuel leaks. Oil/fuel leak claims will still require a photo/video to be attached to the TAVANT claim.

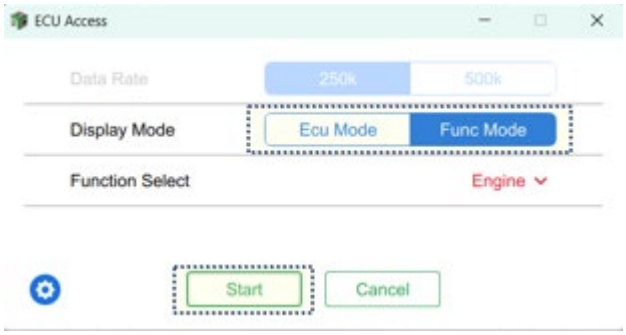
   a. Click Communicate ECU on the Diagnostics tab.

b. Confirm that the key switch is on and click OK.

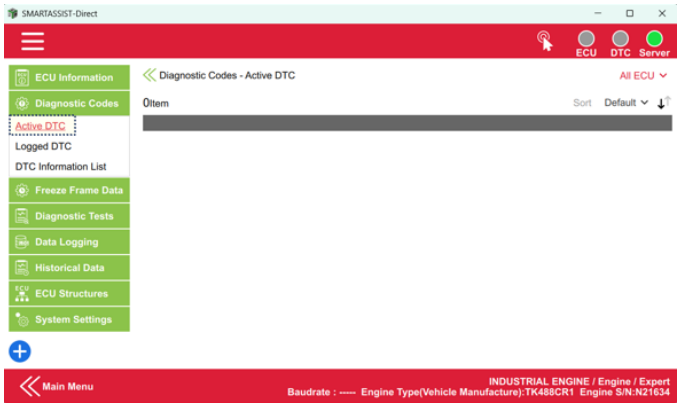


c. Select 250k as data rate and click ECU Search.

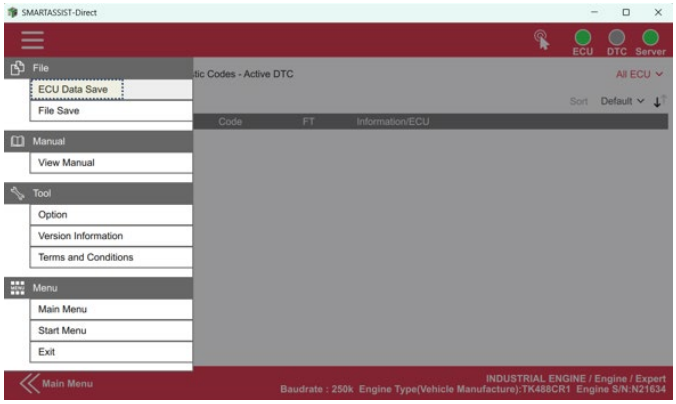
d. Select either ECU Mode or Func Mode and click Start.



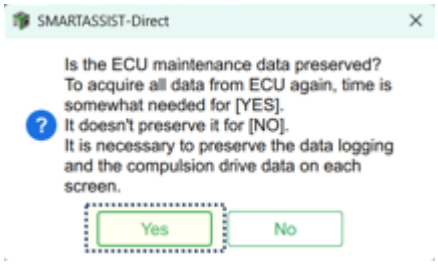
e. Click Active DTC on the Diagnostic Codes tab.



f. Click the three-line menu in the upper-left corner and select ECU Data Save.

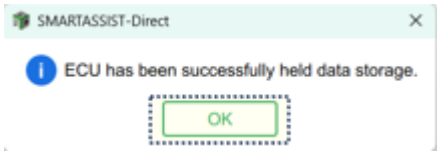


g. Click Yes.

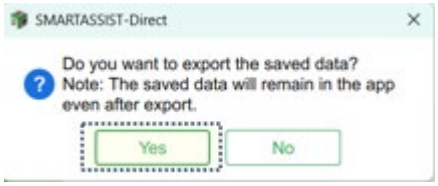


h. Enter the engine operating conditions as shown below, then click OK.

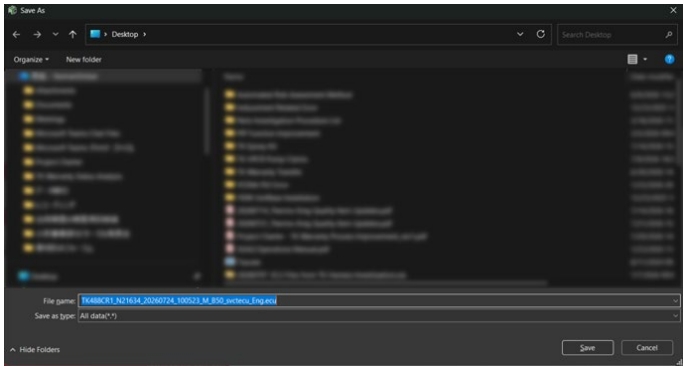
i. Click OK.



j. Click Yes.



k. Save the .ecu file in an easily accessible location, such as the desktop. The file can be shared as an email attachment.



l. Click Yes. The ECU data saving and export is complete.

3. Is the area around the HPCR pump and the top of the oil pan free of leakage? If no, proceed to Section 2 - Leak Symptom Diagnostics. If yes, proceed to next step.
4. Are there any active error codes displayed? If no, proceed to Section 3 - Mechanical Symptom Diagnostics. If yes, proceed to next step.
5. Does it correspond to any of the following errors: P000F, P1666, P1667, P0088, P0093, P0094, P1081? If no, Refer to Engine Troubleshooting Manual. If yes, proceed to next step.
    a. If the mechanical issue was not resolved after the error was cleared, proceed to Section 3 - Mechanical Symptom Diagnostics.
    b. If the mechanical issue was resolved after the error was cleared, repair complete.
6. Which of the following error groups does this belong to? Group A: P000F, P1666, P1667, P0094, P1081. Group B: P0088, P0093.
    a. If Group A, proceed to Section 10 - Group A Diagnostics.
    b. If Group B, proceed to Section 16 - Group B Diagnostics.

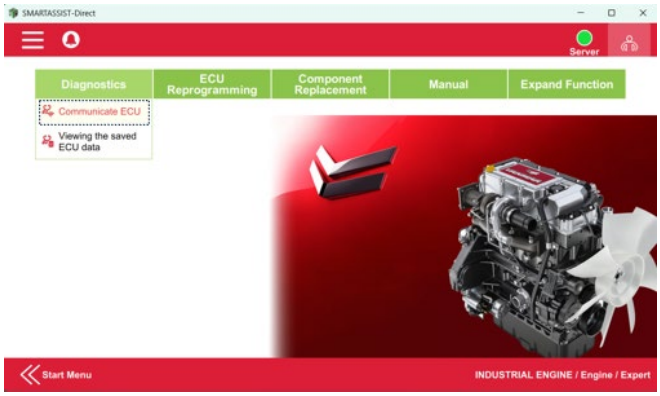
Section 2 - Leak Symptom Diagnostics:

1. Record the condition before starting the diagnosis using photos or videos.
2. Remove the breather hose, clean the orifice at the top of the intake manifold, and reinstall the breather hose.
3. Clean the area around the HPCR pump and the upper surface of the oil pan.
4. After running the engine for approximately 30 minutes, is leakage from the HPCR pump observed? If no, monitor without replacing parts. If the issue recurs, continue to next step.
5. Record the leakage condition using photos or videos.
6. Replace the HPCR pump and high-pressure pipe.

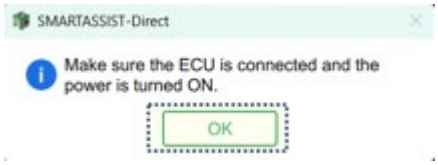
Section 3 - Mechanical Symptom Diagnostics:

1. Is the engine operable? If yes, check the rail pressure using YSAD (step 2) and proceed to step 3. If no, check the rail pressure using YSAD (step 2) and proceed to step 4.
2. Check the rail pressure using YSAD. If the data logging results need to be provided, follow the procedure below to export the file in .logging format and share it.

a. Click Communicate ECU on the Diagnostics tab.

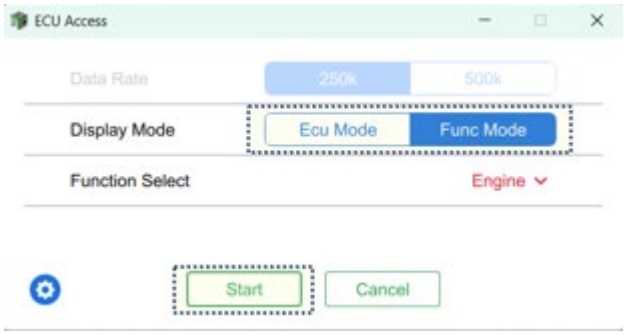


b. Confirm that the key switch is on and click OK.

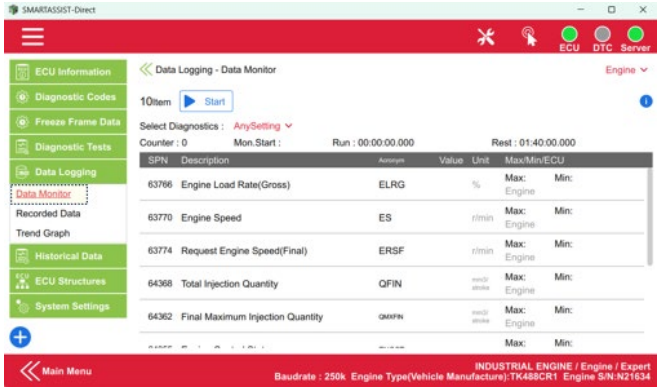


c. Select 250k as data rate and click ECU Search.

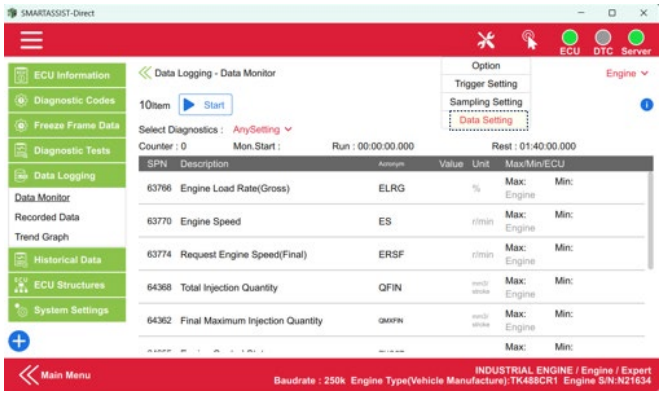
d. Select either ECU Mode or Func Mode and click Start.



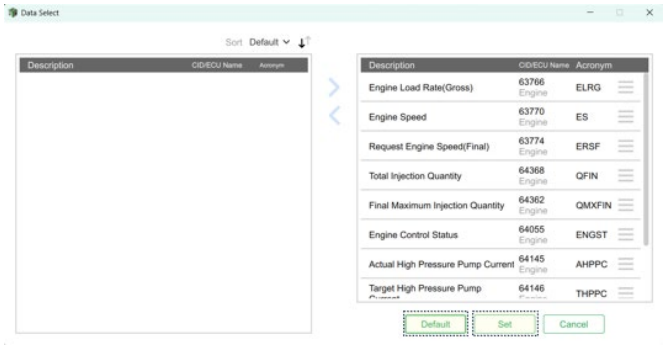
e. Click Data Monitor from the Data Logging tab.



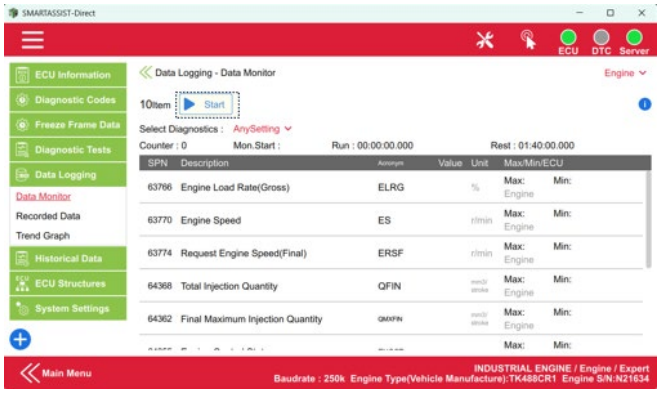
f. Click the tool icon in the upper-right corner and select Data Setting.



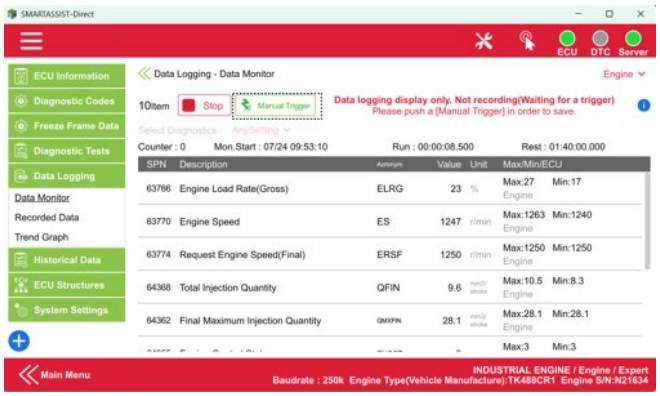
g. Click Default. Click Set.



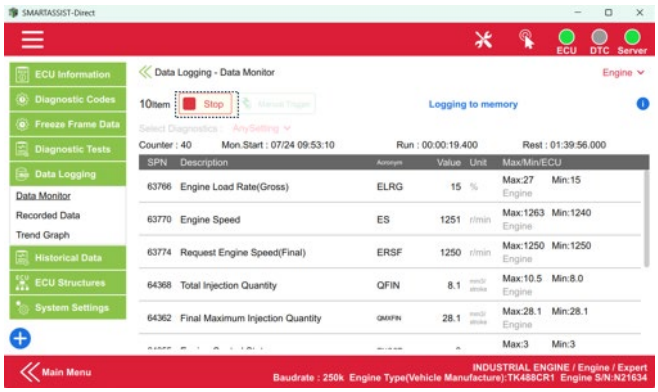
h. Start the engine, then click Start.



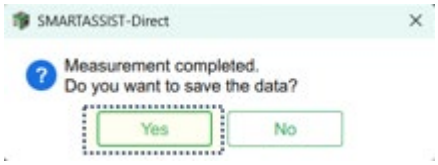
i. Click Manual Trigger. Data logging will not start until Manual Trigger is clicked.



j. If possible, run the unit in a high load condition (high speed cool/heat depending on ambient and box conditions) before clicking Stop.

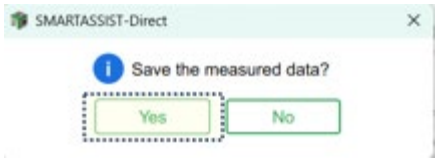


k. Click Yes.

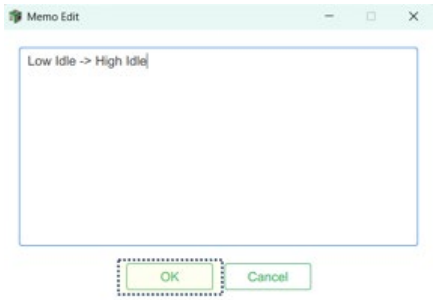


l. Click No.

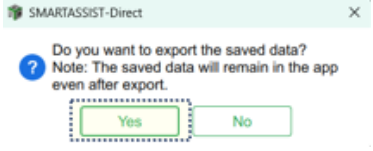
m. Click Yes.



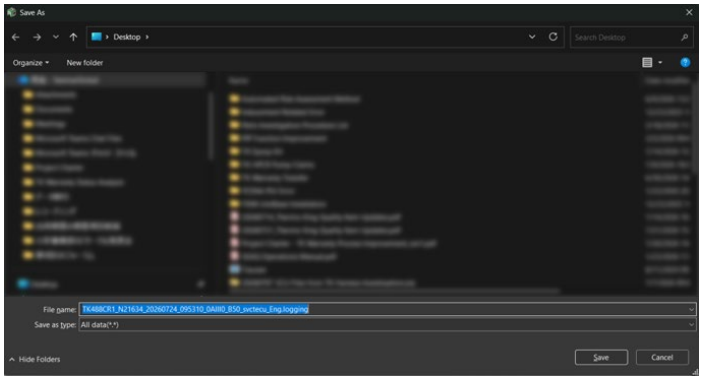
n. Enter the engine operating conditions during data logging as shown below. Click OK.



o. Click OK. Click Yes.

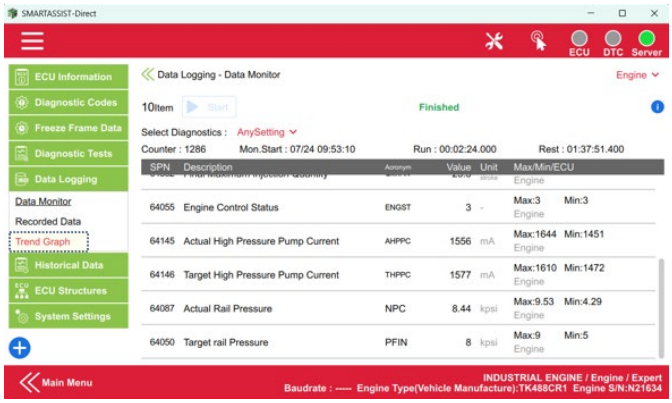


p. Save the .logging file in an easily accessible location, such as the desktop. The file can be shared as an email attachment.



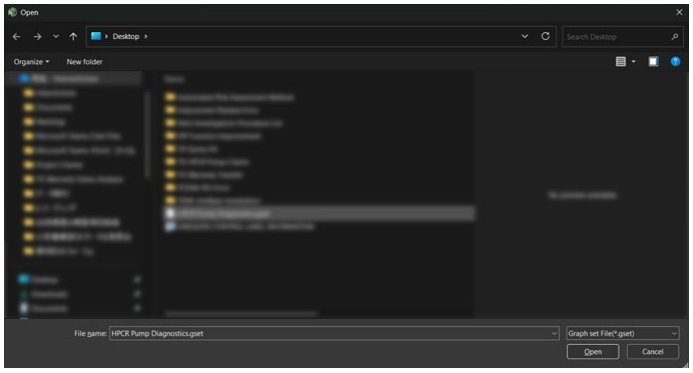
q. Click OK. Data logging is complete. Check the measurement data for any abnormalities in the following steps.

r. Click Trend Graph from the Data Logging tab. Click the tool icon in the upper-right corner and select Graph Setting.



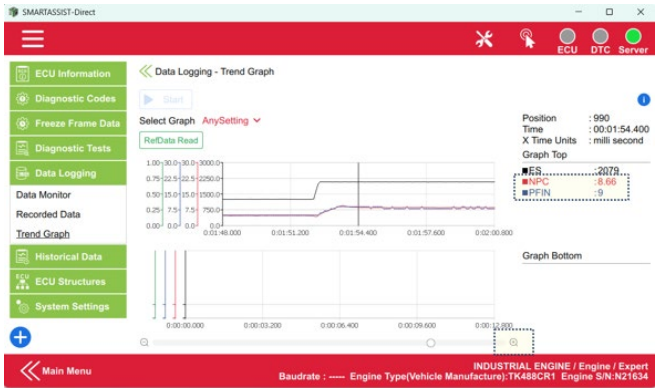
s. Click Open.

t. Select HPCR Pump Diagnostics.gset and click Open.



u. Confirm that Engine Speed, Actual Rail Pressure, and Target Rail Pressure are selected. Click Set.

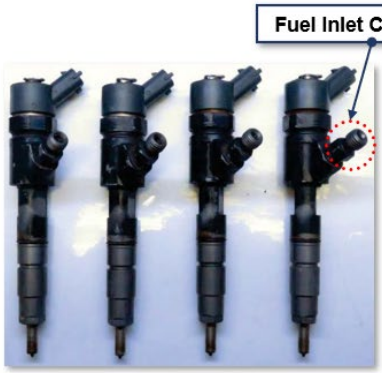
v. Use the magnifying glass icon to zoom in on the data as needed, and check whether the actual rail pressure deviates from the target rail pressure at each engine speed and during acceleration and deceleration.



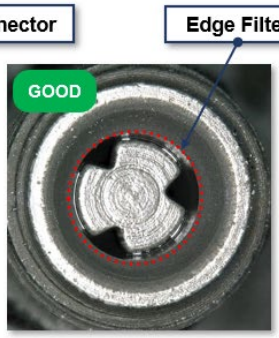
3. If engine is operable, is there a deviation between the target and actual rail pressures? If yes, proceed to Section 6 - HPCR Pump Inspection. If no, conduct the injector cut test using the active control of YSAD. Are there cylinders where the engine sound does not change or the abnormal noise disappears? If yes, verify that low-cetane or degraded fuel has not been used. Monitor the condition. If no, proceed to Section 4 - Injector Inspection A.
4. If engine is not operable, is there a deviation between the target and actual rail pressures? If yes, proceed to Section 8 - Reduced Fuel Flow Cause Inspection. If no, proceed to next step.
5. Check the basics: intake/exhaust restriction, glow plug operation, valve lash, engine RPM greater than 150 during cranking. Refer to unit specific manuals for more detailed information on crank/no start condition.
6. Is the issue resolved? If yes, repair complete. If no, proceed to next step.
7. Measure the compression pressure of each cylinder. Is there any cylinder with relatively low compression pressure? If no, proceed to Section 5 - Injector Inspection B. If yes, the following may have caused the issue: cylinder liner wear, piston ring wear or sticking, bent connecting rod, intake or exhaust valve sticking.

Section 4 - Injector Inspection A:

1. Perform injector return flow bottle test (refer to Service Bulletin SB710, located in e-Tech Library). If test fails, replace injectors. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, replace the HPCR pump. If test passes, proceed to next step.
2. Are there signs of rust at the high-pressure pipe connection? If no, proceed to next step. If yes, replace the injectors and high-pressure pipe. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, the following may have caused the issue: cylinder liner wear, piston ring wear or sticking, bent connecting rod, intake or exhaust valve sticking.
    a. Refer to the images below and inspect the injectors for signs of rust or contamination. As shown in the image, the edge filter in the center of the fuel inlet may sometimes be free of rust or contamination, so carefully inspect the surrounding sealing surface as well. If rust or contamination is present, it may indicate abnormal wear or seizure of the internal sliding components, resulting in reduced performance. In such cases, replacement of the injectors is recommended. When replacing the injectors, also replace the high-pressure pipe connecting the injectors to the rail to prevent fuel leakage.



Entire Injectors



Fuel Inlet

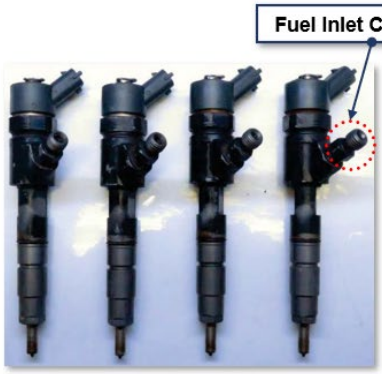
Fuel Inlet

Fuel Inlet

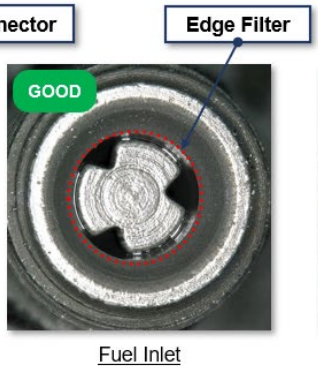
3. Are the injectors free from damage? If yes, the following may have caused the issue: cylinder liner wear, piston ring wear or sticking, bent connecting rod, intake or exhaust valve sticking. If no, replace the injectors. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, the following may have caused the issue: cylinder liner wear, piston ring wear or sticking, bent connecting rod, intake or exhaust valve sticking.

Section 5 - Injector Inspection B:

1. Perform injector return flow bottle test (refer to Service Bulletin SB710, located in e-Tech Library). If test fails, replace injectors. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, replace the HPCR pump. If test passes, restart Section 3 - Mechanical Symptom Diagnostics (something may have been overlooked) or proceed to next step.
2. Are there signs of rust at the high-pressure pipe connection? If no, proceed to next step. If yes, replace the injectors and high-pressure pipe. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, replace the HPCR pump.
    a. Refer to the images below and inspect the injectors for signs of rust or contamination. As shown in the image, the edge filter in the center of the fuel inlet may sometimes be free of rust or contamination, so carefully inspect the surrounding sealing surface as well. If rust or contamination is present, it may indicate abnormal wear or seizure of the internal sliding components, resulting in reduced performance. In such cases, replacement of the injectors is recommended. When replacing the injectors, also replace the high-pressure pipe connecting the injectors to the rail to prevent fuel leakage.



Entire Injectors



Fuel Inlet

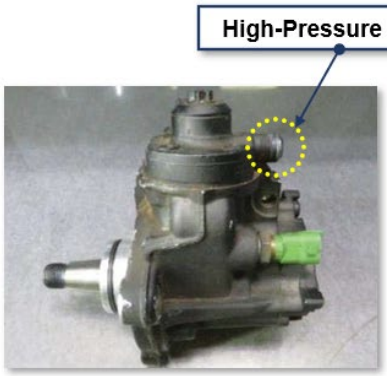
Fuel Inlet

Fuel Inlet

3. Are the injectors free from damage? If yes, monitor without replacing parts. If the issue recurs, replace the injectors. If no, replace the injectors. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, replace the HPCR pump.

Section 6 - HPCR Pump Inspection:

1. Are there signs of rust at the high-pressure pipe connection? If no, proceed to next step. If yes, replace the HPCR pump (as necessary based on the damage condition) and high-pressure pipe. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, proceed to Section 7 - Common Rail Inspection.
    a. Refer to the images below and inspect the HPCR pump outlet for signs of rust. If rust is present, it may indicate abnormal wear of the internal drive components, resulting in reduced performance. In such cases, replacement of the HPCR pump is recommended. When replacing the HPCR pump, also replace the high-pressure pipe connecting the pump to the rail to prevent fuel leakage.



Side View of the HPCR Pump

High-Pressure Outlet

High-Pressure Outlet

2. Remove the SCV. Are there signs of contamination or rust inside the pump or on the SCV? If no, proceed to next step. If yes, replace the HPCR pump (as necessary based on the damage condition) and high-pressure pipe. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, proceed to Section 7 - Common Rail Inspection.
    a. Refer to the images below and check the SCV mesh filter and SCV mounting area for signs of rust or contamination. If rust or contamination is present, it may indicate abnormal wear of the internal drive components, resulting in reduced performance. In such cases, replacement of the HPCR pump is recommended. When replacing the HPCR pump, also replace the high-pressure pipe connecting the pump to the rail to prevent fuel leakage.

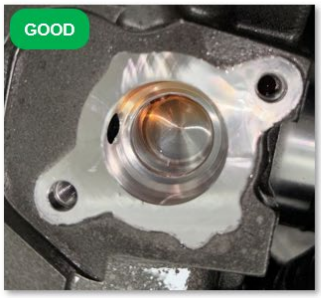
Side View of the HPCR Pump

SCV Mesh Filter

SCV Mesh Filter

SCV Retainer

SCV Retainer



SCV Mounting Area

SCV Mounting Area

SCV Mounting Area

SCV Mounting Area

3. Are the HPCR pump and SCV free from damage? If yes, install the SCV. If no, replace the SCV or HPCR pump as necessary based on the damage condition. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, proceed to Section 7 - Common Rail Inspection.

Section 7 - Common Rail Inspection:

1. Are the common rail, Pressure Limiting Valve (PLV), and rail pressure sensor free from rust? If yes, proceed to next step. If no, replace the common rail assembly and high-pressure pipe. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, proceed to Section 4 - Injector Inspection A.
    a. Refer to the images below and inspect the common rail, PLV, and rail pressure sensor for signs of rust. If rust is present, it may cause injector malfunction downstream of the common rail. In such cases, replacement of the common rail assembly is recommended. When replacing the common rail assembly, also replace the high-pressure pipe between the pump and rail, and between the injectors and rail to prevent fuel leakage.


Common Rail Assembly

High-Pressure Pipe Connection

High-Pressure Pipe Connection

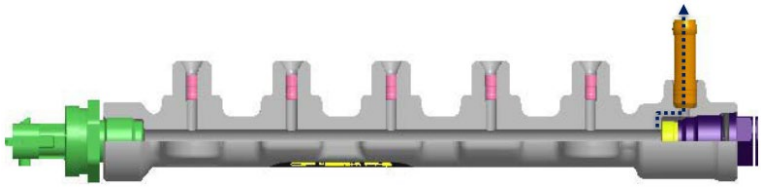
2. Are the common rail, PLV, and rail pressure sensor free from damage? If yes, proceed to Injector Inspection. If no, replace the damaged parts. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, proceed to Injector Inspection.

Section 8 - Reduced Fuel Flow Cause Inspection:

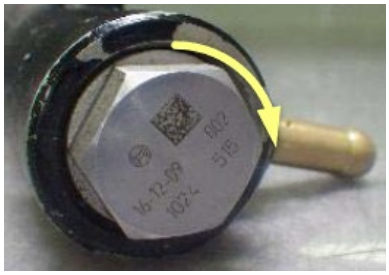
1. Is the fuel filter free of clogging? If yes, proceed to next step. If no, repair the identified issue. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, repeat inspection.
2. Is fuel free from diesel gelling? If yes, proceed to next step. If no, repair the identified issue. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, repeat inspection.
3. Is the fuel hose free from kinks and blockages? If yes, proceed to Section 9 - Fuel Line Air Ingress Cause Inspection. If no, repair the identified issue. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, repeat inspection.

Section 9 - Fuel Line Air Ingress Cause Inspection:

1. Is there sufficient fuel (1/4 tank or more) in the fuel tank? If yes, proceed to next step. If no, repair the identified issue. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, repeat inspection.
2. Is the fuel line free from damage and loose hose clamps? If yes, proceed to next step. If no, repair the identified issue. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, repeat inspection.
3. Has the fuel filter been properly bled? If yes, proceed to next step. If no, repair the identified issue. After running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, repeat inspection.
4. Is there service history for the PLV? If yes, tighten the PLV to the specified torque (95 to 105 Nm). If no, after running the engine, has the mechanical issue been resolved? If yes, repair complete. If no, proceed to Section 6 - HPCR Pump Inspection. Check the PLV for leakage. If yes, verify repair and complete. If no, proceed below.
    a. If the PLV is not tightened sufficiently, fuel may leak internally as shown in the image below. Verify the PLV is tightened to the specified torque of 95 to 105 Nm. The PLV opens to relieve pressure when the common rail pressure becomes abnormally high. However, if the PLV is insufficiently tightened, fuel may escape to the low-pressure side through the internal passage indicated by the arrow below, even when the rail pressure is within the normal range.

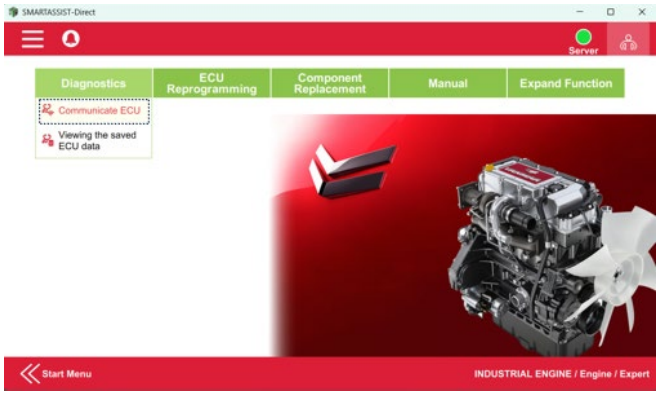


    b. Tighten the PLV hex fitting to a specified torque of 95 to 105 Nm and verify that it is securely tightened.

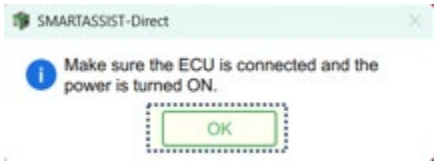


Section 10 - Group A Diagnostics:

1. Check the rail pressure using YSAD. If the data logging results need to be provided, follow the procedure below to export the file in .logging format and share it.
    a. Click Communicate ECU on the Diagnostics tab.

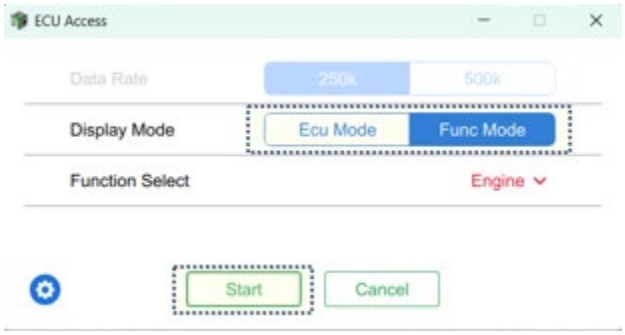


b. Confirm that the key switch is on and click OK.

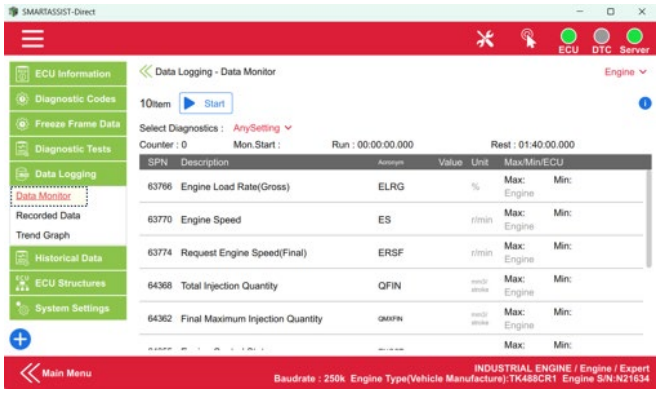


c. Select 250k as data rate and click ECU Search.

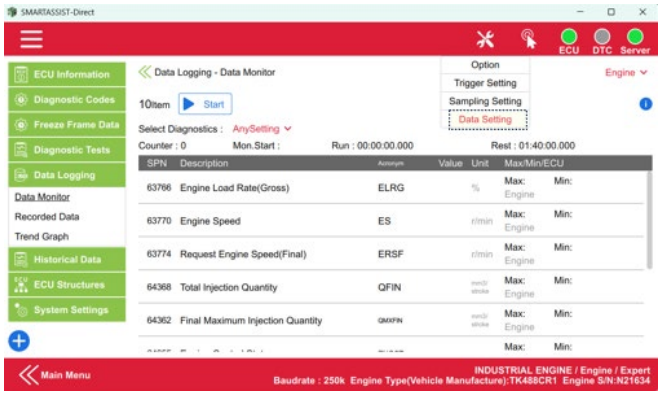
d. Select either ECU Mode or Func Mode and click Start.



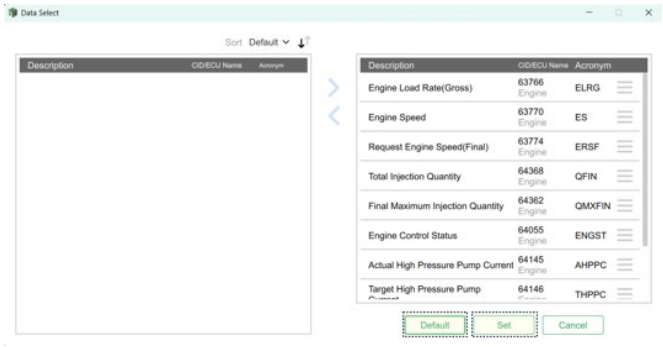
e. Click Data Monitor from the Data Logging tab.



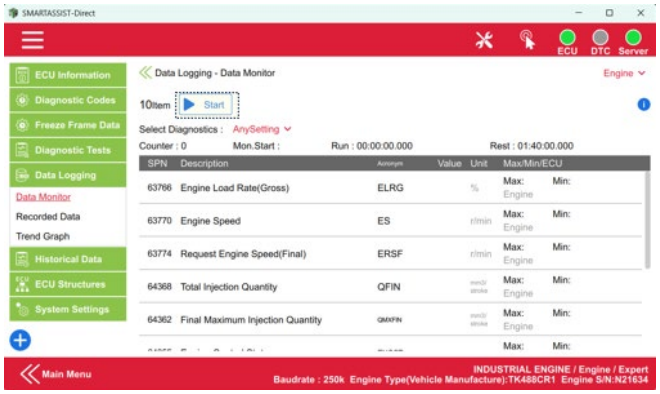
f. Click the tool icon in the upper-right corner and select Data Setting.



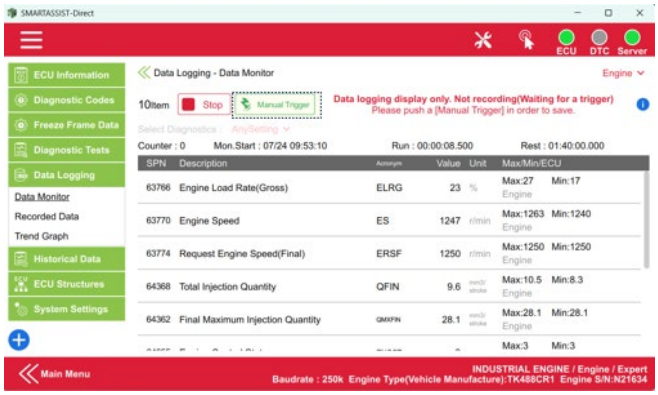
g. Click Default. Click Set.



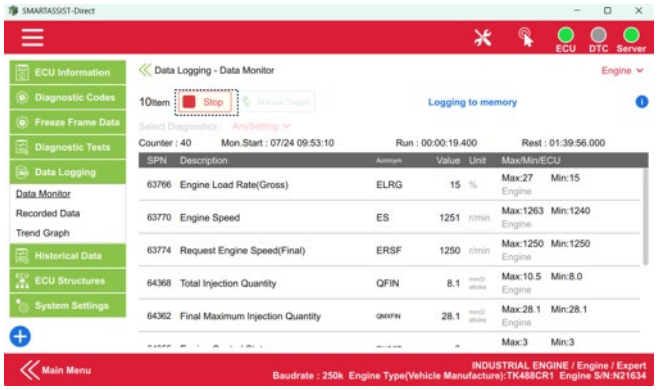
h. Start the engine, then click Start.



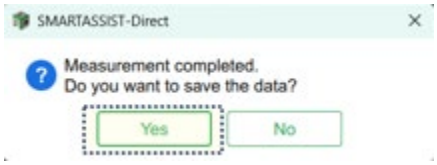
i. Click Manual Trigger. Data logging will not start until Manual Trigger is clicked.



j. If possible, run the unit in a high load condition (high speed cool/heat depending on ambient and box conditions) before clicking Stop.

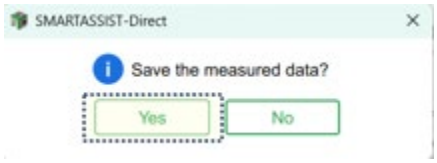


k. Click Yes.

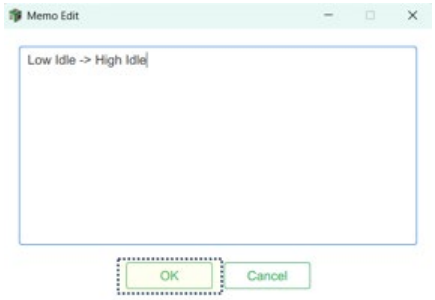


l. Click No.

m. Click Yes.

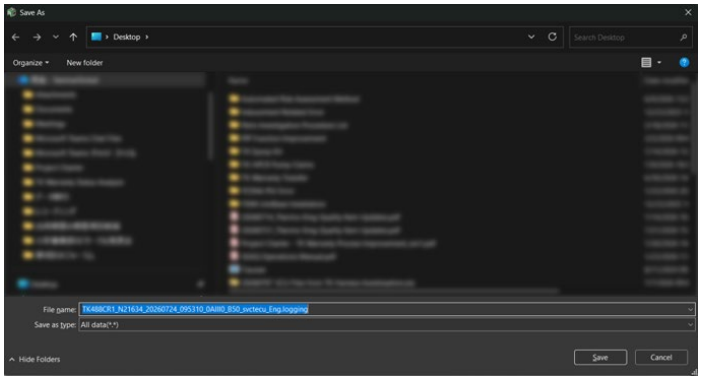


n. Enter the engine operating conditions during data logging as shown below. Click OK.



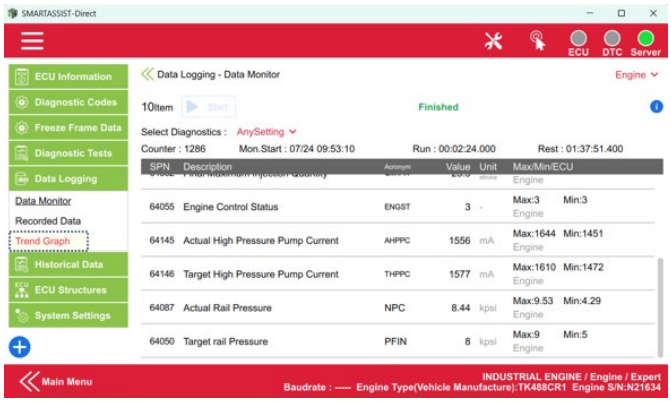
o. Click OK. Click Yes.

p. Save the .logging file in an easily accessible location, such as the desktop. The file can be shared as an email attachment.

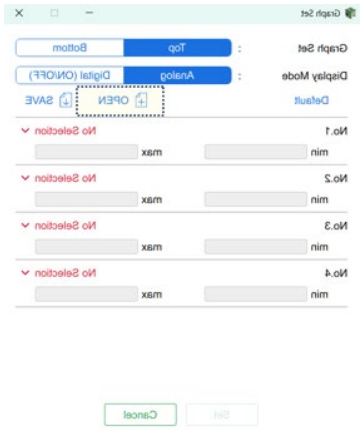


q. Click OK. Data logging is complete. Check the measurement data for any abnormalities in the following steps.

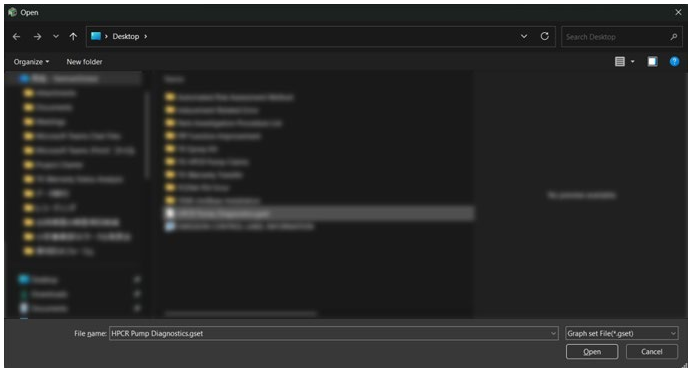
r. Click Trend Graph from the Data Logging tab. Click the tool icon in the upper-right corner and select Graph Setting.



s. Click Open.

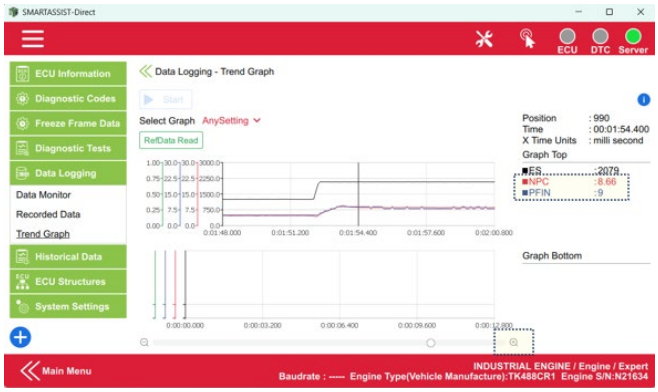


t. Select HPCR Pump Diagnostics.gset and click Open.



u. Confirm that Engine Speed, Actual Rail Pressure, and Target Rail Pressure are selected. Click Set.

v. Use the magnifying glass icon to zoom in on the data as needed, and check whether the actual rail pressure deviates from the target rail pressure at each engine speed and during acceleration and deceleration.



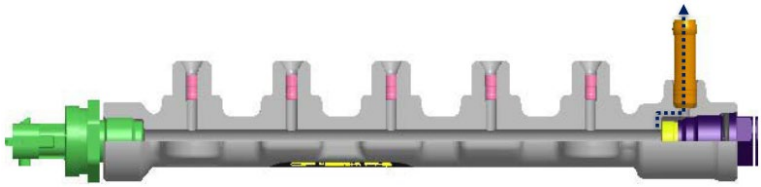
2. Is there a deviation between the target and actual rail pressures? If yes, proceed to Section 11 - Group A Diagnostics - Reduced Fuel Flow Cause Inspection. If no, proceed to Section 13 - Group A Diagnostics - HPCR Pump Inspection.

Section 11 - Group A Diagnostics - Reduced Fuel Flow Cause Inspection:

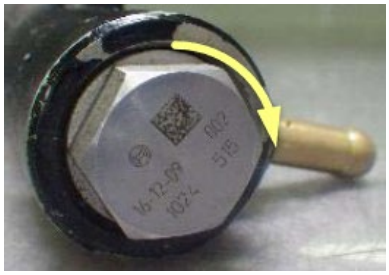
1. Is the fuel filter free of clogging? If yes, proceed to next step. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.
2. Is fuel free from diesel gelling? If yes, proceed to next step. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.
3. Is the fuel hose free from kinks and blockages? If yes, proceed to Section 12 - Group A Diagnostics - Fuel Line Air Ingress Cause Inspection. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.

Section 12 - Group A Diagnostics - Fuel Line Air Ingress Cause Inspection:

1. Is there sufficient fuel (1/4 tank or more) in the fuel tank? If yes, proceed to next step. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.
2. Is the fuel line free from damage and loose hose clamps? If yes, proceed to next step. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.
3. Has the fuel filter been properly bled? If yes, proceed to next step. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.
4. Is there service history for the PLV? If yes, tighten the PLV to the specified torque (95 to 105 Nm). If no, after running the engine, have the active error codes been cleared? If yes, repair complete. If no, proceed to Section 13 - Group A Diagnostics - HPCR Pump Inspection. Check the PLV for leakage. If yes, verify repair and complete. If no, proceed below.
    a. If the PLV is not tightened sufficiently, fuel may leak internally as shown in the image below. Verify the PLV is tightened to the specified torque of 95 to 105 Nm. The PLV opens to relieve pressure when the common rail pressure becomes abnormally high. However, if the PLV is insufficiently tightened, fuel may escape to the low-pressure side through the internal passage indicated by the arrow below, even when the rail pressure is within the normal range.



    b. Tighten the PLV hex fitting to a specified torque of 95 to 105 Nm and verify that it is securely tightened.



Section 13 - Group A Diagnostics - HPCR Pump Inspection:

1. Are there signs of rust at the high-pressure pipe connection? If no, proceed to next step. If yes, replace the HPCR pump (as necessary based on the damage condition) and high-pressure pipe. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, proceed to Section 14 - Group A Diagnostics - Common Rail Inspection.
    a. Refer to the images below and inspect the HPCR pump outlet for signs of rust. If rust is present, it may indicate abnormal wear of the internal drive components, resulting in reduced performance. In such cases, replacement of the HPCR pump is recommended. When replacing the HPCR pump, also replace the high-pressure pipe connecting the pump to the rail to prevent fuel leakage.

Side View of the HPCR Pump

High-Pressure Outlet

High-Pressure Outlet

2. Remove the Suction Control Valve (SCV). Are there signs of contamination or rust inside the pump or on the SCV? If no, proceed to next step. If yes, replace the HPCR pump (as necessary based on the damage condition) and high-pressure pipe. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, proceed to Section 14 - Group A Diagnostics - Common Rail Inspection.

    a. Refer to the images below and check the SCV mesh filter and SCV mounting area for signs of rust or contamination. If rust or contamination is present, it may indicate abnormal wear of the internal drive components, resulting in reduced performance. In such cases, replacement of the HPCR pump is recommended. When replacing the HPCR pump, also replace the high-pressure pipe connecting the pump to the rail to prevent fuel leakage.

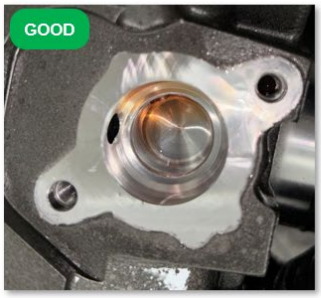
Side View of the HPCR Pump

SCV Mesh Filter

SCV Mesh Filter

SCV Retainer

SCV Retainer



SCV Mounting Area

SCV Mounting Area

SCV Mounting Area

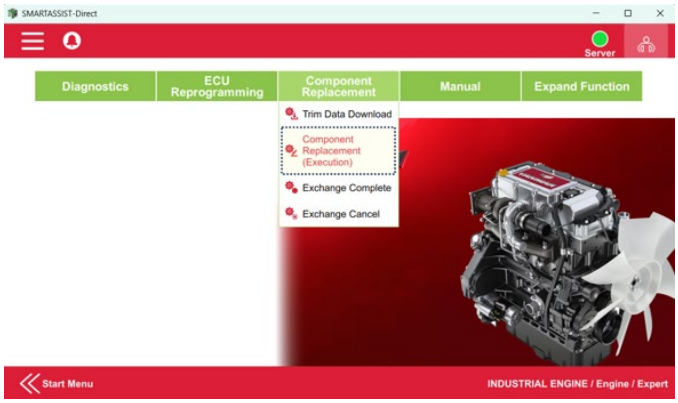
SCV Mounting Area

3. Are the HPCR pump and SCV free from damage? If yes, install the SCV.

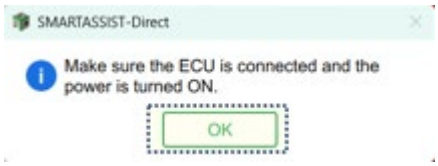
Section 14 - Group A Diagnostics - Common Rail Inspection:

1. Are DTC P1666 or P1667 active? If no, proceed to next step. If yes, replace the PLV. Use YSAD to reset the PLV opening count and opening time to zero. After completing, proceed to next step.

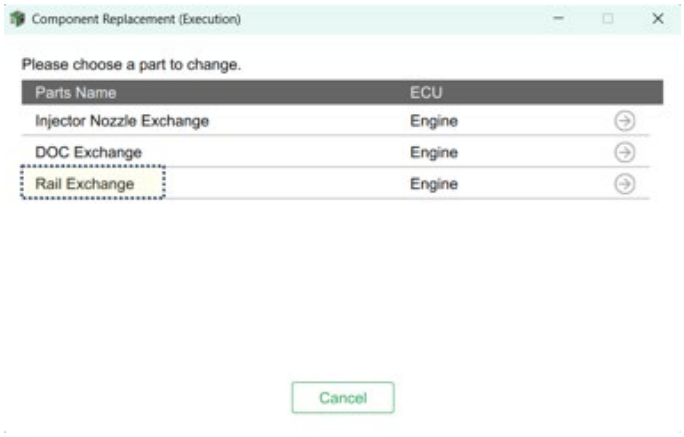
    a. To reset the PLV counter, open YSAD and click Component Replacement (Execution) on the Component Replacement tab.



b. Confirm that the key switch is on and click OK. Click Start.

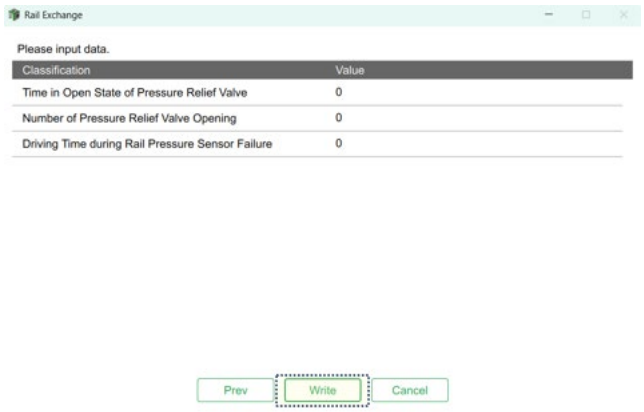


c. Select Rail Exchange.



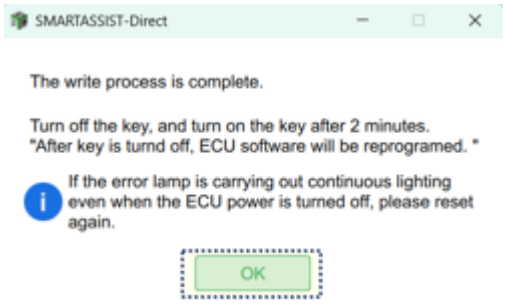
d. Click OK.

e. Click Write.



f. Enter the password for YSAD login and select Set.

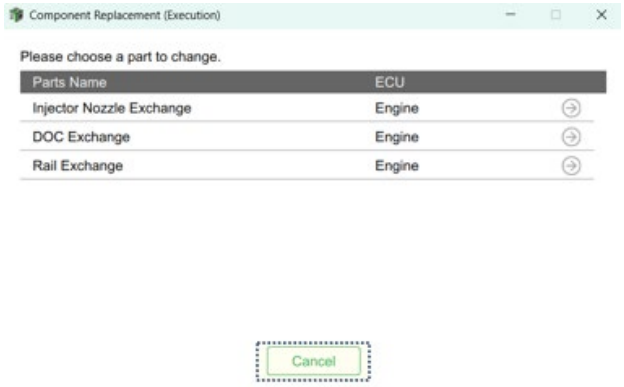
g. Turn off the key switch and turn on the key switch after two minutes to verify that the ECU has completed its after-run. Click OK.



h. Click OK.

i. Click OK.

j. Select Cancel to return to the main menu. The PLV counter reset is complete.



2. Are the common rail, PLV, and rail pressure sensor free from rust? If yes, proceed to next step. If no, replace the common rail assembly and high-pressure pipe. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, proceed to Section 15 - Group A Diagnostics - Injector Inspection.

   a. Refer to the images below and inspect the common rail, PLV, and rail pressure sensor for signs of rust. If rust is present, it may cause injector malfunction downstream of the common rail. In such cases, replacement of the common rail assembly is recommended. When replacing the common rail assembly, also replace the high-pressure pipe between the pump and rail, and between the injectors and rail to prevent fuel leakage.

Common Rail Assembly

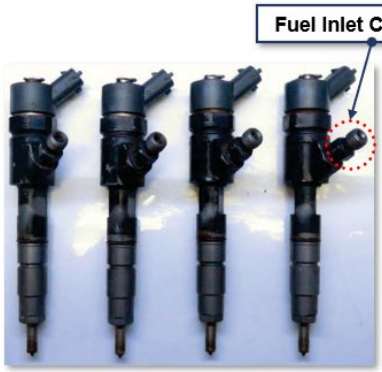
High-Pressure Pipe Connection

High-Pressure Pipe Connection

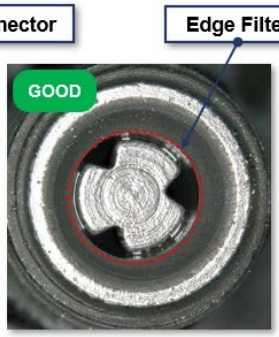
3. Are the common rail, PLV, and rail pressure sensor free from damage? If yes, proceed to Section 15 - Group A Diagnostics - Injector Inspection. If no, replace the damaged parts. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, proceed to Section 15 - Group A Diagnostics - Injector Inspection.

Section 15 - Group A Diagnostics - Injector Inspection:

1. Perform injector return flow bottle test (refer to Service Bulletin SB710, located in e-Tech Library). If test fails, replace injectors. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, replace the HPCR pump. If test passes, proceed to next step.
2. Are there signs of rust at the high-pressure pipe connection? If no, proceed to next step. If yes, replace the injectors and high-pressure pipe. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, replace the HPCR pump.
    a. Refer to the images below and inspect the injectors for signs of rust or contamination. As shown in the image, the edge filter in the center of the fuel inlet may sometimes be free of rust or contamination, so carefully inspect the surrounding sealing surface as well. If rust or contamination is present, it may indicate abnormal wear or seizure of the internal sliding components, resulting in reduced performance. In such cases, replacement of the injectors is recommended. When replacing the injectors, also replace the high-pressure pipe connecting the injectors to the rail to prevent fuel leakage.



Entire Injectors



Fuel Inlet

Fuel Inlet

Fuel Inlet

3. Are the injectors free from damage? If yes, proceed to next step. If no, replace the injectors. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, replace the HPCR pump.
4. Monitor without replacing parts. If the issue recurs, replace the injectors.

Section 16 - Group B Diagnostics:

1. Are any other active error codes displayed? If no, proceed to Section 17 - Group B Diagnostics - Fuel Line Air Ingress Cause Inspection. If yes, refer to Refer to Engine Troubleshooting Manual. Have the active error codes been cleared? If yes, repair complete. If no, proceed to Section 17 - Group B Diagnostics - Fuel Line Air Ingress Cause Inspection.

Section 17 - Group B Diagnostics - Fuel Line Air Ingress Cause Inspection:

1. Is there sufficient fuel (1/4 tank or more) in the fuel tank? If yes, proceed to next step. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.

2. Is the fuel line free from damage and loose hose clamps? If yes, proceed to next step. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.

3. Has the fuel filter been properly bled? If yes, proceed to Section 18 - Group B Diagnostics - HPCR Pump Excessive Back Pressure Cause Inspection. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, repeat inspection.

Section 18 - Group B Diagnostics - HPCR Pump Excessive Back Pressure Cause Inspection:

1. Is the fuel return hose between the HPCR pump and fuel tank free from kinks or crushing? If yes, proceed to Section 19 - Group B Diagnostics - Rail Pressure Sensor Inspection. If no, repair the identified issue. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, proceed to Section 19 - Group B Diagnostics - Rail Pressure Sensor Inspection.

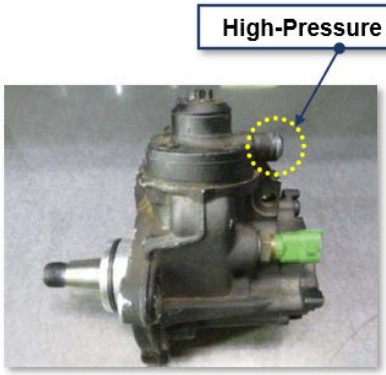
Section 19 - Group B Diagnostics - Rail Pressure Sensor Inspection:

1. Is the actual rail pressure below 100 psi when the engine is stopped? If yes, proceed to Section 20 - Group B Diagnostics - HPCR Pump Inspection. If no, replace the rail pressure sensor. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, proceed to Section 20 - Group B Diagnostics - HPCR Pump Inspection.

Section 20 - Group B Diagnostics - HPCR Pump Inspection:

1. Are there signs of rust at the high-pressure pipe connection? If no, proceed to next step. If yes, replace the HPCR pump (as necessary based on the damage condition) and high-pressure pipe. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, verify no inspection items have been missed.

    a. Refer to the images below and inspect the HPCR pump outlet for signs of rust. If rust is present, it may indicate abnormal wear of the internal drive components, resulting in reduced performance. In such cases, replacement of the HPCR pump is recommended. When replacing the HPCR pump, also replace the high-pressure pipe connecting the pump to the rail to prevent fuel leakage.



Side View of the HPCR Pump

High-Pressure Outlet

High-Pressure Outlet

2. Remove the SCV. Are there signs of contamination or rust inside the pump or on the SCV? If no, proceed to next step. If yes, replace the HPCR pump (as necessary based on the damage condition) and high-pressure pipe. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, verify no inspection items have been missed.

    a. Refer to the images below and check the SCV mesh filter and SCV mounting area for signs of rust or contamination. If rust or contamination is present, it may indicate abnormal wear of the internal drive components, resulting in reduced performance. In such cases, replacement of the HPCR pump is

recommended. When replacing the HPCR pump, also replace the high-pressure pipe connecting the pump to the rail to prevent fuel leakage.

Side View of the HPCR Pump

SCV Mesh Filter

SCV Mesh Filter

SCV Retainer

SCV Retainer

SCV Mounting Area

SCV Mounting Area

SCV Mounting Area

SCV Mounting Area

3. Are the HPCR pump and SCV free from damage? If yes, install the SCV and monitor without replacing parts. If no, replace the SCV or HPCR pump as necessary based on the damage condition. After running the engine, have the active error codes been cleared? If yes, repair complete. If no, verify no inspection items have been missed.