

# **Perkins 2800 Series**

Models 2806C-E16 and 2806C-E18

## **DIAGNOSTIC MANUAL**

**6 cylinder turbocharged diesel engine**

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# 1

## General information

### Introduction

The 2300 and 2800 Series industrial diesel engines are the latest development from Perkins Engines Company Limited, a world leader in the design and manufacture of high performance diesel engines.

Read and remember the "Safety precautions" on page 2. They are given for your protection and must be applied at all times.

Danger is indicated in the text by two methods:

**Warning!** *This indicates that there is a possible danger to the person.*

**Caution:** *This indicates that there is a possible danger to the engine.*

**Note:** Is used where the information is important, but there is not a danger.

Ensure that all adjustments and repairs are done by personnel who have had the correct training.

## Safety precautions

These safety precautions are important. Reference must also be made to the local regulations in the country of operation.

- Only use these engines in the type of application for which they have been designed.
- Do not change the specification of the engine.
- Do not smoke when you put fuel in the tank.
- Clean away fuel which has been spilt. Material which has been contaminated by fuel must be moved to a safe place.
- Do not put fuel in the tank while the engine runs (unless it is absolutely necessary).
- Do not clean, add lubricating oil, or adjust the engine while it runs (unless you have had the correct training; even then extreme caution must be used to prevent injury).
- Do not make adjustments that you do not understand.
- Ensure that the engine does not run in a location where it can cause a concentration of toxic emissions.
- Other persons must be kept at a safe distance while the engine or equipment is in operation.
- Do not permit loose clothing or long hair near moving parts.
- Keep away from moving parts during engine operation.

**Warning!** *Some moving parts cannot be seen clearly while the engine runs.*

- Do not operate the engine if a safety guard has been removed.
- Do not remove the filler cap of the cooling system while the engine is hot and while the coolant is under pressure, because dangerous hot coolant can be discharged.
- Do not use salt water or any other coolant which can cause corrosion in the closed coolant circuit.
- Do not allow sparks or fire near the batteries (especially when the batteries are on charge) because the gases from the electrolyte are highly flammable. The battery fluid is dangerous to the skin and especially to the eyes.
- Disconnect the battery terminals before a repair is made to the electrical system. Always disconnect the negative terminal first.
- Only one person must control the engine.
- Ensure that the engine is operated only from the control panel or from the operator's position.
- If your skin comes into contact with high-pressure fuel, obtain medical assistance immediately.
- Diesel fuel and lubricating oil (especially used lubricating oil) can damage the skin of certain persons. Protect your hands with gloves or a special solution to protect the skin.
- Do not wear clothing which is contaminated by lubricating oil. Do not put material which is contaminated with oil into the pockets.
- Discard used lubricating oil in a safe place to prevent contamination.
- The combustible material of some components of the engine (for example certain seals) can become extremely dangerous if it is burned. Never allow this burnt material to come into contact with the skin or with the eyes.
- Fuel and oil pipes **MUST** be inspected for cracks or damage before they are fitted to the engine.
- Fit only genuine Perkins parts.



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## Glossary of terms

### Active diagnostic code

Describes a condition that is currently present to alert the operator or service technician of an abnormal engine operation parameter. See also Diagnostic fault code.

### Aftermarket device

A device or an accessory that is installed by the customer or OEM after the engine has been delivered.

### Alternating current (AC)

The direction of current flow changes (alternates) regularly and constantly in a circuit.

### Atmospheric pressure sensor

Analogue sensor generates a signal proportional to atmospheric (barometric) air pressure in the crankcase and sends a signal to the ECM.

### Before top center (BTC)

The 180° of crankshaft rotation before the piston reaches the very top of its travel (normal direction of rotation).

### Intake manifold pressure sensor

This sensor measures inlet manifold air pressure (boost pressure) and sends a signal to the ECM.

### Bypass circuit

A circuit, usually temporary, to substitute for an existing circuit, typically for test purposes.

### Calibration

An electronic adjustment of a sensor signal.

### Perkins engine monitoring

The part of the Perkins Electronic Engine Control that monitors coolant temperature, oil pressure, intake manifold air temperature and coolant level to alert the operator of detected problems. The coolant temperature, intake manifold air temperature, and oil pressure sensors are supplied by Perkins and monitored by the ECM. Aftermarket engine monitoring systems do not interface with the Perkins Electronic Engine Control.

### Check engine lamp

Sometimes referred to as the diagnostic lamp, it is used to alert the operator of the presence of an active event.

### Code

Refer to diagnostic fault code and diagnostic event code.

### Cold mode

A mode of engine operation where the timing is retarded for engine protection, reduced smoke emissions and faster warm up time.

**Component identifier (CID)**

The CID is a number that identifies the specific component of the electronic control system that has experienced a diagnostic code. This is part of the PDL (Perkins Data Link).

**Communication adapter**

The communication adapter provides a communication link between the ECM and an electronic service tool.

**Coolant temperature sensor**

This sensor detects the engine coolant temperature for Cold Mode operation and Perkins Engine Monitoring.

**Crankshaft position sensor**

A sensor that measures the crankshaft position, the direction of rotation, and engine rev/min and sends signals to the ECM.

**Customer specified parameter**

A parameter value that can be changed and whose value is set by the customer. These parameters can be protected by customer passwords.

**Desired rev/min**

An input to the electronic governor in the ECM. The electronic governor uses inputs from the crankshaft position sensor and customer parameters to determine 'desired rev/min'.

**Diagnostic event code**

These codes indicate an event that describes an abnormal engine condition such as a shutdown occurrence. These codes are not necessarily (or usually) an indication of problems within the electronic system.

**Diagnostic fault code**

Sometimes referred to as a "fault code". These codes indicate an electronic system malfunction or problem with the engine electronic system.

**Diagnostic lamp**

Sometimes referred to as the "engine check lamp", it is used to alert the operator of the presence of an active diagnostic code.

**Direct current (DC)**

The type of current where the direction of current flow is consistently in one direction.

**Duty cycle**

Refer to pulse width modulation.

**Engine control module (ECM)**

The engine control computer that provides power to the engine electronics. It accepts inputs that monitor and outputs that control or change to act as a governor to control engine rev/min.

**Electronically controlled unit injector**

The injection pump which is a mechanically actuated, electronically controlled unit injector, combining the pumping, electronic fuel metering and injecting elements in a single unit.

**Electronic engine control**

The complete electronic system that monitors and controls the engine operation under all conditions.

**Engine speed/timing sensor**

Provides a variable amplitude and pulse width modulated signal to the ECM, which the ECM interprets as crankshaft position and engine speed.

**Estimated dynamic timing**

The ECM's estimation of actual injection timing.