

MELT Class 1 Driver Training

Gauges, switches, warning lights and indicator symbols



Lesson overview

- Locate and operate all typical primary and secondary controls, gauges, switches and instruments
- Explain the instrument panel indicators displaying important vehicle operating information, warning and safety system status.

Gauges

Gauge (Instrument)

- A device that displays the measurement of a monitored system by the use of a needle or pointer that moves along a calibrated scale.
- It is important that you become familiar with the normal ranges as recommended by the vehicle's operating manual and engine manual.



Gauges continued



Speedometer & Message Centre

- The speedometer indicates vehicle speed.
- The message centre usually contains the following information:
 - Odometer
 - Trip odometer
 - Hour meter
 - Warning & diagnostic messages

Gauges continued

Tachometer

- Displays engine speed in revolutions per minute (RPM).



Gauges continued



Air Brake Gauge

Measures the amount of available air pressure in the reservoirs.

The Primary Circuit (top image) usually provides air pressure to the rear tractor brakes.



The Secondary Circuit (bottom image) usually provides air pressure to the front tractor brakes.

Gauges continued

Air Application Gauge

It measures the amount of air pressure being applied to the service brakes from either the foot valve or hand valve.



Gauges continued



Engine Oil Pressure Gauge

Measures the force (pressure) of the oil being pumped through the engine in psi.

This gauge should be monitored regularly because inadequate oil pressure can cause engine damage.

Gauges continued

Engine Oil Temperature Gauge

Measures the temperature of the engine oil.

Viscosity (thickness) of oil is much higher at lower temperatures, and oil subjected to too high of heat can lose its lubrication properties, which results in loss of lubrication of the engine components.



Gauges continued

Water Temperature Gauge

Measures the temperature of the engine coolant.
Should be monitored regularly to avoid engine damage.



Gauges continued



Fuel Gauge

Measures the approximate level/amount of fuel in your fuel tank(s).

Should be monitored to ensure there is plenty of fuel to reach your destination.

Fuel tanks should be kept at least half full to reduce condensation and a buildup of moisture in the tanks.

Gauges continued

Fuel Filter Gauge

Indicates the condition of the fuel filter.

Monitors for a dirty fuel filter or one that might be gelling up on a cold day.

If the needle stays in the red zone it can indicate a clog in the fuel filter.

A clogged fuel filter should be changed to maximize engine performance.



Gauges continued

Diesel Exhaust Fluid (DEF) Gauge

Measures the level of DEF in tank.

If the vehicle is allowed to run completely out of DEF, one of two things will happen:

- Engine power will be reduced and speed will be limited, or
- Vehicle will not start until there is DEF in the tank.



Gauges continued



Transmission Temperature Gauge

Indicates the temperature of the oil in the transmission.

This gauge should be monitored to ensure the transmission does not overheat.

If the transmission overheats, have it checked by a mechanic.

Gauges continued



Front & Rear Drive Axle Temperature Gauges

Measures the temperature of the lubricant in the front and rear drive axles.

Temperatures vary with the type of load, driving conditions, and type of lubricant.

High temperature readings indicate you should have the axle lubrication checked.

Driving with very hot temperatures in your rear drive axles can cause serious damage to axle bearings and seals.

Gauges continued



Manifold Pressure/Turbo Boost Gauge

Indicates the power the engine is putting out by showing the amount of turbo boost in psi.

The amount of psi indicated on the gauge will vary depending on the load placed on the engine.

Gauges continued



Pyrometer

Indicates engine exhaust temperature.

Monitoring engine exhaust temperature is a more effective and efficient way to recognize early signs of engine problems over any other method.

Mostly present on older trucks with mechanical engines.

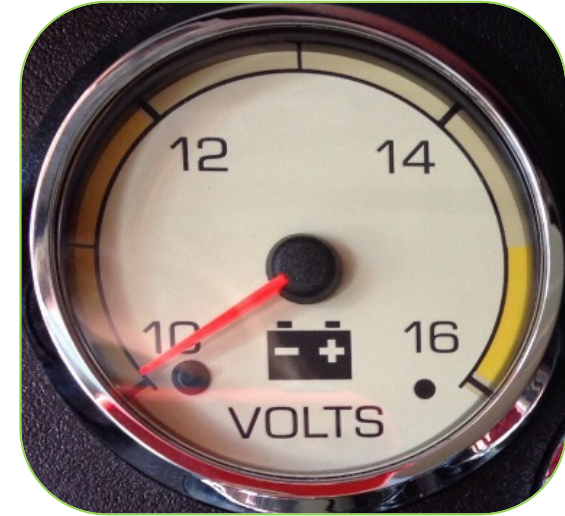
Gauges continued

Voltmeter

Displays the voltage at which the batteries are being charged while the engine is operating.

Displays the stored voltage in the batteries when the ignition is turned on.

Monitoring this gauge can help drivers to anticipate charging issues before they become major problems.



Gauges continued

Ammeter (Amp Gauge)

Measures the current electrical draw on the batteries.

Indicates how many amps are being delivered by the alternator to your electrical system.

Normal operating range should be slightly above zero.



Gauges continued

Air Filter Restriction Indicator or Gauge

Indicates the condition of the engine air cleaner.

Measured by inches of water (inH₂O) or kilopascals (kPa).



Gauges tour

YouTube video (9:16)

2004 Peterbilt379 Gauges Tour

Dave reviews each gauge on the dashboard of his
2004 Peterbilt 379

<https://youtu.be/b2c564JGgcI>

Switches

A device for making and breaking the connection in an electrical circuit.

Switches are either off or on, engaged or not engaged.

Switches control important functions, so it is essential to know:

- where they are,
- when to use them, and
- if they are in the correct operating position.

Switches continued



Headlights

When the headlights are ON, the dash lights, front park lights, side marker lights, and tail lights are also illuminated.



ID & Clearance Lights

These are the amber lights on the top of the cab, top of the trailer in the front and on the sides, and the red lights at the top of the rear of the truck and trailer.

Switches continued

Marker Interrupter/ID & Clearance Lights Flash

Used to thank other drivers who display courteous behavior. Generally used at night to thank other drivers who assisted you in passing them.

Both types can be flashed multiple times to thank drivers by alternately pushing and releasing the switch or button.



Switches continued

Pan

To [unclear] instrument panel

[unclear] can help to
lead, and decrease

Ha

Emergency Flasher

To be [unclear] is disabled, parked
under emergency conditions, or any time you have
to stop off the road or on the side of the road, day
or night.



Switches continued

Fog Lights/Driving Lights

To be used in foggy or blizzard like conditions to assist with visibility.

State and Provincial requirements vary as to when high beams and fog lights can and cannot be used together.



Work Light

Most or all power units come equipped with lights mounted to the side of the cab or bunk.

Use these lights at night when backing up, coupling, and uncoupling.



Switches continued



Automatic Traction Control (ATC)

When turned ON, a Wheel Spin Control warning light will illuminate and allows for additional wheel spin before the power will be reduced.



Engine Fan Override

Allows you to control the engine fan manually or automatically.

Switches continued



Cruise Control On/Off

Advantages of cruise control include:

Improving driver comfort.

Maintaining a consistent speed.

Improving fuel economy by keeping a steady speed and letting the engine do the work.

Switches continued



Cruise Control Set/Resume

When the master switch is ON, it is used to SET the desired speed, and to RESUME the desired speed when the cruise control has been interrupted.

When the master switch is ON, it is used to SET the idle speed while the truck is parked with the engine running.

Switches continued



Engine Brake On/Off

Turns the engine brake on and off.

The engine brake is also controlled by the throttle pedal and clutch pedal.

Switches continued

Engine Brake Mode Selector

Selects the progressive braking function that controls the amount of retarding/braking.

Most trucks are equipped with 3 modes to select from: LOW, MEDIUM, HIGH.



Switches continued

Air Suspension Dump Switch

Used to dump the air out of the rear suspension of the truck.



Switches continued

Differential Lock (DCDL)

Also called "main differential lock" or "wheel differential lock."

Locks both sets of dual wheels on the same axle to ensure they both turn together at the same speed.

Used when operating on slippery or uneven surfaces.



Switches continued

Fifth Wheel Slide Lock

The fifth wheel can be slid to various positions in order to adjust weight distribution between the steering axle and the drive axles.

the fifth wheel can be slid to a position to accommodate a variety of trailers.



Warning lights and indicator symbols

Commercial vehicles are equipped with warning lights and symbols to inform the driver of a change to a system or component.



Warning lights and indicator symbols continued

Active Warnings/Exclamation Point

Illuminates when a RED warning is active.



Oil Pressure Warning Lights

May illuminate as the tractor-trailer is being started, but should go off right after the engine starts, if it does not, then the vehicle should be examined.



Warning lights and indicator symbols continued



Displays when the fuel level is low;
light usually red, or yellow.



Active warning triangle Illuminates
when a YELLOW warning is active;
usually yellow.

Warning lights and indicator symbols continued

Anti-Lock Brake System (ABS)

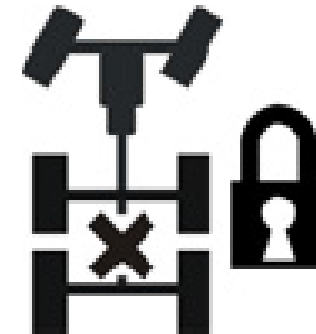


Warning lights and indicator symbols continued

The battery light indicates a battery charging problem.



Inter-Axle Differential Power Divider LOCKED;
Illuminates when the Power Divider Lock / Inter-Axle
Differential Lock is in the LOCKED position.



Warning lights and indicator symbols continued



Illuminates when the cruise control is active.



Illuminates when the diesel particulate filter is plugged or when the regeneration operation is active.

Warning lights and indicator symbols continued

High Exhaust System Temperature (HEST)

Illuminates when the exhaust gas temperature and exhaust components become extremely hot.



Malfunction Indicator Lamp (MIL)

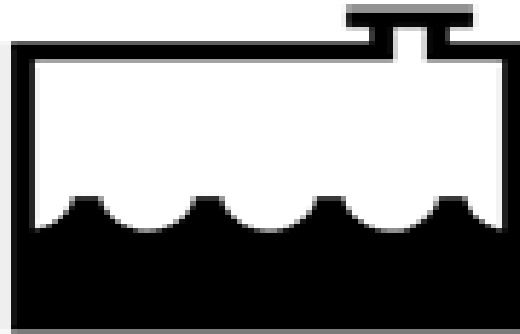
Illuminates when a problem with the engine after treatment system exists. The vehicle can still be safely driven, but the vehicle should be serviced to correct the problem.

Warning lights and indicator symbols continued

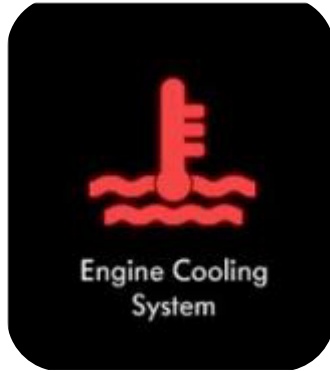
Low Coolant Level

Illuminates with an audible alarm indicating critically low coolant level.

Some trucks will shut down and will not start again until the problem has been corrected.



Warning lights and indicator symbols continued



Water temperature

This light is displayed when coolant temperature becomes excessively hot.



Engine Brake/Retarder

Illuminates when the engine brake is turned on.

Warning lights and indicator symbols continued



Check/Stop Engine

Check Engine Illuminates when a minor engine issue occurs.

Stop Engine Illuminates and an audible alarm tone will sound when a major engine system problem exists.

Warning lights and indicator symbols continued

Wait to Start Engine

Illuminates when the intake air heater (grid heater) needs to warm the intake air prior to starting the engine.



Fifth Wheel Slide Unlocked

Illuminates and may have an audible warning tone will sound to remind the driver that the fifth wheel slide is UNLOCKED.

Warning lights and indicator symbols continued



Park Brake

Illuminates when the parking brake is applied.



Fasten Seat Belt

Illuminates to remind the driver to fasten their seat belt.

Gauges tour

YouTube Video (9:16)

2004 Peterbilt379 Gauges Tour

Dave reviews each gauge on the dashboard of his 2004
Peterbilt 379

<https://youtu.be/b2c564JGgcI>

Kenworth

YouTube video (3:01)

T880 Kenworth Driver Academy
Switches, Cab Climate & Gauges

<https://youtu.be/Pzk9Xb3EWkA>

Review quiz (answer key)

- | | |
|------------------------------|------------|
| 1. ANS: | 9. ANS: A |
| A. primary control systems | 10. ANS: C |
| B. engine control systems | 11. ANS: D |
| C. secondary control systems | 12. ANS: B |
| 2. ANS: B | 13. ANS: B |
| 3. ANS: B | 14. ANS: C |
| 4. ANS: D | 15. ANS: A |
| 5. ANS: C | |
| 6. ANS: C | |
| 7. ANS: A | |
| 8. ANS: A | |