

## Closed Crankcase Ventilation (CCV) installs

The writer has experienced successful operation of these units in applications ranging from marine pleasure craft (they are very prevalent in the mega yacht market as part of actions to avoid oil stains in harbor waters) through to rental equipment and base load power applications and would recommend the use of them in standby applications due to reducing the risk of radiator fouling. Obviously oil vapor condensing on the radiator surfaces becomes a catalyst for dust collection. The high volumes of air with these high powered machines, (circa 90,000cfm) carry a proportionate amount of dust.



“High” mount position depicted on a CAT 3516 (ref Note 3 below)

### Theory of operation is as follows. **CCV (Closed Crankcase Ventilation)**

1. Crankcase Oil vapor via a 1.5” ID hose connection between crankcase and the CCV unit passes through a coalescer filter under vacuum created by the 1.5” hose connection to the engine aspiration air filter can.
2. Oil that has been coalesced from the vapor drops to a containment vessel as part of the coalescing filter assembly (CCV unit).
3. The CCV has a permanent drain connection to the engine crankcase. This permanent drain incorporates a check valve that will not allow the vacuum in the CCV to draw crankcase vapors.

4. When a sufficient head of oil has accumulated in the CCV to overcome, a) crankcase pressure and, b) check valve delta P, oil will flow into the crankcase until the static head level equals prevailing resistance to flow.
5. NOTE 1. Crankcase pressure originates from gas blow by via piston rings and varies according to load and piston ring wear, and of course operating temperature, hence the use of "prevailing resistance to flow" in point 4 above.
6. NOTE 2. Height of the CCV unit in relation to crankcase is important. Mounting the unit too low will not allow oil to flow until the engine comes to rest and or crankcase pressure has sufficiently reduced. This low mounting position is often seen in Standby applications as run time is expected to be less than the length of time that is expected to fill the CCV unit.
7. NOTE 3. YES mounts the CCV high, to allow automatic draining irrespective of standby duty or not. See photo inset above depicting correct install which also shows the connections referred to in the above.
8. NOTE 4. In the event that the coalescing filter becomes fouled, the unit will bypass allowing crankcase gas to flow to aspiration air. A red indicator on top of each CCV indicates this condition. Obviously the CCV becomes part of regular maintenance. This bypass action is not normally desirable but equally is not putting the engine "at risk" providing the matter is resolved expeditiously.



A 3516 CHD rated 2.5 mWe has a total of 3 units. 2 on one side per above. 1 on the opposite side.