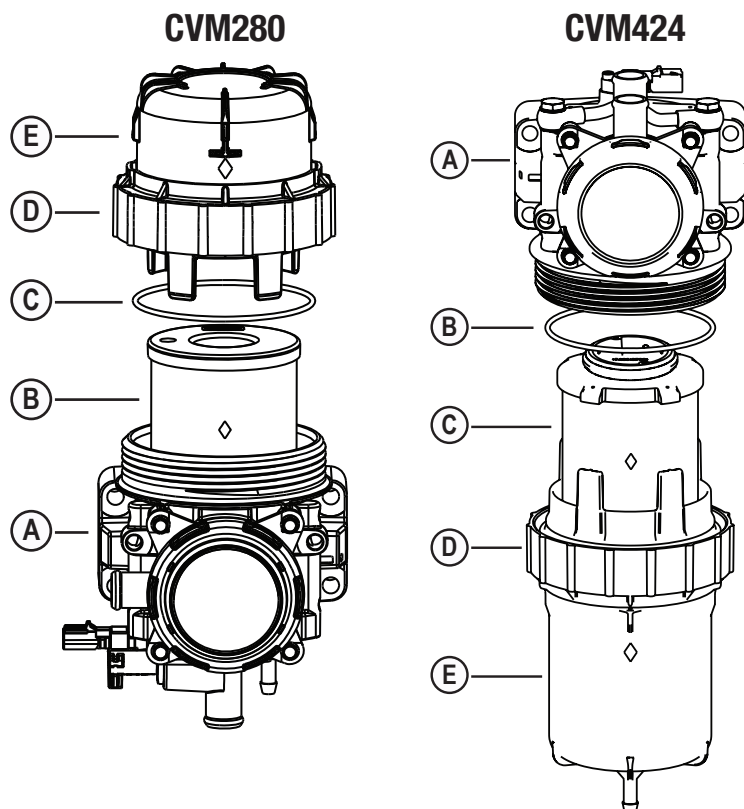




Crankcase Ventilation Manager (CVM) Installation Instructions



Parts List CVM280

Part	Description	No. Included	Part Number
A	Head	1	See Page 6 for Ordering Information
B	*O-Ring	1	
C	*Element	1	
D	Collar	1	
E	Head	1	

*Parts included in Service Kits CV52052 and CV52053.

Parts List CVM424

Part	Description	No. Included	Part Number
A	Head	1	See Page 6 for Ordering Information
B	*O-Ring	1	
C	*Element	1	
D	Collar	1	
E	Shell	1	

*Parts included in Service Kits CV52052 and CV52053.

Additional Materials Required

Description
1" (25 mm) Hose (SAE20R3)
1" (25 mm) Hose Clamps
3/8" (10 mm) Hose (SAE30R7)
3/8" (10 mm) Hose Clamps
3/8" (10 mm) Check Valve (No. Q458222A)
(4) 3/8" (10 mm) or M10 Bolts

Tools Required

Description
Ratchet and Socket Set
Torque Wrench
Collar Wrench (No. 3944451 S) or Strap Wrench (needed for service only)
Hose Cutter

Note: Depending on the application, other components and tools may be required for installation.

CAUTION: These instructions are intended for use by professional mechanics who are trained in the proper use of power and hand tools, using appropriate safety precautions (including eye protection).

Introduction

The gases that are vented out through the crankcase are the result of leakage around turbocharger seals and the piston rings in the combustion chamber and are composed of hydrocarbon particles, soot from diesel combustion, engine oil and its contaminants.

The Fleetguard® CVM coalescer system is designed to remove emissions on a variety of diesel engines with maximum blow-by flows of 10 ft³/min (280 L/min) for the medium size and 15 ft³/min (424 L/min) for the tall size. Along with reducing emissions, this system helps to reduce oil consumption, mist, fumes and drips in the engine compartment, resulting in a cleaner and safer operating environment.

In Closed Crankcase Ventilation (CCV) mode, the gases are vented back into the air intake system to be consumed by the combustion process. The CVM system is capable of vastly reducing the amount of contaminants circulated back into the air intake for a wide variety of today's diesel engines, keeping the turbocharger and heat exchangers clean and performing well.

⚠ CAUTION: Use of this product will cause an increase in engine crankcase pressure. The installer is responsible for verification that the application is appropriate and that related crankcase pressure issues will not arise.

CVM System Installation

This section identifies the installation procedures for the CVM System. Please review all the installation procedures before proceeding with the installation.

⚠ CAUTION: The CVM installation requirements **MUST** be met to maintain full warranty coverage.

Locating and Mounting the Assembly

The system must be mounted near the engine at least 6" (15 cm) away from major heat sources like the turbocharger or exhaust manifold, and not experience temperatures over 250 °F (125 °C).

The "cold side" of the engine is the preferred location for mounting. The CVM assembly must

be mounted vertically, with drain port **DOWN**, for proper operation.

The ability to service and access the coalescer system should be taken into consideration when determining your application's mounting location. See Table 1.

Table 1 – Service Heights

Size	Loading	Service Height Required	Direction (Above/Below Assembly)
CVM280	Bottom	5.3" (135 mm)	Below
	Top	5.2" (132 mm)	Above
CVM424	Bottom	5.3" (135 mm)	Below
	Top	9.0" (229 mm)	Above

During operation, the coalescer should not exceed a 45° angle from vertical. This ensures the proper draining of oil from the coalescer back into the engine.

In order to drain continuously, the oil in the drain must overcome the crankcase pressure and requires the system to be mounted a certain height above the drainback port location. Drain height should be measured from coalescer drain to top of check valve in the drain line.

See Figure 1 for measurement. See Table 2 for minimum drain height requirements.

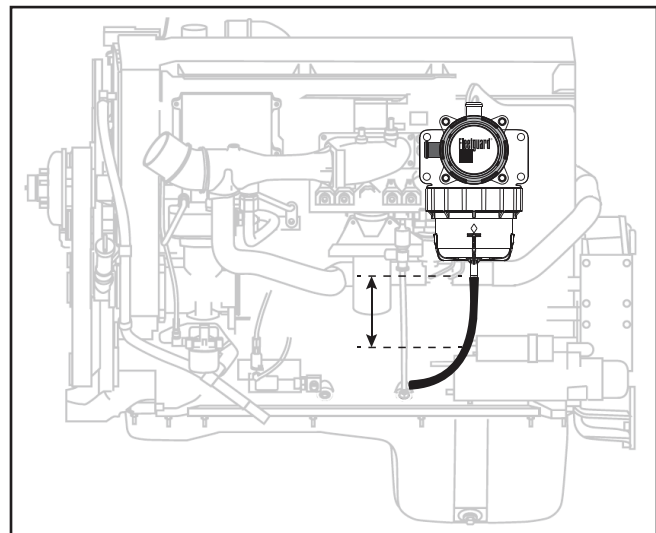


Figure 1 – Measuring Drain Height

Table 2 – Drain Heights

Size	Minimum Drain Height
CVM280	26" (660.4 mm)
CVM424	32" (812.8 mm)

Note: All values shown above protect for continuous drain up to 45° engine angularity; for intermittent angularity or flow condition, drain height can be reduced. Contact a ® Filtration applications engineer to determine appropriate drain height requirements.

To install:

1. Find a mounting location for the CVM assembly above the engine drain-back port location. Be sure to take both service height and drain height into consideration.
2. Secure coalescer to engine or bracket using four (4) M10 bolts.

Hose Installation

Note: This CVM system requires the three (3) hose connections described below in order to function properly).

Installing the CVM Inlet Hose

The engine's crankcase vent port should be connected to the inlet of the coalescer unit using 1" (25 mm) ID hose. Use 1" (25 mm) hose clamps to connect. Tighten to secure. See Figure 2.

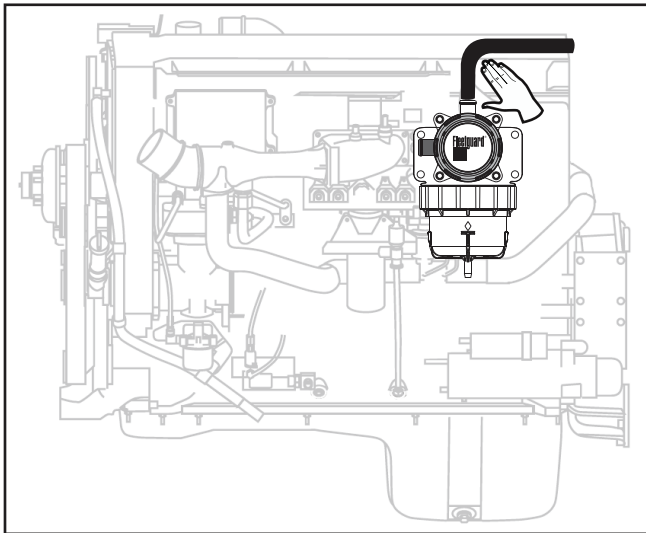


Figure 2 – Connecting to Inlet

Installing the CVM Outlet Hose

The outlet of the CVM system can be routed either to the atmosphere (open system) or back to the engine air intake ducting (closed system). Instructions for both options are included here.

⚠ CAUTION: Make sure you are compliant with emission regulations for your locale when deciding to use Open Crankcase Ventilation (OCV) versus Closed Crankcase Ventilation (CCV).

CVM Outlet (Open)

1. Attach a 1" (25 mm) ID hose to the CVM outlet. Ensure the hose is directed downward and trim, if necessary. Secure the loose hose to stabilize. See Figure 3.
2. Use a 1" (25 mm) hose clamp on the hose connection and tighten to secure.

⚠ CAUTION: Avoid low spots in hoses. When the hose has dips or low spots, oil is able to collect and pool, leading to blocked lines, which can raise the pressure in the crankcase.

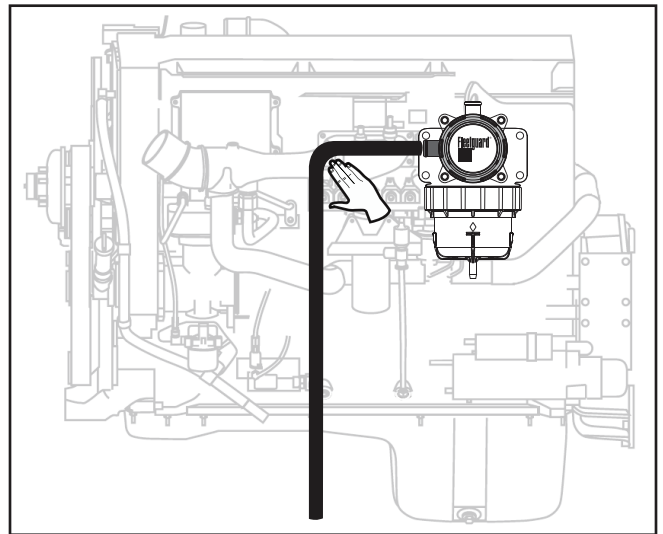


Figure 3 – Connecting to Outlet (Open)

CVM Outlet (Closed)

1. Locate an area downstream of the air filter, but upstream of the turbocharger for the hose connection. The hose can be connected to an unused port, to a T-style connecting coupler, or to a hose barb welded onto a metal section of the air intake ducting. See Figure 4.
2. Attach a 1" (25 mm) ID hose to the CVM outlet. Attach the opposite end of the hose back to the air intake ducting port.
3. Use 1" (25 mm) hose clamps on the hose connections and tighten to secure.

⚠ CAUTION: When welding on hose barbs, make sure the welds are leak-free and all the shavings and debris are removed from the intake ducting before starting the engine in order to avoid damaging components.

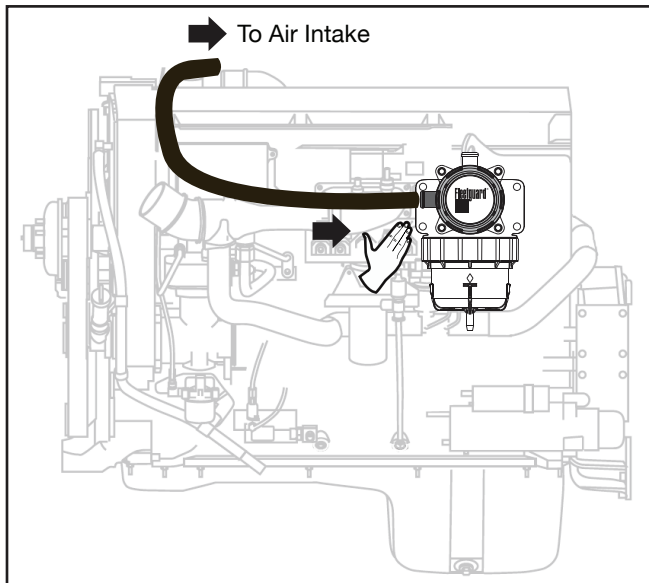


Figure 4 – Connecting to Outlet (Closed)

Installing the Drain Hose

To ensure adequate drain height, follow the guidelines in Table 2.

A check valve must be installed between the CVM system drain and the drain-back port location. Proper orientation of the valve allows flow from the coalescer's drain to the engine, but blocks flow from the engine into the coalescer.

Typical engine drain locations are available on unused low pressure engine block ports, dip-stick holes, or by welding a 3/8" (10 mm) adapter to the oil fill neck. If any other drain location is desired, contact a ® Filtration applications engineer.

1. Attach a 3/8" (10 mm) ID hose to the CVM system drain. Attach the other end of the hose to the check valve. Ensure the check valve is oriented properly and in a vertical position. This hose should be long enough so that the check valve is near the drain-back port on the engine. See Figure 5.

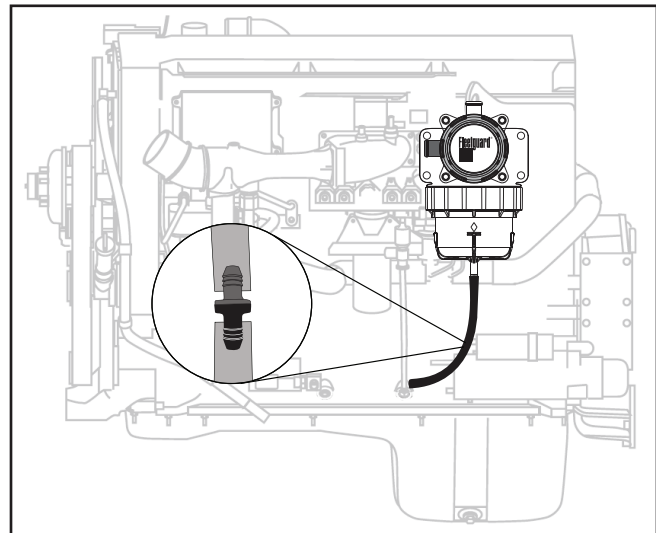


Figure 5 – Connecting to Drain

2. Attach a short piece of 3/8" (10 mm) ID hose to the bottom side of the check valve. Attach the opposite end of the hose to the drain-back port location.
3. Use 3/8" (10 mm) hose clamps on all hose connections and tighten to secure.

⚠ CAUTION: Re-inspect the hose and routing to verify it is free of any loops, kinks, or abrupt bends.

⚠ CAUTION: Be sure to follow the hose manufacturer's specification when routing the drain line.

Avoid trimming too short to prevent hose kink after installation.

Pressure Sensor Connection

Plug the FCI/Apex® 3-pin connector from the wiring harness to the pressure sensor on the coalescer unit.

Please refer to LT36847 for pressure sensor specifications.

Ensuring the System is Leak-Free

To be fully effective, all the connecting hoses and tubing should be in good condition and leak-free. The system should be inspected regularly for any leaks, damages, or material defects. Those issues should be corrected by replacing damaged parts with new ones.

Post Installation Check

1. Make sure that all bolts, fasteners, and clamps are tight.
2. Make sure that all hoses are secure.
3. Make certain that drain line height is adequate (see Table 2).
4. Start the engine, allowing it to idle and warm up.
5. Check for leaks in all hose connections.
6. Turn the engine off.
7. Repair all leaks, if found, during checks.
8. Add filter service note to the Service Log.

⚠ CAUTION: The oil dip-stick can act as a pressure relief location and become dislodged from its properly installed position. If the dip-stick becomes dislodged, check the coalescer filter to see if it has become plugged or dirty, and replace if necessary.

System Maintenance

® Filtration recommends that the coalescer filter be serviced once every year or 2000 hours, whichever comes first, and the vehicle maintenance records should be updated to include a reminder.

Refer to Table 3 for correct service kit.

Table 3 – Service Kits

CVM System	Service Kit
CV52008	CV52053
CV52015	
CV52019	
CV52021	
CV52023	
CV52034	
CV52006	CV52052
CV52007	
CV52009	
CV52016	
CV52017	
CV52028	

⚠ CAUTION: A filter left unchecked and unchanged can result in lower efficiencies and fouling of the turbocharger and heat exchanger. A plugged filter can also

cause high crankcase pressure.

1. Remove the collar using collar wrench (No. 3944451S) or strap wrench. Remove shell and used filter. Remove used o-ring from shell. See section on Filter Disposal Information for proper handling of used filter.
2. Lubricate the new o-ring with clean engine oil. Install the new o-ring onto the reusable shell.
3. Install the new filter:
 - a. For **CVM280T** and **CVM424T** models: Insert the new filter into the head, being sure to align the yellow diamond on the filter with the yellow diamond on the label. Insert the shell, being sure to align the yellow diamond on the shell with the yellow diamond on the label and filter.
 - a. For **CVM280B** and **CVM424B** models: Insert the new filter into the shell, being sure to align the yellow diamond on the filter with the yellow diamond on the shell. Insert the shell and element together into the head, being sure to align the yellow diamond on the label with the yellow diamonds on the shell and filter.
4. Tighten the reusable collar onto the assembly by hand.
5. Use a collar wrench or strap wrench to fully secure the collar (minimum 1/15 additional turn; each rib on the collar represents 1/15 turn).
6. Perform a Post Installation Check.

Filter Disposal Information

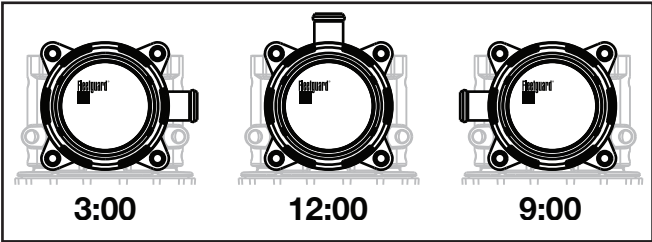
During normal use, the coalescer's filter collects engine oil, diesel particles, engine wear debris and by-products of combustion. Please dispose of used coalescer filters per local regulations. Treating the used coalescer filter in the same manner as a used oil filter can usually meet local regulations.

Ordering Information

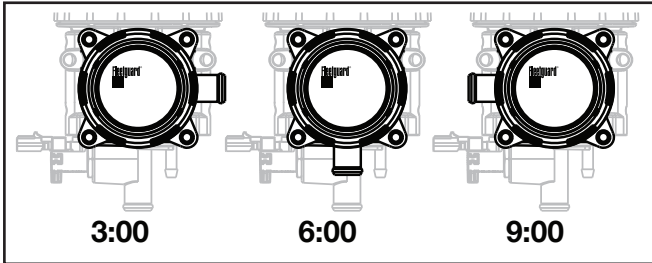
Part No.		Description
CVM280B	CV52008	Outlet at 3 O'Clock
	CV52034	Outlet at 12 O'Clock
	CV52015	Outlet at 9 O'Clock
CVM280T	CV52019	Outlet at 3 O'Clock
	CV52021	Outlet at 6 O'Clock
	CV52023	Outlet at 9 O'Clock
CVM424B	CV52016	Outlet at 3 O'Clock
	CV52006	Outlet at 12 O'Clock
	CV52009	Outlet at 9 O'Clock
CVM424T	CV52007	Outlet at 3 O'Clock
	CV52017	Outlet at 6 O'Clock
	CV52028	Outlet at 9 O'Clock

Outlet Orientations

Bottom Load Units



Top Load Units

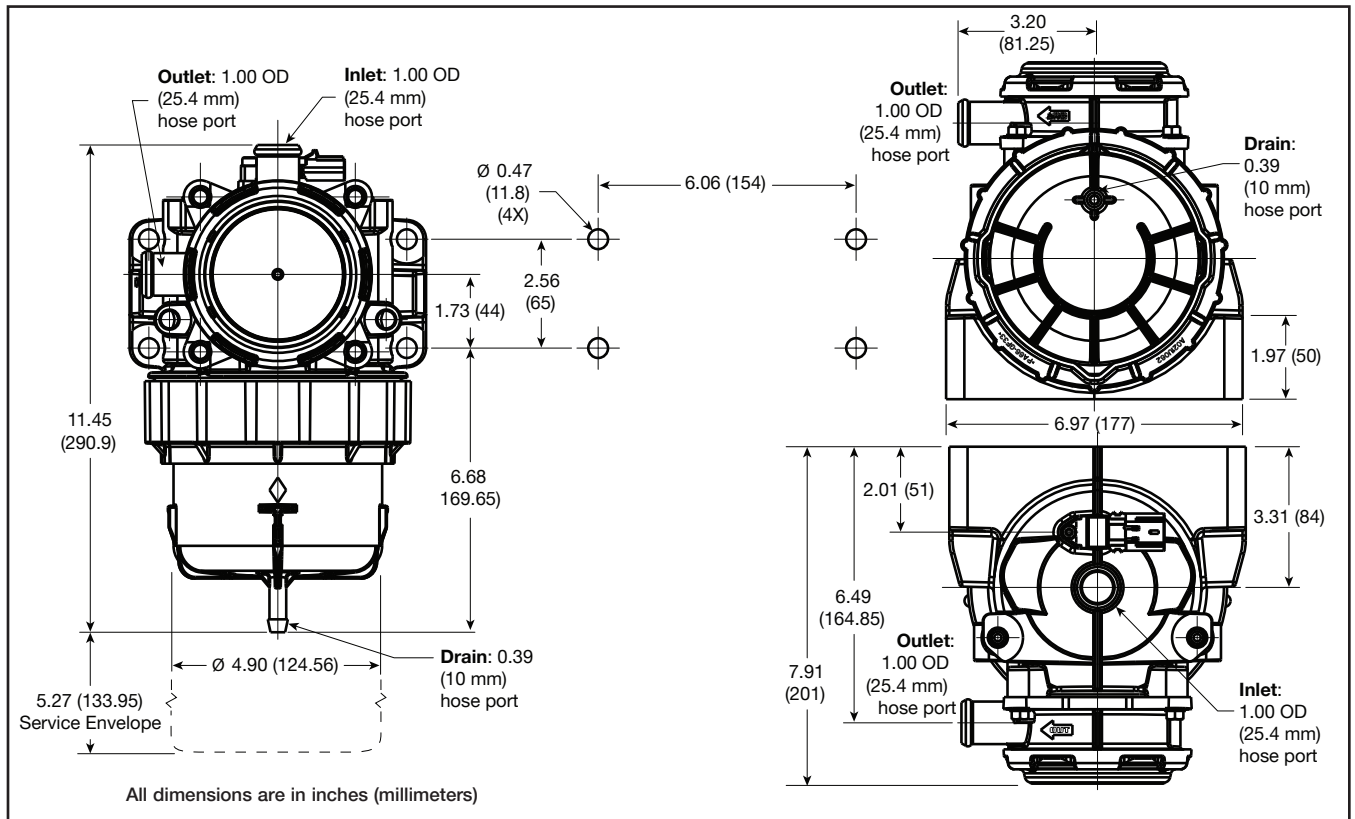


Specifications

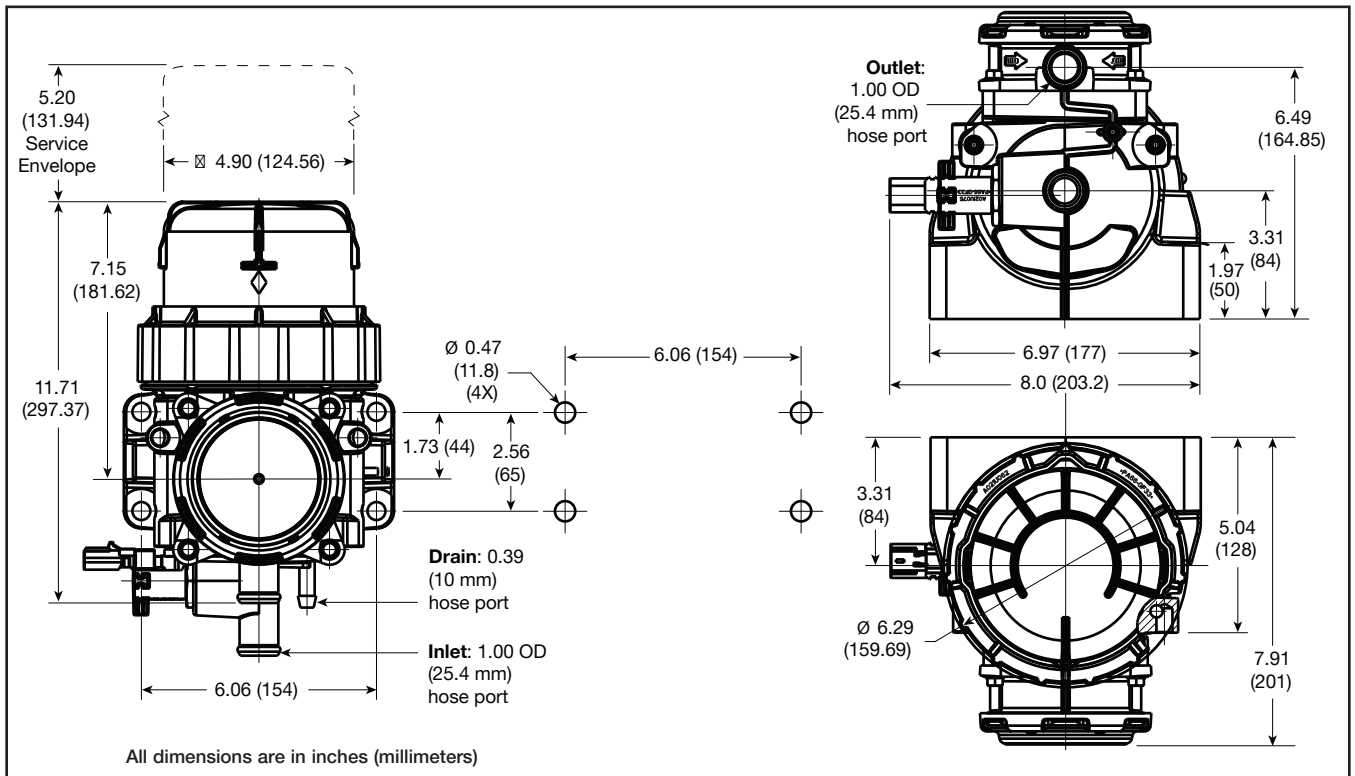
Specification	CVM280B	CVM280T	CVM424B	CVM424T
Height Overall	11.46" (290.9 mm)	11.71" (297.37 mm)	15.39" (391 mm)	15.50" (393.47 mm)
Depth Overall	7.92" (201.1 mm)	7.92" (201.1 mm)	7.92" (201.1 mm)	7.92" (201.1 mm)
Width Overall	6.97" (177 mm)	8" (203.2 mm)	6.97" (177 mm)	8" (203.2 mm)
Nominal Flow	3.53 ft³/min (100 L/min)	3.53 ft³/min (100 L/min)	5.30 ft³/min (150 L/min)	5.30 ft³/min (150 L/min)
Efficiency at Nominal Flow (Dry)	99.5 %	99.5 %	99.9 %	99.9 %
Restriction at Nominal Flow (Dry)	1.97" H ₂ O (0.49 kPa)	1.97" H ₂ O (0.49 kPa)	2.28" H ₂ O (0.57 kPa)	2.28" H ₂ O (0.57 kPa)
Restriction at Nominal Flow (Saturated)	5.51" H ₂ O (1.37 kPa)	5.51" H ₂ O (1.37 kPa)	4.92" H ₂ O (1.23 kPa)	4.92" H ₂ O (1.23 kPa)
Maximum Flow	10.0 ft³/min (280 L/min)	10.0 ft³/min (280 L/min)	15.0 ft³/min (424 L/min)	15.0 ft³/min (424 L/min)
Restriction at Max Flow (Dry)	8.11" H ₂ O (2.02 kPa)	8.11" H ₂ O (2.02 kPa)	12.17" H ₂ O (3.03 kPa)	12.17" H ₂ O (3.03 kPa)
Restriction at Max Flow (Saturated)	15.87" H ₂ O (3.95 kPa)	15.87" H ₂ O (3.95 kPa)	17.56" H ₂ O (4.37 kPa)	17.56" H ₂ O (4.37 kPa)

Mounting/Dimensions

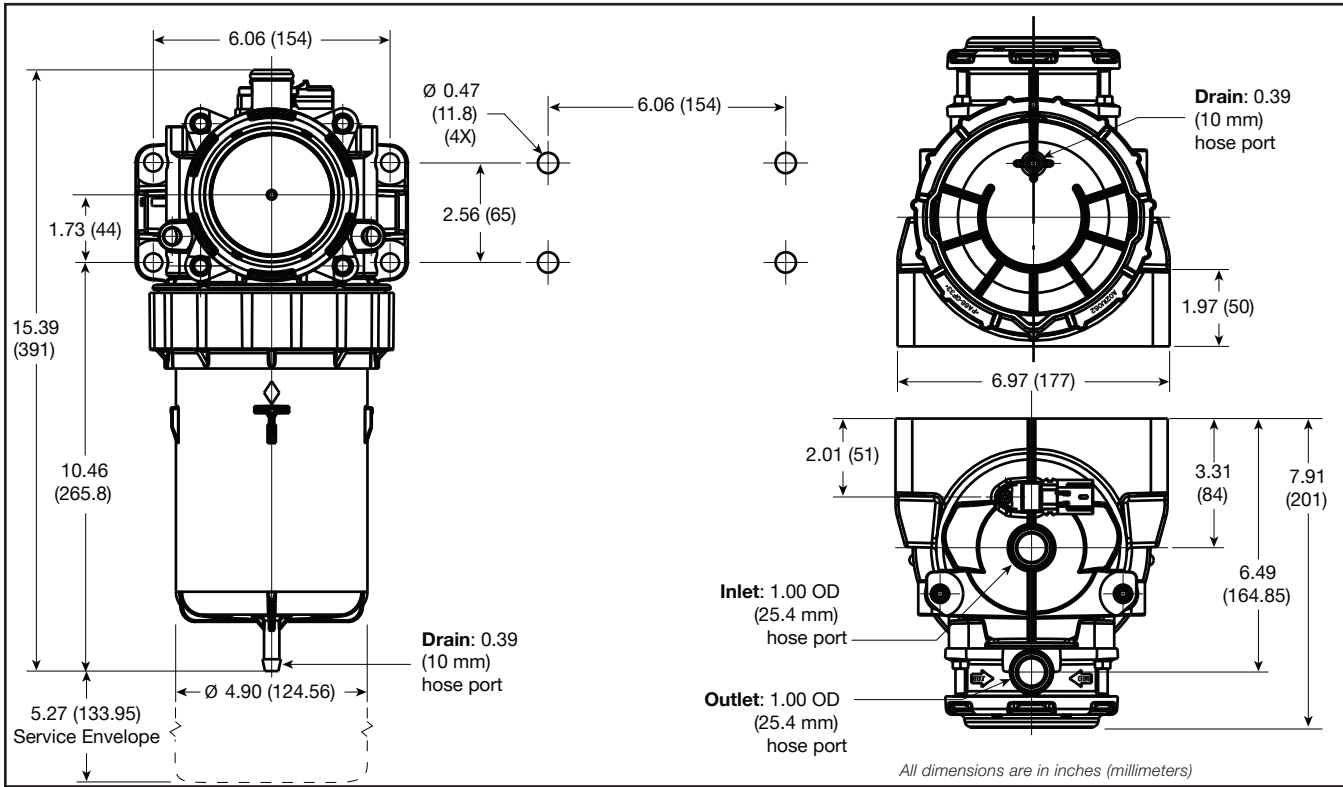
CVM280B



CVM280T



CVM424B



CVM424T

