



aerospace  
climate control  
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**filtration**  
fluid & gas handling  
hydraulics  
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process control  
sealing & shielding



## Crankcase Ventilation

Products and Custom Solutions



ENGINEERING YOUR SUCCESS.

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# Closed Crankcase Ventilation

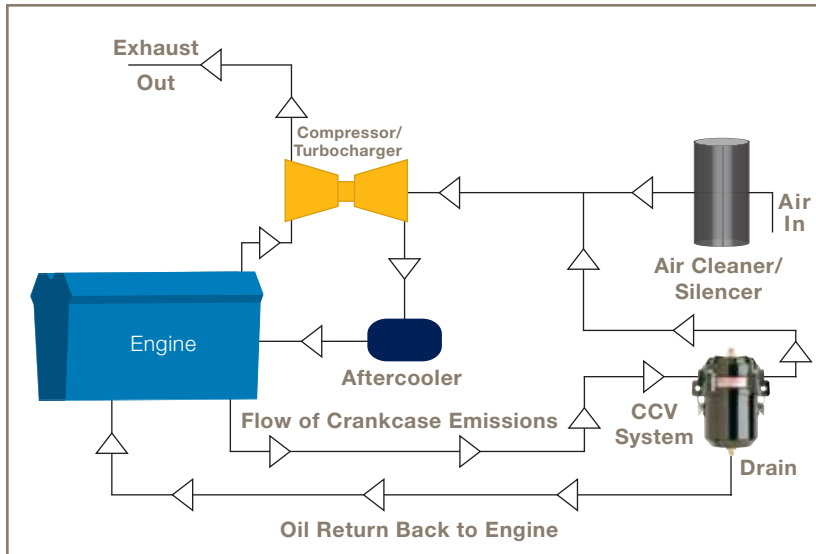
## Market Challenges and Overview

### The Problem – Engines Releasing Pollutants Through Unfiltered Breathers

Environmental concerns and legislation to control crankcase emissions have increased significantly. To further reduce the total emissions of engines, in some applications it is becoming necessary to close the crankcase breather system, routing these gases into the air intake system.

Crankcase blow-by is produced when combustion gases under high pressure are blown past the piston rings into the crankcase. As these blow-by gases pass through the crankcase, they become contaminated. Racor's Crankcase Ventilation System removes these contaminations. The exhaust can then be allowed to vent to the atmosphere.

For applications requiring more stringent emissions requirements, a closed crankcase filter is recommended. In this application, the exhaust from the crankcase filter is routed to the inlet side of the turbo. A regulator in the crankcase filter controls the vacuum in the crankcase to ensure proper operation.



CCV4500KIT01 is currently being used in many different front and rear engine configurations.



CCV4500 installed on a CAT engine.



CCV3551KIT01 installed on a Mercedes Sprinter Van.

- In closed environments like generator sets and marine engine rooms, damage to surrounding equipment such as radiators and electronic control panels can cause hazardous conditions, down time, and expensive maintenance.

- Oil mist will coat and contaminate the aftercooler and other engine components. This coating reduces engine cooling capacity, causes a degradation of engine performance and reliability over time, and shortens the useful service life of the engine components.

- The engine intake inhales contaminated gasses, clogging air filter systems, and damaging turbocharger components. It is imperative that oil mist be removed from the crankcase emissions prior to introduction into the engine air intake in closed breather systems.

## Racor CCV Systems

In a robust, compact package, the patented Racor Closed Crankcase Ventilation (CCV) Filter System provides superior oil coalescence and crankcase pressure control under the most severe conditions.

The only routine maintenance required for the CCV system is filter replacement. Typical service life of the high-performance filter in diesel applications is 750 hours. Some variations in service life occur depending on load profile, engine wear condition, flow and aerosol mass concentration of crankcase emissions, and soot concentration.

### How To Select A CCV Assembly:

CCV systems are designed to handle various crankcase flow rates up to 50 CFM. Traditionally, the crankcase flow rate can be calculated as follows: rated horsepower  $\div$  40 = cubic feet per minute (CFM). This formula can only be used as a guide since recent improvements in piston design have produced engines with higher horsepower and lower blow-by flow rates. The blow-by flow rate of a worn engine, at time of overhaul, is generally double the flow rate when the engine is new. The flow rate of a worn engine is factored into the formula. Note: Specify left or right-hand inlet when ordering.

Examples:

CAT 3116  
260 HP / 40 = 6.5 CFM  
Select CCV4500

CAT 3406  
525 HP / 40 = 13.13 CFM  
Select CCV6000

# Closed Crankcase Ventilation Features and Benefits



Pop-up style indicator alerts of bypass condition and need for filter change.

Unique crankcase pressure regulator with integral bypass valve minimizes variation in crankcase pressure. Excessive variation in crankcase pressure can damage seals, cause loss of oil, and other problems.

Choose left or right-hand inlet. Available with or without bypass indicator.

High-efficiency oil separation to 0.3 micron.

Stainless steel latches for tool-less element change.

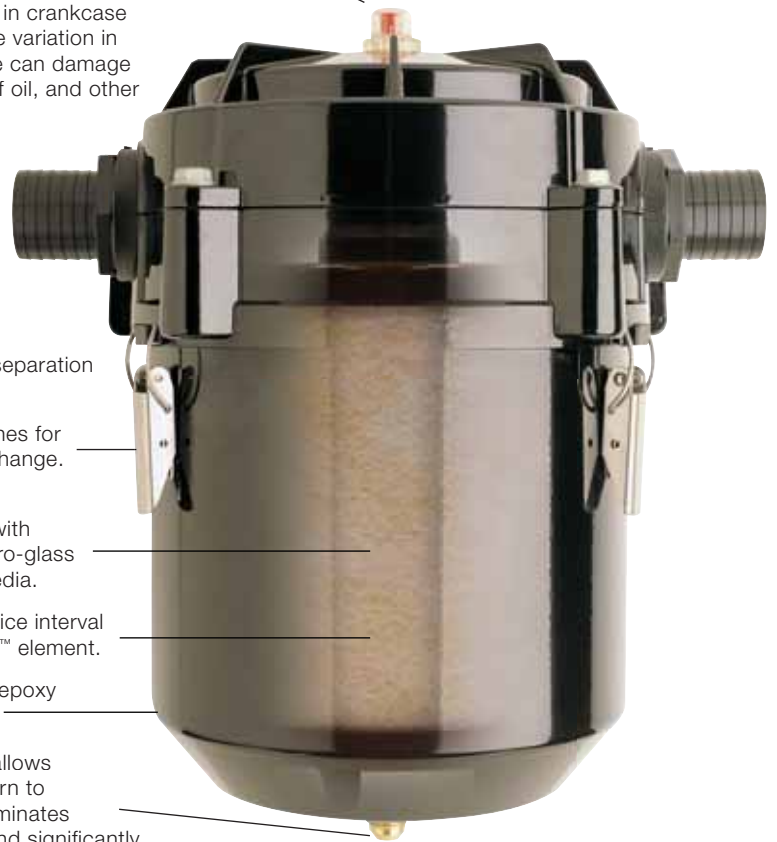
Replaceable high-performance filter with depth-loading, micro-glass fiber coalescing media.

Extended filter service interval from the Vaporbloc™ element.

Steel housing with epoxy powder coating.

Drain check valve allows collected oil to return to crankcase. This eliminates frequent draining and significantly reduces oil consumption.

Continuous operating temperature range is -40°F to +240°F (-40°C to 116°C).



# Closed Crankcase Ventilation Specifications



	CCV1500	CCV3500	CCV4500	CCV6000	CCV8000	CCV12000
<b>Maximum Flow Rate</b>	1 CFM (28 LM)	3 CFM (85 LM)	10 CFM (283 LM)	20 CFM (566 LM)	40 CFM (1133 LM)	50 CFM (1416 LM)
<b>Maximum Engine Rating</b>	40 HP (30 KW)	120 HP (89 KW)	400 HP (298 KW)	800 HP (597 KW)	1600 HP (1193 KW)	2000 HP (1491 KW)
<b>Inlet/Outlet Port Size</b>	3/4" hose	3/4" hose	1 3/16"-12 STOR	1 5/8"-12 STOR	1 7/8"-12 STOR	1 7/8"-12 STOR
<b>Weight</b>	1.5 lbs (0.7 kg)	2.3 lbs (1.0 kg)	3.3 lbs (1.5 kg)	5.0 lbs (2.3 kg)	8.7 lbs (3.9 kg)	9.3 lbs (4.2 kg)
<b>Replacement Filter Media Density: Low</b>	CCV55365-04	N/A	CCV55248-04	N/A	N/A	N/A
<b>Replacement Filter Media Density: High</b>	N/A	CCV55304-08	CCV55248-08	CCV55274-08	CCV55222-08	CCV55222-12-08
<b>Replacement Filter Media Density: Ultra</b>	N/A	N/A	CCV55248-10	CCV55274-10	CCV55222-10	CCV55222-12-10
<b>Housing Material</b>	Glass-filled nylon and black powder epoxy-coated steel bracket.	Glass-filled nylon components.	Die cast head, glass-filled nylon and black powder epoxy-coated steel bowl.	Die cast head, glass-filled nylon and black powder epoxy-coated steel bowl.	Die cast head, glass-filled nylon and black powder epoxy-coated steel bowl.	Die cast head, glass-filled nylon and black powder epoxy-coated steel bowl.
<b>Crankcase Pressure Regulator</b>	Vacuum Limiting valve	Integral	Integral	Integral	Integral	Integral
<b>Bypass/Change Indicator</b>	N/A	Integral	Integral or Remote	Integral or Remote	Integral or Remote	Integral or Remote
<b>Engine Block Check Valve Return Fitting</b>	N/A	1/4" NPT	1/4" NPT	1/4" NPT	3/8" NPT	3/8" NPT
<b>Swivel Fitting (Qty.)</b>	N/A	#6 JIC (2 pcs.)	#6 JIC (2 pcs.)	#6 JIC (2 pcs.)	#8 JIC (2 pcs.)	#8 JIC (2 pcs.)
<b>Oil Drain Hose I.D.</b>	N/A	0.375 in. (0.95 cm)	0.375 in. (0.95 cm)	0.375 in. (0.95 cm)	0.5 in. (1.27 cm)	0.5 in. (1.27 cm)

Units can be manifolded to handle higher flow rates. Do not use CCV1500 in continuous duty applications.

## Racor CV Systems

In an open system, the crankcase breather is connected to the Crankcase Ventilation (CV) filter assembly. The CV outlet is open to atmosphere. This configuration is simple to install and is an effective oil mist removal system for applications which allow crankcase venting to atmosphere. There may be some visible blow-by gases present from the CV outlet.

The only routine maintenance required for the CV system is filter replacement. Typical service life of the high-performance filter in diesel applications is 750 hours. Some variations in service life occur depending on load profile, engine wear condition, flow and aerosol mass concentration of crankcase emissions, and soot concentration.

CV units are designed to handle various crankcase flow rates up to 50 CFM. Traditionally, the crankcase flow rate can be calculated as follows:  $\text{rated horsepower} \div 20 = \text{cubic feet per minute (CFM)}$ . This formula can only be used as a guide since recent improvements in piston design have produced engines with higher horsepower and lower blow-by flow rates. The blow-by flow rate of a worn engine, at time of overhaul, is generally double the flow rate when the engine is new. The flow rate of a worn engine is factored into the formula. Note: Specify left or right-hand inlet when ordering.

# Open Crankcase Ventilation Features and Benefits

CV systems include a crankcase pressure regulator with integral bypass valve that minimizes variation in crankcase pressure. Excessive variation in crankcase pressure can damage seals, cause loss of oil, and other problems.

Choose left or right-hand inlet.

High-efficiency oil separation to 0.3 micron.

Stainless steel latches for tool-less filter change.

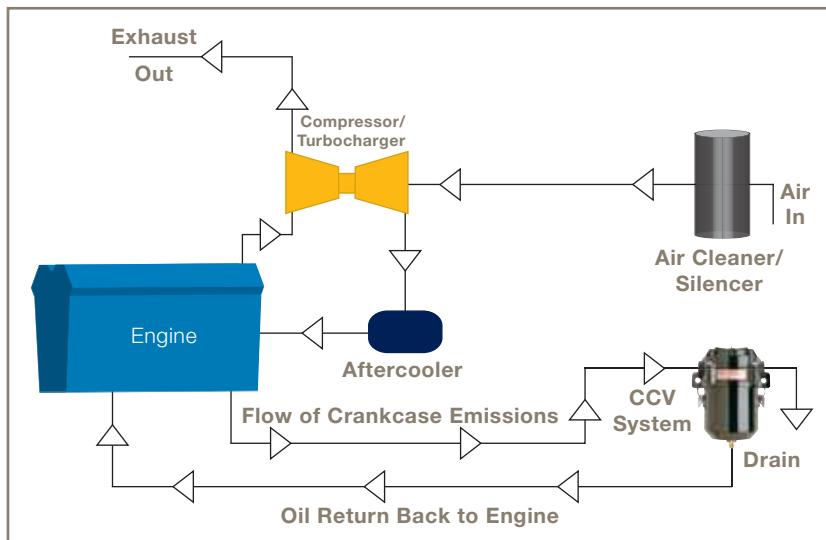
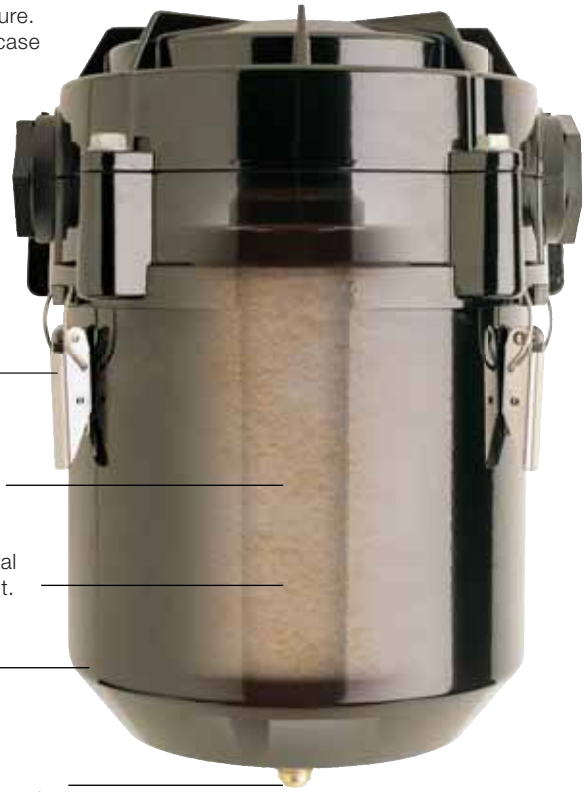
Replaceable high-performance filter with depth-loading, micro-glass fiber coalescing media.

Extended filter service interval from the Vaporbloc™ element.

Steel housing with epoxy powder coating.

Drain check valve allows collected oil to return to crankcase. This eliminates frequent draining and significantly reduces oil consumption.

Continuous operating temperature range is -40°F to +240°F (-40°C to 116°C).



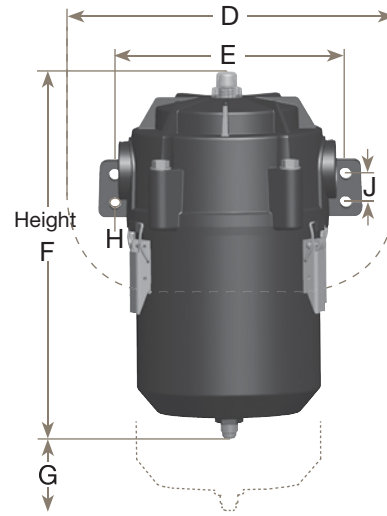
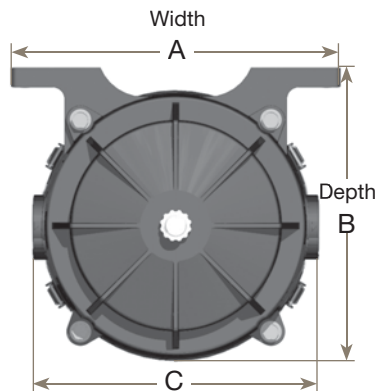
# Open Crankcase Ventilation Specifications



	CV4501	CV6001	CV8001	CV12001
<b>Maximum Flow Rate</b>	10 CFM (283 LM)	20 CFM (566 LM)	40 CFM (1133 LM)	50 CFM (1416 LM)
<b>Inlet/Outlet Port Size</b>	1 3/16"-12 STOR	1 5/8"-12 STOR	1 7/8"-12 STOR	1 7/8"-12 STOR
<b>Weight</b>	3.3 lbs (1.5 kg)	5.0 lbs (2.3 kg)	8.7 lbs (3.9 kg)	9.3 lbs (4.2 kg)
<b>Replacement Filter Media Density: High</b>	CCV55248-08	CCV55274-08	CCV55222-08	CCV55222-12-08
<b>Housing Material</b>	Die cast head, glass-filled nylon and black powder epoxy-coated steel bowl.	Die cast head, glass-filled nylon and black powder epoxy-coated steel bowl.	Die cast head, glass-filled nylon and black powder epoxy-coated steel bowl.	Die cast head, glass-filled nylon and black powder epoxy-coated steel bowl.
<b>Crankcase Pressure Regulator</b>	Integral	Integral	Integral	Integral
<b>Engine Block Check Valve Return Fitting</b>	1/4" NPT	1/4" NPT	1/4" NPT	3/8" NPT
<b>Swivel Fitting (Qty.)</b>	#6 JIC (2 pcs.)	#6 JIC (2 pcs.)	#8 JIC (2 pcs.)	#8 JIC (2 pcs.)
<b>Oil Drain Hose I.D.</b>	0.375 in. (0.95 cm)	0.375 in. (0.95 cm)	0.5 in. (1.27 cm)	0.5 in. (1.27 cm)

Units can be manifolded to handle higher flow rates.

## CCV and CV Dimensions



Dimension	1500 Series		3500 Series		4500 Series		6000 Series		8000 Series		12000 Series	
	IN	CM	IN	CM	IN	CM	IN	CM	IN	CM	IN	CM
<b>A</b>	8.0	20.3	7.1	18.1	7.2	18.3	8.6	21.8	10.6	26.9	10.6	26.9
<b>B</b>	5.0	12.7	6.3	16.0	5.6	14.2	7.3	18.5	9.3	23.6	9.3	23.6
<b>C</b>	3.6	9.1	5.5	14.0	5.6	14.2	7.1	18.0	9.1	23.1	9.1	23.1
<b>D</b>	8.2	20.8	7.1	18.1	7.5	19.1	11.3	28.7	13.3	33.8	13.3	33.8
<b>E</b>	7.0	17.8	6.0	15.2	6.0	15.2	7.5	19.1	9.5	24.1	9.5	24.1
<b>F<sup>1</sup></b>	5.0	12.7	7.0	17.8	9.3	23.6	12.0	30.5	13.9	35.3	18.0	45.7
<b>G<sup>2</sup></b>	6.0	15.2	4.6	11.7	2.3	5.7	4.0	10.1	5.0	12.7	6.0	15.2
<b>H</b>	0.38	0.97	0.43	1.09	0.43	1.09	0.37	0.94	0.43	1.09	0.43	1.09
<b>J<sup>3</sup></b>	N/A	N/A	N/A	N/A	N/A	N/A	0.93	2.4	1.06	2.7	1.06	2.7

<sup>1</sup> Dimension "F" is 0.75" less for CV Systems.

<sup>2</sup> Dimension "G" is the minimum filter removal clearance - allow more room if possible for ease of service. CCV1500 and CCV3500 Series filters are serviced from top.

<sup>3</sup> Dimension "J" is not applicable on CCV1500, 3500, and 4500 assemblies because there are only two (2) mounting holes. All other units have four (4) mounting holes.

# CCV™ Assemblies



## CCV3500 Series – Maximum Flow 3 CFM

Part Number	Description	Inlet Side	Media Density	Inlet/Outlet Barb Size	Check Valve	Swivel Fitting (Qty.)	Hose I.D. (Qty.)
CCV3500-08L CCV3500-08R	Continuous with Internal Bypass	Left Right	High	3/4" Barb	1/4" NPT	#6 JIC (1 pc.)	3/8" (6 ft.)
CCV3501-08L CCV3501-08R	Continuous - Non-Bypass	Left Right	High	3/4" Barb	1/4" NPT	#6 JIC (1 pc.)	3/8" (6 ft.)
CCV3550-08L CCV3550-08R	Intermittent with Internal Bypass	Left Right	High	3/4" Barb	1/4" NPT	#6 JIC (1 pc.)	3/8" (3 ft.)
CCV3551-08L CCV3551-08R	Intermittent - Non-Bypass	Left Right	High	3/4" Barb	1/4" NPT	#6 JIC (1 pc.)	3/8" (3 ft.)
CCV55304-08 CCV55404-08	Replacement Filter	N/A	Intermittent Continuous	N/A	N/A	N/A	N/A

## CCV4500 Series – Maximum Flow 10 CFM

Part Number	Description	Inlet Side	Media Density	Inlet/Outlet Thread Size	Check Valve	Swivel Fitting (Qty.)	Hose I.D. (Qty.)
CCV4500-08L CCV4500-08R	Bypass Assembly	Left Right	High	1-3/16"-12 SAE	1/4" NPT	#6 JIC (2 pcs.)	3/8" (3 ft.)
CCV4501-08L CCV4501-08R	Non-Bypass Assembly	Left Right	High	1-3/16"-12 SAE	1/4" NPT	#6 JIC (2 pcs.)	3/8" (3 ft.)
CCV4500-10L CCV4500-10R	Bypass Assembly	Left Right	Ultra	1-3/16"-12 SAE	1/4" NPT	#6 JIC (2 pcs.)	3/8" (3 ft.)
CCV4501-10L CCV4501-10R	Non-Bypass Assembly	Left Right	Ultra	1-3/16"-12 SAE	1/4" NPT	#6 JIC (2 pcs.)	3/8" (3 ft.)
CCV55248-08 CCV55248-10	Replacement Filter	N/A	High Ultra	N/A	N/A	N/A	N/A

## CCV6000 Series – Maximum Flow 20 CFM

Part Number	Description	Inlet Side	Media Density	Inlet/Outlet Thread Size	Check Valve	Swivel Fitting (Qty.)	Hose I.D. (Qty.)
CCV6000-08L CCV6000-08R	Bypass Assembly	Left Right	High	1-5/8"-12 SAE	1/4" NPT	#6 JIC (2 pcs.)	3/8" (3 ft.)
CCV6001-08L CCV6001-08R	Non-Bypass Assembly	Left Right	High	1-5/8"-12 SAE	1/4" NPT	#6 JIC (2 pcs.)	3/8" (3 ft.)
CCV6000-10L CCV6000-10R	Bypass Assembly	Left Right	Ultra	1-5/8"-12 SAE	1/4" NPT	#6 JIC (2 pcs.)	3/8" (3 ft.)
CCV6001-10L CCV6001-10R	Non-Bypass Assembly	Left Right	Ultra	1-5/8"-12 SAE	1/4" NPT	#6 JIC (2 pcs.)	3/8" (3 ft.)
CCV55274-08 CCV55274-10	Replacement Filter	N/A	High Ultra	N/A	N/A	N/A	N/A



# CCV™ Assemblies

## CCV8000 Series – Maximum Flow 40 CFM

Part Number	Description	Inlet Side	Media Density	Inlet/Outlet Thread Size	Check Valve	Swivel Fitting (Qty.)	Hose I.D. (Qty.)
CCV8000-08L CCV8000-08R	Bypass Assembly	Left Right	High	1-7/8"-12 SAE	3/8" NPT	#8 JIC (2 pcs.)	1/2" (3 ft.)
CCV8000-08L CCV8000-08R	Non-Bypass Assembly	Left Right	High	1-7/8"-12 SAE	3/8" NPT	#8 JIC (2 pcs.)	1/2" (3 ft.)
CCV8000-10L CCV8000-10R	Bypass Assembly	Left Right	Ultra	1-7/8"-12 SAE	3/8" NPT	#8 JIC (2 pcs.)	1/2" (3 ft.)
CCV8001-10L CCV8001-10R	Non-Bypass Assembly	Left Right	Ultra	1-7/8"-12 SAE	3/8" NPT	#8 JIC (2 pcs.)	1/2" (3 ft.)
CCV55222-08 CCV55222-10	Replacement Filter	N/A	High Ultra	N/A	N/A	N/A	N/A

## CCV12000 Series – Maximum Flow 50 CFM

Part Number	Description	Inlet Side	Media Density	Inlet/Outlet Thread Size	Check Valve	Swivel Fitting (Qty.)	Hose I.D. (Qty.)
CCV12000-08L CCV12000-08R	Bypass Assembly	Left Right	High	1-7/8"-12 SAE	3/8" NPT	#8 JIC (2 pcs.)	1/2" (3 ft.)
CCV12001-08L CCV12001-08R	Non-Bypass Assembly	Left Right	High	1-7/8"-12 SAE	3/8" NPT	#8 JIC (2 pcs.)	1/2" (3 ft.)
CCV12000-10L CCV12000-10R	Bypass Assembly	Left Right	Ultra	1-7/8"-12 SAE	3/8" NPT	#8 JIC (2 pcs.)	1/2" (3 ft.)
CCV12001-10L CCV12001-10R	Non-Bypass Assembly	Left Right	Ultra	1-7/8"-12 SAE	3/8" NPT	#8 JIC (2 pcs.)	1/2" (3 ft.)
CCV55222-12-08 CCV55222-12-10	Replacement Filter	N/A	High Ultra	N/A	N/A	N/A	N/A

# CCV Fitting/Hose Kits

## CCV4500 Series Assemblies

Part No.	Description
CCV55024	(1) 3/4" fitting, (1) 1" fitting, (1) 3/4" ID x 4 foot long hose, (1) 1" ID x 4 foot long hose, (4) clamps and (4) ties
CCV55025	(2) 1" fittings, (1) 1" ID x 8 foot long hose, (4) clamps and (4) ties
CCV55037	(1) 1-1/4" fitting, (1) 1" fitting, (1) 1-1/4" ID x 4 foot long hose, (1) 1" ID x 4 foot long hose, (4) clamps and (4) ties
CCV55038	(1) 3/4" fitting, (1) 1" fitting, (1) 3/4" ID x 6 foot long hose, (1) 3/4" Tee fitting, (1) 1" ID x 4 foot long hose, (8) clamps and (8) ties

## CCV6000 Series Assemblies

Part No.	Description
CCV55046	(2) 1-1/4" fittings, (1) 1-1/4" ID x 8 foot long hose, (4) clamps and (4) ties
CCV55047	(2) 1-1/4" fittings, (1) 1-1/4" Tee fitting, (1) 1-1/4" ID x 10 foot long hose, (8) clamps and (8) ties
CCV55048	(2) 1-1/4" fittings, (1) 1-1/2" ID x 4 foot long hose, (1) bushing reducer, (1) 1-1/4" ID x 4 foot long hose, (4) clamps and (4) ties
CCV55049	(2) 1-1/4" fittings, (1) 1-1/2" ID x 5 foot long hose w/2" cuff, (1) bushing reducer, (1) 1-1/4" ID x 4 foot long hose, (4) clamps and (4) ties

## CCV8000 and CCV12000 Series Assemblies

Part No.	Description
CCV55067	(2) 1-1/2" fittings, (1) 1-1/2" ID x 10 foot long hose, (1) bushing reducer, (4) clamps and (4) ties
CCV55068	(2) 1-1/2" fittings, (1) 1-1/2" Tee fitting, (1) 1-1/2" ID x 12 foot long hose, (2) bushing reducers, (8) clamps and (8) ties
CCV55069	(2) 1-1/2" fittings, (1) 1-1/2" ID x 5 foot long hose w/2" cuff, (1) bushing reducer, (1) 1-1/2" ID x 5 foot long hose, (4) clamps and (4) ties

## Hose and Fitting Kits

Hose and fitting kits include inlet and outlet fittings and enough hose for a typical installation of a CCV assembly. CCV assemblies require special fittings only available from Racor. In order to determine the correct hose and fitting kit, you need to know the quantity and outside diameter of the engine breather(s). Hose and fitting kits are available in various sizes and configurations.

## Bulk Hose Kits

### Drain Hoses

Part Number	Push-Lok Hose Size
CCV836-6-25	3/8 I.D., 25' Roll
CCV836-6-50	3/8 I.D., 50' Roll
CCV836-8-25	1/2 I.D., 25' Roll
CCV836-8-50	1/2 I.D., 50' Roll

### Inlet/Outlet Hose Kits

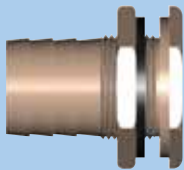
(available by the foot)

Part Number	Corrugated Hose Size (I.D.)
CV1034-01	3/4"
CV1100-01	1"
CV1114-01	1 1/4"
CV1112-01	1 1/2"

### Hump Hose Fittings

These are designed to be used with existing air cleaner to turbo rubber adapters.

Part Number	Hose
CCV55540	0.75"
CCV55113	1.0"
CCV55114	1.25"
CCV55115	1.5"



## Marine Air Filter Assemblies with Racor CCV™ Connector



The Racor Marine Air Filter and the Racor CCV can be connected to bring you effective air and crankcase filtration with one simple hose and clamp.

Marine Air Filter Model	Replacement Filter Part Number	Outlet Diameter	Length	Hose Barb	Diameter
AF M408512	AF M8040	4"	12"	1"	8.5"
AF M501012	AF M8050	5"	12"	1"	10"
AF M601212	AF M8060	6"	12"	1.25"	12"

All Marine Air Filters include Installation Instructions

Note: AF M601212 includes 1-1/4" x 1-1/2" Bushing (connects to 1-1/2" I.D. Hose)

## CCV 90° Hose Adapters



Part Number	CCV55121
Use with Model	CCV6000
Hose Size	1-1/4" I.D.

Part Number	CCV55547-10
Use with Model	CCV8000

Part Number	CCV55547-02
Use with Model	CCV4500

## CCV Hose Barbs



CCV Assembly	Hose Barb Part Number	Size
CCV4500	CCV55251	0.75"
CCV4500	CCV55250	1"
CCV4500	CCV55280	1.25"
CCV6000	CCV55089	0.75"
CCV6000	CCV55268	1.25"
CCV6000	CCV55121	1.25" (90°)
CCV6000	CCV55267	1.5"
CCV8000/CCV12000	CCV55218	1.5"

## CCV8000 Conversion Kits

The CCV55613-08 and CCV55613-10 allow the CCV8000 to be converted to a CCV12000. The CCV12000 series offers 60% additional media. The CCV12000 series is great for applications where extra capacity is desired and immediate engine accessibility is not available. It allows for increased efficiency and longer service intervals. Kit includes element, wear spacer, o-rings, and CCV12000 bowl.



Part Number	Element
CCV55613-08	High Density
CCV55613-10	Ultra Density

## CCV Heater Kits



CCV heater kits are an optional accessory for engine applications operating in severe cold weather. Emulsion and/or ice deposits on the element and inside the canister develop when the air blast from the radiator cools the CCV assembly. The emulsions are created by water vapors condensing and combining with oil droplets in the cold air stream of the CCV system. This build-up can prematurely choke the filter and reduce filter life. The heater band and insulating sleeve are placed over the CCV canister and insulate the assembly to prevent the emulsion build-up. Reduced filter life can be avoided by installing a Racor CCV Heater Kit.

CCV Assembly	Heater Kit Part Number
CCV4500	CCV55461
CCV6000	CCV55462
CCV8000	CCV55463

Kits include heater band and insulating sleeve only. CCV assembly sold separately.

## Electronic Remote Filter Gauge



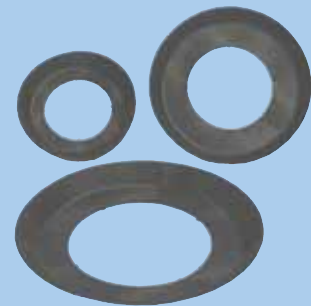
The CCV55615-01 electronic remote filter gauge features a green light that turns red at 8 inWc pressure indicating the need for filter changeout.

## Remote Filter Gauge

Part Number: CCV55012  
All Hardware Included



## Heavy-Duty Wear Spacers



CCV Unit	Spacer Number
CCV4500	CCV55390
CCV6000	CCV55385
CCV8000	CCV55374
CCV12000	CCV55374

## Tap Sleeves



Part Number	Size
CCV30100	3" x 1"
CCV40100	4" x 1"
CCV50125	5" x 1-1/4"
CCV60125	6" x 1-1/4"

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