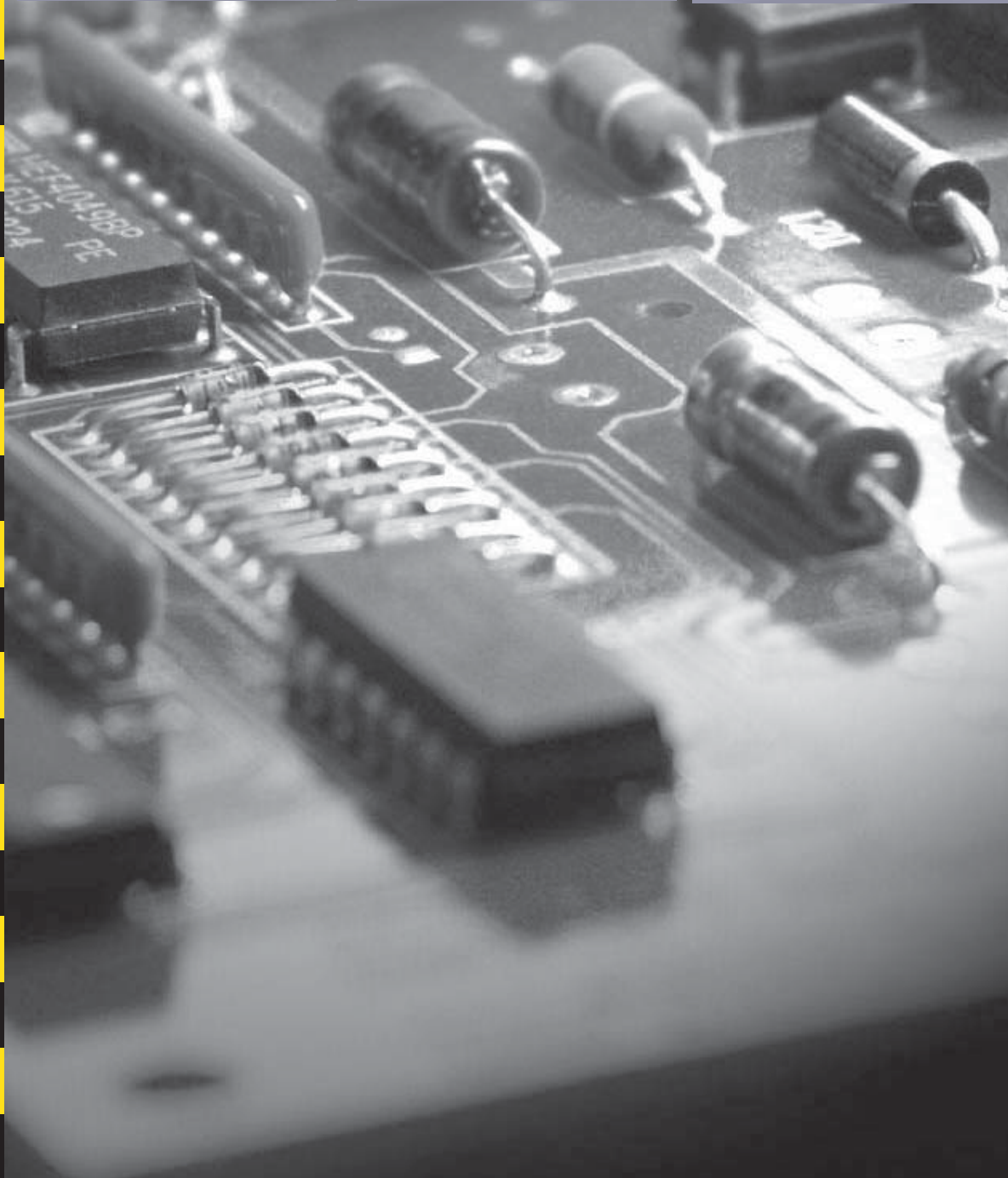
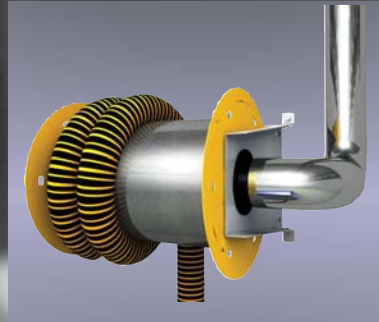


Intelligent Control Equipment

System solutions for Vehicle Exhaust applications





The right control equipment for every application.

PlymoVent can offer the best control equipment solution for every application. It doesn't matter if it's for the one man shop or for the big workshop, we can supply an outstanding solution in every case.

Why control equipment?

To have the most suitable control equipment can mean many different things depending on application. In the small garage a fan starter on the wall is probably the best choice, for bigger garages or workshops a more advanced control system is preferred. More frequent use of an exhaust extractor increases the need of efficient and correctly chosen control equipment in order to get the best function and lowest running cost possible for the system.

What can be achieved?

The most apparent benefits when using PlymoVent control equipment.

- ▶ **Simplicity**
Manual starters are a simple and cost effective way to operate smaller systems.
- ▶ **Flexibility**
PlymoVent can customize your system to meet your needs.
- ▶ **Automatic operation**
When installing automatic control equipment you don't have to worry about turning the system on or off the system will do it automatically when it needs to.
- ▶ **Energy savings on heating and power consumption**
A smaller fan with less power consuming can do the same job as a bigger one when using energy saving equipment. A smaller fan will also save you money by only extracting heated air when it's needed. The global awareness also calls for any energy savings possible.
- ▶ **Cheaper duct-, mechanical- and electrical installation**
Smaller filters, fans and duct make the total installation easier, faster and cheaper.
- ▶ **Better working environment**
Lower noise levels thanks to automation, fans only running as much as, or when, needed.
- ▶ **High efficiency at any given time**
Correct air volume at each extractor when you need it.

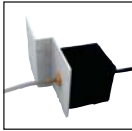
The equipment we use



ECMSO
Motor starter with built-in motor protection.



TR-24
Transformer 230/24 Volt to supply motordriven dampers when no other control equipment is used.



MSR-24/2
Micro switch that fits all PlymoVent hose reels. To control a motordriven damper and/or fan starter.



BRC-MS
Micro switch for installation on BRC balancer. To control a motordriven damper and/or fan starter.



MD-160 (160mm)
Motorised damper 24V. Available in sizes 100-400 mm. Running time 5 seconds.



SA-24
Fan Starter to manually operate a local or central fan. Activated by hood switch



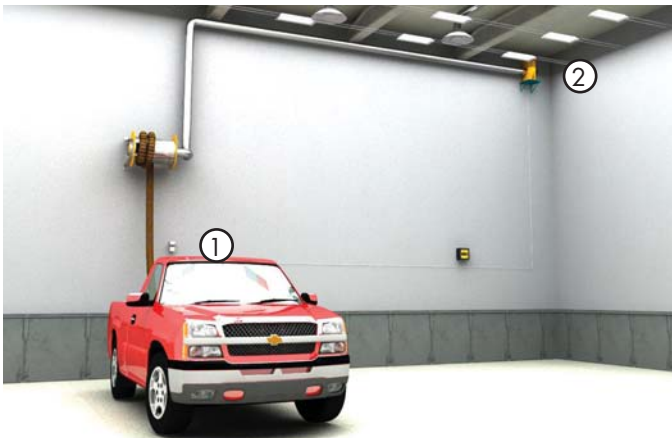
DCV/TG
Inverter and pressure transmitter for demand controlled systems.



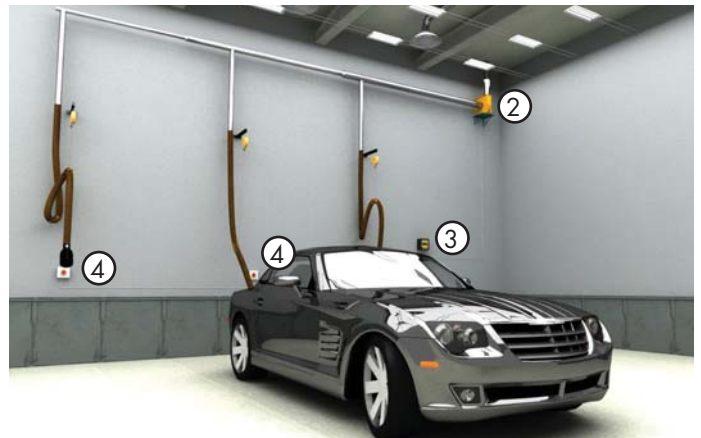
External switch
Example, supplied by other.

Manual controls

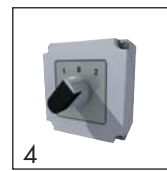
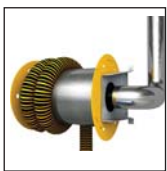
Suitable for small garages or in workshops with low frequency use a manual operation of the exhaust system can be acceptable. The fan is turned on and off manually.



Hose reel, ECMSO fan starter and TEV fan.



FE hose drops, wall mounted external switches, fan starter SA-24 and TEV fan.

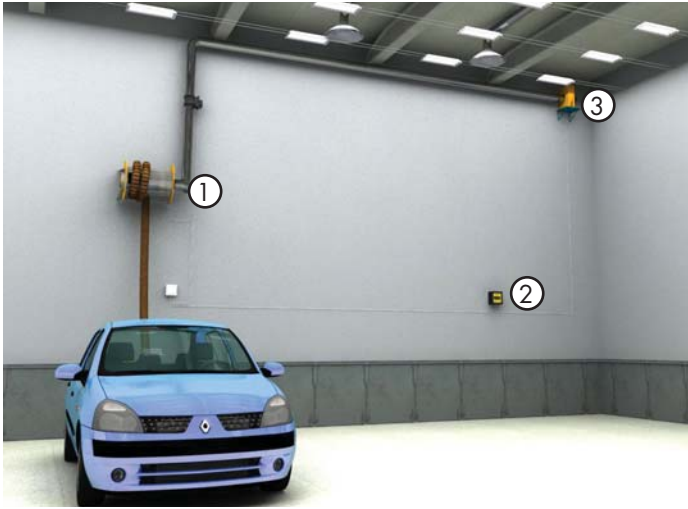


Manual controls can be applied in small garages or workshops with low frequency use where manual operation is suitable. For single position start-stop we recommend the motor starter, ECMSO, which has a built-in motor overload. If individual start-stop switches are used at each workplaces, (supplied by others), a fan starter, SA-24, should be used. The fan will run as long as any of the work station switches are on.

- ▶ Manual operation
The fan is switched on and off manually.
- ▶ For small garages
This solution is suitable where only a few hose reels or hose drops are installed.
- ▶ For low frequency use
Suits application where the frequency of use is low.
- ▶ Simple operation
Easy to use and install.

Automatic controls

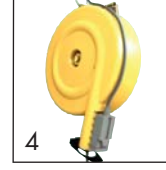
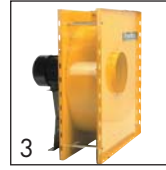
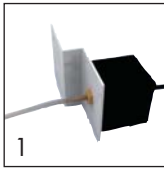
Suitable for small or medium sized garages (2-5 workplaces) or in workshops with low to medium frequency use where an automated control of the exhaust system is desired. Micro switches installed on the hose reel or hose drop balancer are activated by the use of the extraction system and they will activate the fan starter which controls the fan.



Hose reels with micro-switches MSR-24/2, fan starter SA-24 and TEV fan.



FE hose drops, BRC balancers with micro switch BRC-MS, fan starter SA-24 and TEV fan.

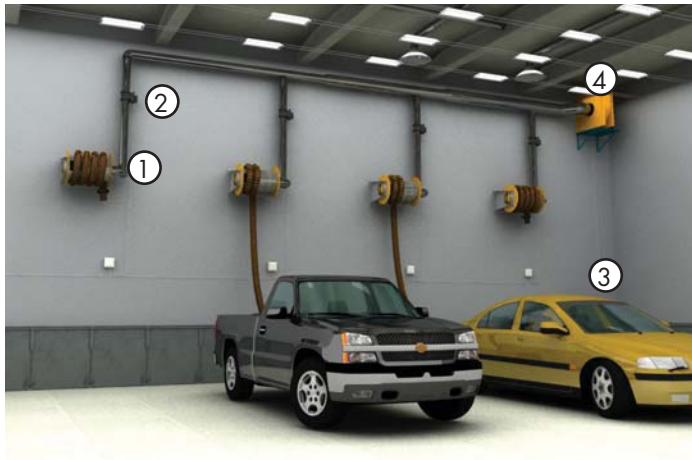


Automatic control system operates the fan automatically when either hose drop or hose reel are in use. The fan starter makes an automatic start of the fan possible by a micro switch mounted on the balancer at each hose drop or hose reel. When the hose is pulled down or retracted an impulse from the micro switch will make the fan start and stop automatically.

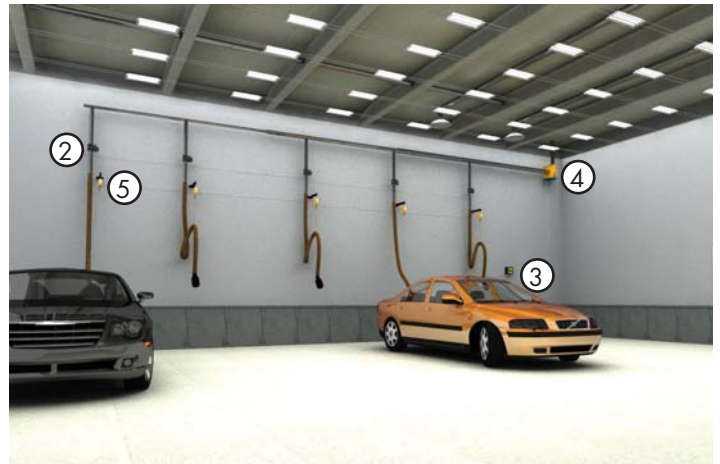
- ▶ **Automatic operation**
The fan is switched on and off automatically when either hose drop or hose reel is used.
- ▶ **For small to medium sized garages**
Suitable for garages with 2-5 workplaces.
- ▶ **Medium frequency use**
In applications where the exhaust extractors are used on a daily basis.
- ▶ **Cost savings**
Savings on extracted heated air and fan power consumption thanks to automation.

Automatic controls with energy saving functions

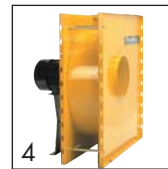
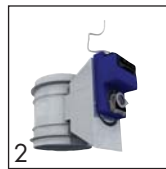
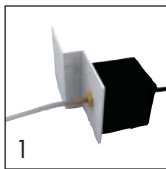
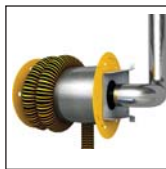
Suitable for medium or big sized garages (4-10 workplaces) or in workshops with medium to high frequency use where an automated control of the exhaust system is required. Micro-switches on the hose reels or balancers are activated by the use of the extractor. The micro-switch activates the local motorised damper and at the same time a fan starter will operate the central exhaust fan.



Hose reels with micro-switches MSR-24/2, motorised dampers MD-160, fan starter SA-24 and TEV fan



FE hose drops, BRC balancers with micro switches BRC-MS, motorised dampers MD-160, fan starter SA-24 and TEV fan

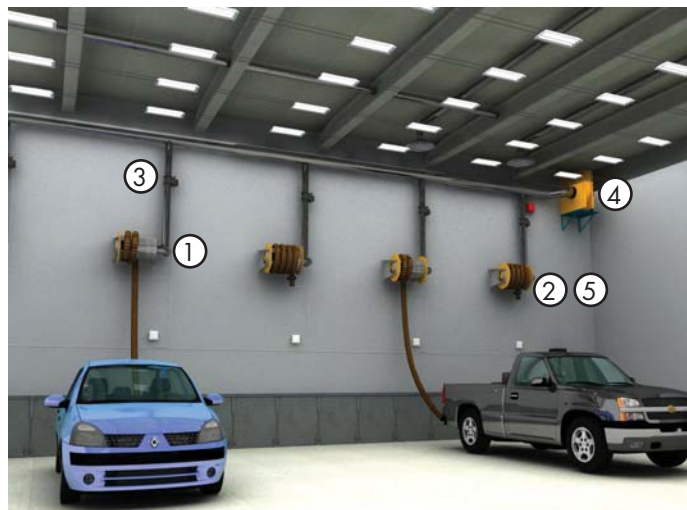


Automatic control system with energy saving functions is recommended when you require that only the exhaust extractor in use has air flow and all others are closed while not in use. When you pull down the hose a signal will be sent from the balancer or hose reel mounted micro switches activating the motor driven dampers and at the same time activating the fan starter. By using this control system you will reduce the size of your fan, duct system and energy costs because air is only extracted from the extractor in use.

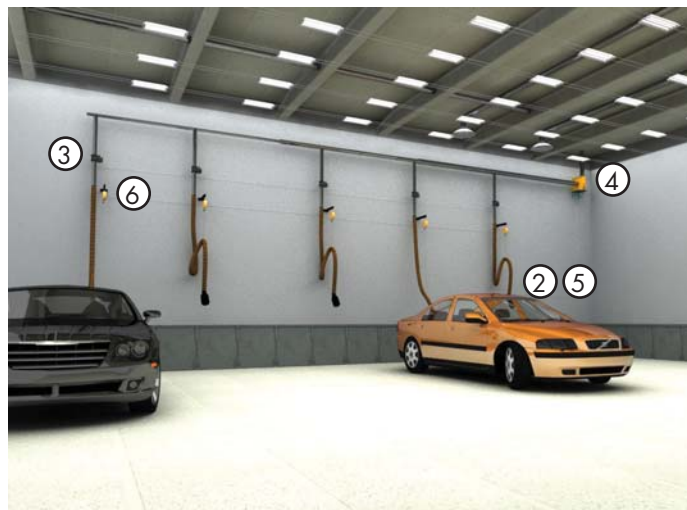
- ▶ Automatic operation, local and central
The local extractors will open and the central fan starts when the hose is pulled or run down.
When the hoses are retracted the local damper will close and the central fan will stop after the last local extractor is retracted.
- ▶ For medium sized garages
Suitable for garages with 4-10 workplaces.
- ▶ Medium to high frequency use
In applications where the exhaust extractors are used regularly on a daily basis.
- ▶ Cost savings
Downsizing of fan and duct system.
Savings on extracted heated air and fan power consumption thanks to automation.

Fully automated with on demand controls

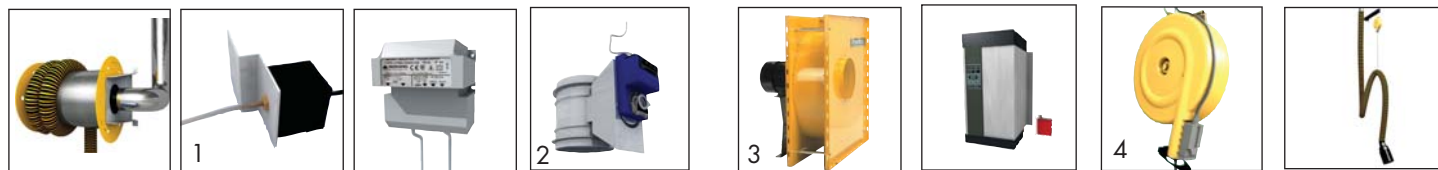
Suitable for medium or large sized garages (5 or more workplaces) or in workshops with high frequency use applications where an on demand automated control of the exhaust system is required. Micro switches installed on the hose reel or balancer are activated by the use of the extraction system and they will activate the local hose reel or hose drop extractor. At the same time the fan will start and the extracted air volume will be automatically adjusted to the correct level depending on how many extraction points being open at any particular time.



Hose reels with micro-switches MSR-24/2, motorised dampers MD-160, transformer 230/24V TR-24, DCV/TG controller and TEV-fan



FE hose drops, Balancers BRC with micro-switch BRC-MS, motorised dampers MD-160, transformer 230/24V TR-24, DCV/TG controller and TEV-fan



Fully automatic control system with demand control will operate your exhaust system by monitoring the amount of hose reels or hose drops being used in your system. When you pull down the hose, a signal will be sent from the hose reel or balancer mounted micro-switch activating the motor driven damper. At the same time the DCV-Controller will start the fan but only run it to meet the demand of air that is needed depending on how many hose drops or hose reels being used and it does so automatically. This is the state of the art extraction system with which you will reduce the size of your fan, duct work and energy costs for your exhaust system by working on demand instead of running it all the time.

- ▶ Fully automatic operation
The local extractor damper will open when the hose is pulled down and the fan starts automatically and runs on demand depending on how many extractors being used.
- ▶ For big garages
This solution is most suitable for garages with 5 or more workplaces
- ▶ High frequency use
In applications where the exhaust extractors are used regularly on a daily basis.
- ▶ Saves money, power and energy
Downsizing of fan and duct system.
Savings on extracted heated air and fan power consumption thanks to automation.
- ▶ Improved working environment
Fans will only run as much as needed.

Case Study

Customer

Pacific Detroit Diesel Allison in Ridgefield, WA.
 PlymoVent Dealer: Pacific Air
 Consultants, Inc. La Center, WA.

Problem

New building with high ceilings. Customer requires an effective and easy to operate vehicle exhaust system for 21 stations at temperatures up to 315°C/600°F. Since many station will rarely be in use at the same time, an energy saving concept for the fans was desired.

Solution and how we did it

A PlymoVent vehicle exhaust system, using 21 MHR-850-150 motorized hose reels with EG-150-10 and Stack-150-250 vertical stacker nozzles with cane accessory. Automatic dampers were installed for each motorized hose reel to deliver airflow only to the hose reels in use.

This resulted in 2 PlymoVent 7,5kW / 10Hp TEV fans instead of two larger 18,5kW / 25Hp fans otherwise needed.

When the hose is let down or brought up, a microswitch is tripped which opens or closes the damper. When the first hose is let down the fan automatically starts and when the last hose is recoiled the fan automatically stops.

PlymoVent equipment supplied:

- 21 MHR-850 - Motorised Exhaust Reels
- 21 MAP-150 - Hose mounting kits
- 21 EG-150-10 - Exhaust hoses
- 21 FHC-24 - Free hanging keysets
- 21 Stack-150-250 with TH-90
- 21 ICE-LC + MD-160 - Automatic dampers
- 21 MSR-24/2 - Micro-switches
- 2 TEV - Fans, 7,5 kW/10 HP
- 2 M-1000 - Fan Control units



Energy saving calculation

This example shows an application in Munich, Germany where the energy cost can be reduced by more than 50%!

System facts:

- * Average winter temperature 1,7°C degrees and average summer temperature is 13,9°C
- * 21 motorised hose reels
- * 750m³/h each hose reel
- * 9 working hours per day
- * 220 working days per year
- * Usage rate set to 40%. The system usage rate can be set as low as 40% due to the low numbers of extractors actually used at the same time.
- * 100% supply air
- * Inside temperature 19°C

If we run this size system 100%, the power for the electric motor and the heating cost would be approximately 8300 Euros per year.

When we on the other hand install intelligent control equipment and on demand controls, the running cost can be reduced by 5000 Euros.

This is how the calculation sheet looks.

Energy Saving Calculation

Quick guide

City	System	Average temp. Winter -2.2 °C	Average temp. Summer 11.7 °C	Cost for ...	At source extraction
Finland, Helsinki	Heating			Heating	8 379
Finland, Hymnkaa	Cooling			Fan electricity	1 690
Finland, Ilomantsi	Heating & Cooling			Total	10 069 EUR
Finland, Jyväskylä					
Finland, Järvenpää					
Finland, Kuopio					

Number of extraction points	Air volume per extraction point			Cost for ...	At source extraction with DCV
12 units	1000 m ³ /h			Heating	4 189
				Fan electricity	844
				Total	5 033 EUR

Working hours / day	Working days / year				
16 h	220 days			Solution 1 less Solution 2 = Savings	
				Heating	4 190
				Fan electricity	846
				Total	5 036 EUR

System usage rate	Supply air level	Inside temperature			
50 %	100 %	19 °C		Solution 1	Solution 2
				At source extraction	At source extraction with DCV

Extraction with hoods At source extraction At source extraction with DCV	At source extraction with DCV At source extraction with filtration At source extraction with filtration and DCV
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Make your own energy calculations at www.plymovent.com



FEB hose dropper on boom arm

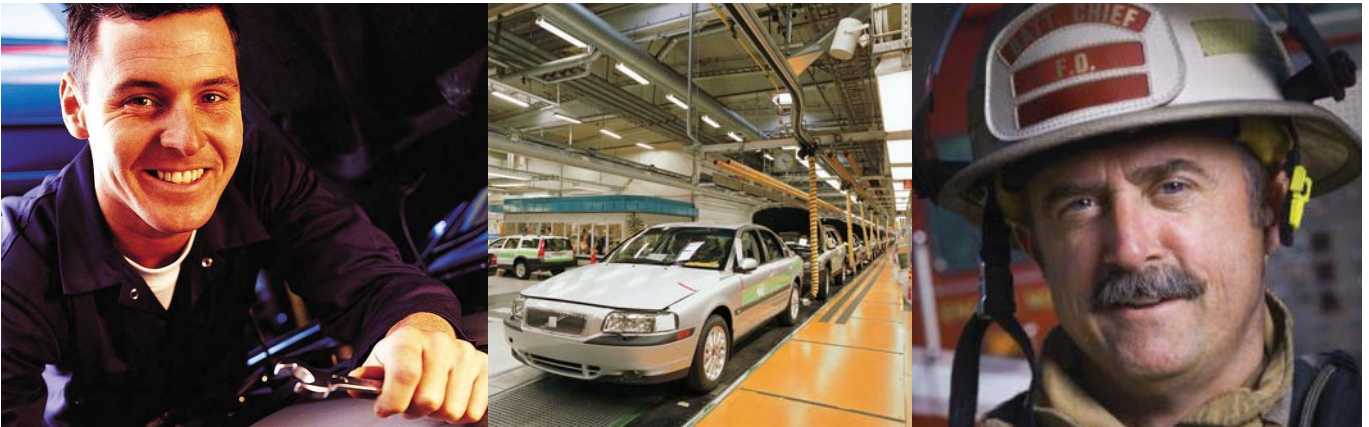


SBT emergency extraction system



Products within the vehicle exhaust range

- A variety of nozzles to fit most vehicles and applications.
- Hose drops in different configurations.
- Hose reels with spring return or motordriven models.
- For the rescue service there is a range of specially adapted exhaust extraction systems.
- PlymoVent offers a range of central fans as a complement to your exhaust system.



At source capture - Intelligent process ventilation

Our mission is to protect people all over the world from airborne contaminants. We have developed a unique technology to capture the pollution directly at the source, instead of allowing it to spread into the local environment. A more intelligent ventilation solution that gives you a safe and healthy working environment for your employees - and minimal investments and energy consumption.

For more information, visit us at www.plymovent.com.



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