

## CRT<sup>®</sup>(+) Diesel Particulate Filter System

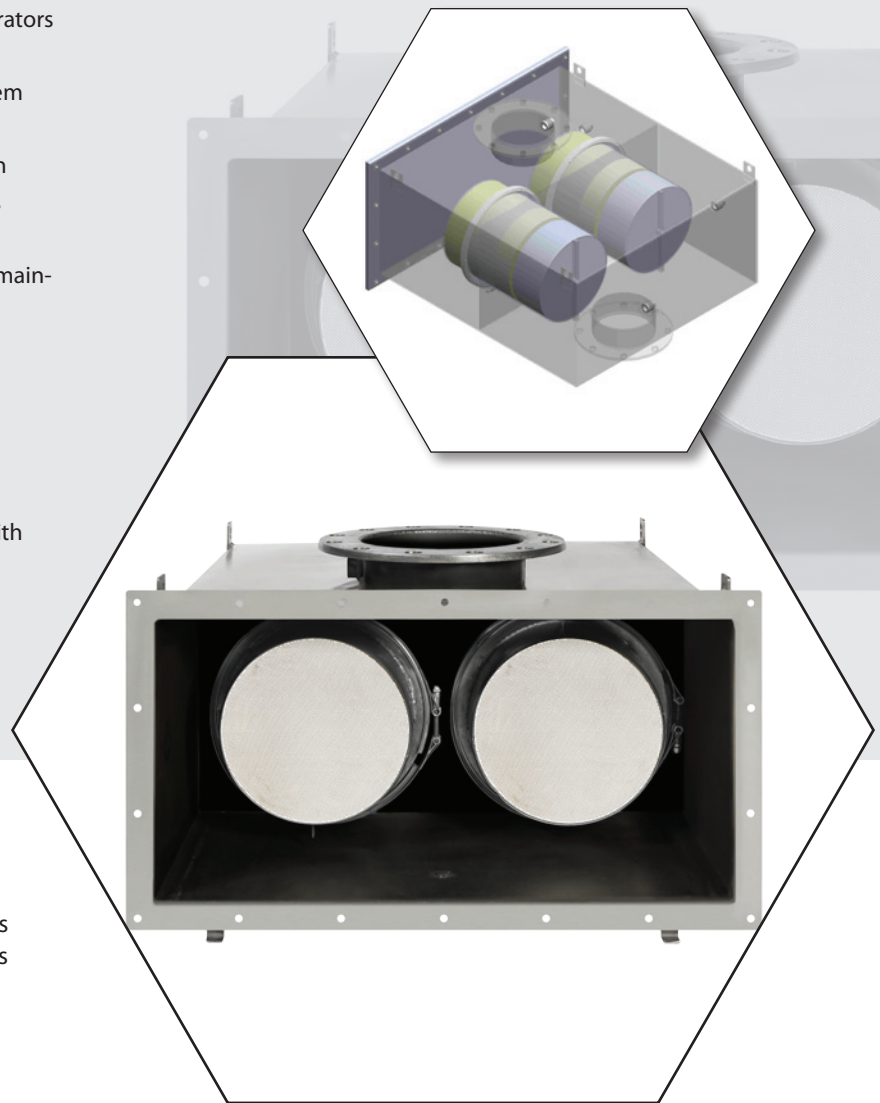
Johnson Matthey's CRT Diesel Particulate Filter optimizes engine performance with advanced filtration and exhaust gas regeneration.

### Benefits:

- >> CARB-verified for emergency backup and prime power generators
- >> Reduces PM by 85+%, HC by 70%, CO by 80%
- >> Johnson Matthey's SootAlert™ Monitor ensures the CRT system is always ready for full load engine operation
- >> The CRT(+) uses advanced hot exhaust gas filter regeneration that is simple and reliable, has no moving parts, and requires no supplemental heat or fuel
- >> The CRT(+)'s hot exhaust gas regeneration method helps to maintain the engine and to avoid wet stacking
- >> Compact, light-weight design with small footprint
- >> Multiple-filter design fits all engine sizes
- >> Quick installation, easy to service and maintain
- >> Compatible with ULSD (ultra-low sulfur diesel) or B20 biodiesel fuels
- >> Each system equipped with the CRT(+) diagnostic module with data logging, back pressure alarm capability with computer interface
- >> Proven on more than 5,000,000 on-road cars & trucks, 200,000 retrofitted trucks & off-road vehicles and 300 stationary generators since 1980s.

### Johnson Matthey CRT<sup>®</sup>(+) Continuously Regenerating Technology

The CRT<sup>®</sup>(+) Diesel Particulate Filter (DPF) is Johnson Matthey's patented technology for the control of PM and other emissions from diesel engines. The redesigned CRT<sup>®</sup>(+) DPF regenerates easily by the heat of the exhaust gas, and with the companion **SootAlert™ Monitor** your engine is assured of operational readiness whenever your emergency generator is called into action. In addition, the filters are easily accessible for cleaning or replacement.



**Johnson Matthey**  
Stationary Emissions Control

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The CRT(+) DPF has been verified by the California Air Resources Board (CARB) for application to all stationary diesel engines used for generating power, including:

- >> Emergency back-up power
- >> Prime power
- >> Demand response power

This advanced passive regenerating DPF system not only reduces PM by 85+%; it also reduces HCs by 70% and CO by 80% and meets the 2009 CARB NO<sub>2</sub> limit of 20%.

### Engineering Innovation Makes the CRT(+) DPF System Unique, Superior

With its low-profile design, the Johnson Matthey CRT(+) DPF is engineered for optimum efficiency and effectiveness. It is compact; easy to install; can accommodate multiple filters and the low height of the unit allows easier installation and access.

While other filter systems may require a catalyst coated filter or an external heating source, Johnson Matthey's CRT(+) DPF employs a DOC (Diesel Oxidation Catalyst) that is close-coupled to a non-catalyzed ceramic wall-flow soot filter. This allows for maximum catalyst and filter performance. The DOC converts NO into NO<sub>2</sub>. The NO<sub>2</sub> then combusts the soot that is collected on the filter to regenerate the filter.

### Compatible with All Typical Diesel Exhaust Temperatures

The operating temperature of the Johnson Matthey CRT(+) DPF is compatible with typical diesel exhaust temperatures, so no supplemental heat is required. The CRT(+) DPF employs passive regeneration to keep the filter clean during engine operation. By contrast, active-regeneration DPF's systems require an external heat source such as a fuel burner or electricity.

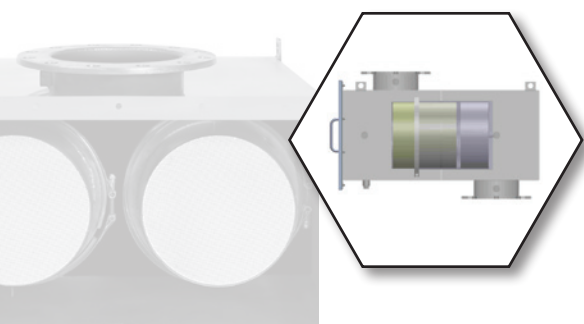


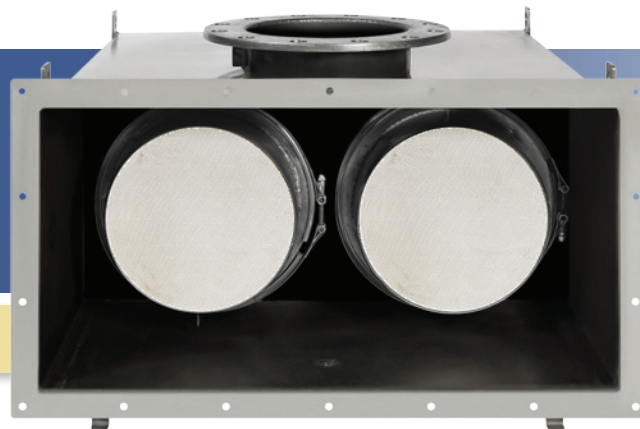
### Value of Johnson Matthey SootAlert™ Monitor

Each time you run your engine, Johnson Matthey's unique SootAlert Monitor checks the time, pressure, and temperature of the CRT system, and shows you a Green Light when the filter is clean, a Yellow Light when it has begun to accumulate soot, and a Red Light indicating that it is time to regenerate the CRT Filters.

Johnson Matthey's CRT System is sized for each engine application to allow for a minimum of 24 consecutive cold starts before filter regeneration is necessary (30 minutes per cold start) and 150 cold starts before cleaning ash from the filter is necessary. This means that an engine can be run once a month for a half-hour at idle or minimal load and not need to be regenerated for two years.

Regenerating the filters is easy—just run the engine under the recommended load until the Soot Alert light turns from Red to Green, and the CRT system is good for another 24 Cold Starts. This method also conforms to most engine manufacturers' recommendations to run the engine under load periodically to maintain the engine and to avoid wet stacking.





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## Key Attributes for Johnson Matthey's Passive CRT(+) DPF System

<b>Product Design</b>	Diesel Oxidation Catalyst (DOC) plus wall-flow ceramic filter
<b>Filter Regeneration Technology</b>	>> NO is converted to NO <sub>2</sub> over the DOC >> NO <sub>2</sub> combusts the soot, regenerating the filter
<b>Heat Source for Regeneration</b>	Engine exhaust
<b>Converts CO, HC and HAPs</b>	Yes
<b>Regeneration method matches Engine OEM recommended maintenance and helps to avoid wet stacking of engine</b>	Yes
<b>Regeneration Frequency</b>	Annual
<b>Proven Technology and In-Use Durability</b>	In-use since the 1980s >> 5 million installed on on-road cars and trucks >> 200,000 installed on retrofitted trucks and off-road equipment >> 300 installed on stationary generators
<b>Product Weight and Size</b>	Lightweight, compact, small footprint, silencing built-in
<b>Assured Filter Readiness for Operation</b>	SootAlert™ monitor assures that the CRT+ System is always ready for operation
<b>Maintenance</b>	Simple, no moving parts
<b>External Heat Source Required</b>	No
<b>Dedicated Power Source Required</b>	No
<b>Total Cost of Ownership over 10 years, including purchase price and fuel</b>	Lowest



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### Johnson Matthey's SootAlert™ Monitor Specifications

<b>Power Supply</b>	<ul style="list-style-type: none"> <li>&gt;&gt; Input voltage: 24VDC</li> <li>&gt;&gt; Permissible range: 20.4VDC to 28.8VDC with less than 10% ripple</li> </ul>
<b>Graphic Display Screen</b>	<ul style="list-style-type: none"> <li>&gt;&gt; LCD type: STN, LCD display</li> <li>&gt;&gt; Illumination backlight: white LED, software-controlled</li> <li>&gt;&gt; Display resolution: 128 x 64 pixels; Viewing area 2.4"</li> </ul>
<b>Keypad</b>	<ul style="list-style-type: none"> <li>&gt;&gt; Key type metal dome, sealed membrane switch; 20 keys</li> </ul>
<b>Removable Memory</b>	<ul style="list-style-type: none"> <li>&gt;&gt; Micro SD card: data logged at 5-min. intervals with up to 5 years of data storage capacity; export .csv files to Excel</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>&gt;&gt; Real-time clock functions (date and time)</li> <li>&gt;&gt; Battery replacement: coin-type 3V, lithium battery, CR2450</li> </ul>
<b>Weight/Dimensions</b>	<ul style="list-style-type: none"> <li>&gt;&gt; Weight: 2.27 kg (5.0 lbs.)</li> <li>&gt;&gt; Size: 240 x 223 x 150mm (9.52 x 8.85 x 5.95")</li> </ul>
<b>Environment</b>	<ul style="list-style-type: none"> <li>&gt;&gt; Operational temperature: 0 to 50°C (32 to 122°F)</li> <li>&gt;&gt; Storage temperature: -20 to 60°C (-4 to 140°F)</li> <li>&gt;&gt; Relative humidity: (RH) 10% to 95% (non-condensing)</li> </ul>
<b>Mounting Method</b>	<ul style="list-style-type: none"> <li>&gt;&gt; Panel mount IP65 rated enclosure</li> </ul>

### Proven Success

For 40 years, Johnson Matthey has been the global leader in the emissions control industry. When it comes to performance, Johnson Matthey's CRT technology has proven to be the superior solution for mobile and stationary diesel engines. The leader—Johnson Matthey—continues to be the best choice for all engine emissions control applications.



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