

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-393-2
Relating to Exemptions Under Section 27156
of the Vehicle Code

JOHNSON MATTHEY, INC.
CAM CONVERTER TECHNOLOGY UPGRADE KIT

Pursuant to the authority vested in the Air Resources Board (ARB) by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9;

IT IS ORDERED AND RESOLVED: That installation of the Cam Converter Technology (CCT) Upgrade Kit, manufactured by Johnson Matthey, Inc. of 460 East Swedesford Road, Wayne, Pennsylvania 19087-1880, has been found not to reduce the effectiveness of the applicable vehicle pollution control system, and therefore, the CCT Upgrade Kit is exempt from the prohibitions of Section 27156 of the Vehicle Code for installation on 1985-1993 model-year Detroit Diesel Corporation (DDC) 6V92TA DDEC two-stroke urban bus diesel engines with power ratings of 253 and 277 horsepower.

The CCT Upgrade Kit rebuilds all applicable engines to federal 1991-1993 model-year DDC specification. The CCT Upgrade Kit is exempt only when used in conjunction with other DDC engine rebuild parts. The required CCT Upgrade Kit parts and DDC rebuild parts are listed in the parts lists which are attached hereto and incorporated herein.

The CCT Upgrade Kit includes patented engine camshafts, CCT cylinder kits, CEM II catalytic muffler, and 0.015 offset key to retard fuel injection timing. For 1985-1987 model-year engines, the CCT Upgrade Kit also includes DDEC I to DDEC II conversions parts, fuel injectors, turbocharger, blower assembly, blower bypass valve, 40-tooth blower drive gear, and an ECM upgrade. For 1988-1990 model-year engines, the CCT Upgrade Kit also includes fuel injectors and an ECM upgrade.

For 1985-1990 model-year engines, DDC's revised certification word codes listed in Attachment A must be used. For 1991-1993 model-year engines, the revised certification word codes may be used.

This exemption is based on emission tests conducted by Johnson Matthey, Inc. on a 1992 model-year 6V92TA DDEC II engine rebuilt to a federal 1991 model-year urban bus engine configuration. Johnson Matthey, Inc. submitted the following federal transient heavy-duty diesel engine test results for a 552 cubic inch 6V92TA DDEC engine with a 277 horsepower rating:

	HC	CO	NOx	PM
	<u>(grams per brake horsepower-hour)</u>			
Baseline	0.46	1.18	4.88	0.188
With CCT Kit	0.2	0.6	4.98	0.091
<i>Emission Standard</i>	<i>1.3</i>	<i>15.5</i>	<i>5.0</i>	<i>0.1</i>

The test data show that the CCT Upgrade Kit did not adversely affect the exhaust emissions of the DDEC 6V92TA engine. The same emissions impact is expected when the CCT Upgrade Kit is installed on the engines for which the exemption is requested.

This Executive Order is valid provided that installation instructions for the CCT Upgrade Kit not recommend tuning the vehicle to specifications different from those submitted by the vehicle manufacturer.

Changes made to the design or operating conditions of the CCT Upgrade Kit, as exempt by the ARB, which adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of the CCT Upgrade Kit using an identification other than that shown in this Executive Order or for an application other than those listed in the attachments shall be prohibited unless prior approval is obtained from the ARB.

In addition to the foregoing, the ARB reserves the right in the future to review this Executive Order and the exemption provided herein to assure that the exempted add-on or modified part continues to meet the standards and procedures of Title 13, California Code of Regulations, Section 2222 et seq.

This Executive Order does not constitute any opinion as to the effect the use of the CCT Upgrade Kit may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF JOHNSON MATTHEY, INC.'S CCT UPGRADE KIT.

No claim of any kind, such as "Approved by the Air Resources Board," may be made with respect to the action taken herein in any advertising or other oral or written communication.

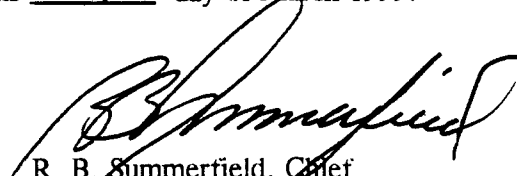
Violation of any of the above conditions shall be grounds for revocation of this Executive Order. The Executive Order may be revoked only after a ten-day written notice of intention to revoke the Executive Order, in which period the holder of the Executive Order may request in writing a hearing to contest the proposed revocation. If a hearing is requested, it shall be held within ten days of receipt of the request and the Executive Order may not be revoked until a determination after the hearing that grounds for revocation exist.

JOHNSON MATTHEY, INC.
CCT UPGRADE KIT

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Executive Order No. D-393-1, dated January 12, 1999, has been superseded and is of no further force and effect.

Executed at El Monte, California, this 24th day of March 1999.



R. B. Summerville, Chief
Mobile Source Operations Division

DDEC CCT™ PARTS LIST – UNIQUE / NON-UNIQUE

Unique Component	1985 - 87 DDEC I		1988 - 90 DDEC II		1991 - 93 DDEC II	
	DF #1	DF #2	DF #1	DF #2	DF #1	DF #2
CEM II	Yes	Y	Y	Y	Y	Y
Patented Camshafts	Y	Y	Y	Y	Y	Y
CCT Cylinder Kits	Y	Y	Y	Y	Y	Y
0.015 Offset Key	Y	Y	Y	Y	Y	Y
Fuel Injectors	Y	Y	Y	Y	No	N
ECM Program	Y	Y	Y	Y	N*	Y
40T Blower Gear	Y	Y	N	N	N	N
Turbocharger	Y	Y	N	N	N	N
Blower Assembly	Y	Y	N	N	N	N
Blower Bypass Valve	Y	Y	N	N	N	N
DDEC I to DDEC II	Y	Y	NA	NA	NA	NA

PARTS REQUIRED FOR DDEC I TO DDEC II CONVERSION

PART NUMBER	DESCRIPTION	QUANTITY
7570049	Module, Electronic Control	1
23502686	Harness, Sensors to disconnect (DDEC II)	1
16070629	Sensor, Air intake pressure	1
23503240	Sensor, TRS and SRS	1
25036693	Sensor, Oil, Water, Fuel, Air Temperature	1
23502922	Bracket, ECM Mounting (DDEC II coach)	1
23502894	Shield, ECM Heat	1
23502860	Cold Plate, ECM (DDEC II)	1
23502678	Harness, Injector Wiring –LB (DDEC II)	1
23502679	Harness, Injector Wiring –RB (DDEC II)	1

**JOHNSON MATTHEY
CCT™ 0.1 PM UPGRADE KIT
DDEC PARTS LIST**

253/277 RH DDEC			253/277 LH DDEC		
Q	PART NUMBER	DESCRIPTION	Q	PART NUMBER	
1	2RDA69RB	CAM RB	1	2LDA69RB	
1	2RDA69LB	CAM LB	1	2LDA69LB	
1	R23503263	TURBO	1	R23503263	
6	23505052	DOME KIT OR CROWN	6	23505052	
6	23508986	PISTON SKIRT	6	23508986	
6	23522064	RING SET	6	23522064	
6	23508383	LINER 0.85	6	23508383	
1	8928596	40T BLOWER DRIVE GEAR - HARDENED	1	8928596	
1	R8927039	BLOWER ASS'Y	1	R8927039	
1	8927187	BLOWER BYPASS	1	8927187	
6	R5234960P	INJECTOR REBUILT	6	R5234960P	
1	VARIOUS	CEM II™	1	VARIOUS	
1	JM0015	OFFSET KEY 0.015	1	JM0015	
HP / FUEL	ECM CERT #	TORQUE	HP/FUEL	ECM CERT #	
253 / DF1	261	775 @ 1300 RPM	253 / DF1	264	
253 / DF2	485	775 @ 1300 RPM	253 / DF2	482	
253 / DF1	260	880 @ 1300 RPM	253 / DF1	263	
253 / DF2	484	880 @ 1300 RPM	253 / DF2	481	
277 / DF1	259	880 @ 1300 RPM	277 / DF1	262	
277 / DF2	483	880 @ 1300 RPM	277 / DF2	480	



Johnson Matthey

Johnson Matthey CEM II Listing

CEM II Model	Latest Revision	CEM II Model	Latest Revision
Numer	Number	Numer	Number
CEM9601	S	CEM9645	-
CEM9602	P	CEM9646	A
CEM9603	G	CEM9647	-
CEM9604	-	CEM9648	D
CEM9605	N	CEM9649	C
CEM9606	I	CEM9650	C
CEM9607	I	CEM9653	B
CEM9608	H	CEM9654	B
CEM9609	G	CEM9655	-
CEM9610	H	CEM9656	-
CEM9611	F	CEM9667	A
CEM9612	K	CEM9668	A
CEM9613	H		
CEM9614	C		
CEM9615	D		
CEM9616	A		
CEM9617	A		
CEM9618	-		
CEM9619	-		
CEM9620	H		
CEM9621	B		
CEM9622	C		
CEM9623	D		
CEM9624	-		
CEM9625	B		
CEM9626	-		
CEM9627	-		
CEM9628	-		
CEM9629	J		
CEM9630	K		
CEM9631	H		
CEM9632	E		
CEM9633	F		
CEM9634	I		
CEM9635	E		
CEM9636	D		
CEM9637	C		
CEM9638	C		
CEM9639	E		
CEM9640	-		
CEM9641	-		
CEM9642	-		
CEM9643	C		
CEM9644	B		

Attachment A

Revised Certification Word Codes (CWC's) for Johnson Matthey's CCT Upgrade Kit

CWC*	Revised CWC
483	1126
480	1123
484	1127
481	1124
485	1128
482	1125
259	1110
262	1113
260	1111
263	1114
261	1112
264	1115

* Specified in Johnson Matthey's notification of intent to certify signed March 6, 1998 and other documents provided by Johnson Matthey.