



CARB Compliance Solutions

Options for meeting the California Air Resources Board requirements for Transport Refrigeration Units.



CARB - Are You Ready?

The California Air Resource Board (CARB) has passed a series of regulations called the Airborne Toxic Control Measure (ATCM) that will affect owners/operators of transport refrigeration units (TRUs) which operate in California.


- Compliance is required by January 1, 2010 for 2001 and older engine model year transport refrigeration units
- Thermo King offers a variety of options to help your business comply with CARB regulations, including new units and Tier 4i engine kits.

The TRU ATCM will require in-use TRU and TRU genset engines that operate in California to meet in-use performance standards that vary by horsepower range. These standards can be met by:

- Using an engine that meets the required engine certification standard
- Equipping the engine with the required level of verified diesel emission control strategy
- Using an Alternative Technology

Thermo King is the Green Leader

Thermo King offers industry-leading products and solutions that enable businesses around the world to reduce energy consumption and costs and decrease harmful environmental emissions.

The  symbol indicates a feature that delivers a significant environmental advantage over previous models or the competition.



Understanding the CARB TRU regulation

CARB Requirements

CARB is targeting 7 year old Transport Refrigeration Units for particulate emissions reduction.

Compliance required for 2001 and older TRU beginning January 1, 2010.

Compliance is based on engine model year and occurs 7 years after the model year.

Example: 2002 engine model year equipment must meet LETRU standards by January 1, 2010.

Example: 2003 engine model year equipment must meet ULETRU standards by December 31, 2010

Equipment upgraded to LETRU status must be upgraded to ULETRU status in an additional 7 years.

There are several different methods for becoming compliant with the CARB regulation.

Operators should have registered with CARB for an identification number by July 31, 2009. This is required for California based TRUs and optional for out-of-state based TRUs that operate in California.

Determining model year for CARB compliance:

The manufacture year of the TRU unit can be used if it and the engine model year differ by no more than one year. Example: A 2008 model year TRU with a 2007 engine is effectively a 2008 for CARB compliance.

When the engine model year is newer than the TRU model year, the engine year is used for CARB compliance. Example: A 2008 TRU with a 2009 engine is effectively a 2009 unit for CARB compliance.

(See TRU Advisory 08-01-R1 on CARB's website for full details.)

Key Definitions

CARB California Air Resources Board

TRU Transport Refrigeration Unit

ATCM Airborne Toxic Control Measure

Regulation within CARB that applies to in-use diesel engines

VDECS Verified Diesel Emissions Control System

Approved methods for complying with ATCM for reducing diesel emissions

PM Particulate Matter is soot from the diesel exhaust

LETRU Low Emission Transport Refrigeration Unit

At least 50% particulate matter reduction, Level 2 VDECS

ULETRU Ultra-Low Emission Transport Refrigeration Unit

At least 85% particulate matter reduction, Level 3 VDECS

CARB posts complete regulation, updates, FAQ, and other information at this website:

<http://www.arb.ca.gov/diesel/tru.htm>

What is your CARB

Compliance Schedule

Engine Model Year	In-use Compliance Year													
	07	08	09	10	11	12	13	14	15	16	17	18	19	20
2001 & older		L	L	L	L	L	L	L	U	U	U	U	U	U
2002			L	L	L	L	L	L	L	U	U	U	U	U
2003				U	U	U	U	U	U	U	U	U	U	U
2004					U	U	U	U	U	U	U	U	U	U
2005						U	U	U	U	U	U	U	U	U
2006							U	U	U	U	U	U	U	U
2007								U	U	U	U	U	U	U
2008									U	U	U	U	U	U
2009										U	U	U	U	U
2010											U	U	U	U
2011												U	U	U
2012													U	U
2013														U*

L= LETRU Low Emission Transport Refrigeration Unit

U= ULETRU Ultra-Low Emission Transport Refrigeration Unit

*<25 hp engines only, >25 hp engines do not require upgrades for 2013 model year.

Compliance Method and Recommendations

Compliance Method

Recommendation

Engine: Retrofit TRU with a new engine	Ideal solution to achieve compliance while reducing maintenance costs
Electricity: Use electric standby to eliminate diesel engine operation at a facility	Appropriate for units originally equipped with electric standby, must equip facility with plugs for each unit
New Equipment: Purchase new equipment	New units are EPA compliant. CARB regulation requires upgrades to units 7 or more years old
Fleet Management: Maintain 7 year trade cycle	Keeps equipment in compliance without upgrades, retrofits, or fuel changes
Fleet Management: Move affected equipment out of California	May be possible for national companies with routes or operations that do not require travel to California
Alternative Fuels: Use B100, CNG, Fuel Cells, or other CARB approved fuels	Difficult to use because of additional service requirements, record keeping, and availability of fuels

(See TRU advisory 08-08 on the CARB website for full details)

Thermo King CARB-C 2011

- CARB-compliant through 2018
- Lowest life cycle cost solution for CARB compliance
- 2-year warranty on dealer-installed engines



2011 Engine Characteristics

2011 Tier 4i Engine Part Number 1010377

Installation: Engine installation typically requires 10-12 hours. Most kits are complete with all parts required outside of routine shop supplies. Some kits require software chip or drive plate change.

Operation: Operates normally

Service: Normal engine service guidelines apply

Available for these applications

SB, SB III, SB III King of the Road, SB 100 ,
SB 190, SB 200 / 300 / 400, SB Classic,
Super II, Super II, Super II 190



EMI-3000 Fuel Filter **100325**
EMI-3000 Air Filter **119299**

Upgrade to EMI-3000 Extended Maintenance Interval Filters

Engine Retrofit Kits come equipped with EMI-3000 oil filters. Upgrade your fuel and air filters for maximum benefits!

- Reduces maintenance costs
- Reduces clean up and disposal costs
- Reduces environmental impact with less spillage and less waste
- Extends engine life

Compliant Engines



Yanmar > Yanmar Tier 4i Engine Retrofit Kits

	SB	Super II
Alternator Mounting	900403/923870/923866	900404
Throttle Solenoid	900405/900406	900405/900406
Engine Vibration Mounts	900401	900402
Battery Cables	416565 and 416566	416616 and 416615
Wiring Brackets	926727 and 924990	926727 and 924990

Isuzu > Yanmar Tier 4i Engine Retrofit Kits

Engine Retrofit Kits	Part #
SB	100397
Super II	100398

Coupler	
Large Shaft Compressor.....	772506
Small Shaft Compressor.....	772358

Software
Must use the right version for the controller

Controller	Required Software	Part #
TGVI	V1091	400896
MPIV	V0472	400671
Note: MPIV with V03xx software and 8 relay board use shunt relay kit 401014.		
MPIV MT	V2041	400946
MPV	V06xx	not necessary
MPVI	V40xx	not necessary

See your local Thermo King dealer for assistance in selecting the appropriate kits for your application.

Thermo King Truck Units with SmartPower™ Electric Standby



An alternative strategy for complying with the CARB regulations is to use electric standby at facilities where 3 or more refrigeration units operate. An electric standby equipped reefer can make short duration stops without plugging in when two or less TRUs are present at a time and the delivery stop is 30 minutes or less. This is a good option for truck fleets making deliveries to convenience stores and restaurants. See CARB regulation and FAQ for more information on electric standby record keeping and operation requirements.

See your Thermo King dealer for more information on new truck refrigeration units with SmartPower Electric Standby.

CARB-Compliant Reman Engines for Carrier® Trailer Applications



- ✓ A cost-competitive alternative for your CARB compliance needs
- ✓ Remanufactured with CARB-approved “match set” parts, resulting in a Tier II-compliant engine
- ✓ Approved for use in California through 2014
- ✓ 2-year warranty
- ✓ Backed by the nationwide Thermo King dealer network

Part #s	Models	Engine Type
P-26-00119-00CRM	Extra XT, Ultra XT, Ultra XTC, Genesis TM900/TM1000, Smart Air	134DI
P-26-00119-02CRM	Ultima, Ultima 53, Ultima XTC	134DI
P-26-00123-00CRM	Extra	114TV
P-26-00124-00CRM	Ultra, Ultra XL, Ultra Multitemp	134TV
P-26-00103-02CRM	Optima	9iTV

Engine Identification



CARB regulations are based on engine model year. Below are model identification photos for Tier I and Tier II models. Pre-Tier engines (1998 and older) did not have sticker identification

Tier I

Tier I engines have stickers generally installed on the unit frame rail and valve cover



2000 Tier I Isuzu



2003 Tier I Yanmar

Tier II

Tier II engines have stickers installed on the front of the oil pan and valve cover



Tier II Yanmar sticker location



2007 Tier II Yanmar

Expert Service and Support are as close as this sign.

Enjoy the support of the Thermo King Dealer Network.



Over 200 factory-authorized service centers nationwide—**find one nearby at www.thermoking.com**



Providing equipment and services to manage controlled-temperature environments for food and other temperature-sensitive products, our Climate Control Technologies sector encompasses both transport and stationary refrigeration solutions. Our product brands include Thermo King®, a world leader in transport temperature control systems, and Hussmann®, a manufacturer of refrigeration and food merchandising equipment.

www.thermoking.com www.hussmann.com www.ingersollrand.com

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