

1994 Mazda RX-7 Workshop Manual

WARNING

Servicing a vehicle can be dangerous. If you have not received service-related training, the risks of injury and property damage increase. The recommended servicing procedures for the vehicle in this workshop manual were developed with Mazda-trained technicians in mind. This manual may be useful to non-Mazda trained technicians, but a technician with our service-related training and experience will be at less risk when performing servicing operations. However, all users of this manual are expected to know general safety procedures.

This manual contains "Warnings" and "Cautions" applicable to risks not normally encountered in a general technician's experience. They should be followed to reduce the risk of injury and the risk that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that the "Warnings" and "Cautions" are not exhaustive. It is impossible to warn of all the hazardous consequences that might result from failure to follow the procedures.

The procedures recommended and described in this manual are effective methods of performing service and repair. Some require tools specifically designed for a specific purpose. Nonrecommended procedures and tools should include consideration for safety of the technician and continued safe operation of the vehicle.

Parts should be replaced with genuine Mazda replacement parts, not parts of lesser quality. Use of a nonrecommended replacement part should include consideration for safety of the technician and continued safe operation of the vehicle.

1994 Mazda RX-7 Workshop Manual

FOREWORD

A thorough familiarization with this manual is important for proper repair and maintenance.

It should always be kept in a handy place for quick and easy reference.

The contents of this manual, including drawings and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up-to-date.

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

All rights reserved. No part of this book may be reproduced or used in any form or by any means, electronic or mechanical — including photocopying and recording and the use of any kind of information storage and retrieval system — without permission in writing.

WARRANTY

The manufacturer's warranty on Mazda vehicles and engines can be voided if improper service or repairs are performed by persons other than those at an Authorized Mazda Dealer.

**Mazda Motor Corporation
HIROSHIMA, JAPAN**

APPLICATION:

This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN) shown on the following page.

CONTENTS

Title		Section
General Information		GI
Pre-Delivery Inspection and Scheduled Maintenance		A
Engine		C
Lubrication System		D
Cooling System		E
Fuel and Emission Control Systems		F
Engine Electrical System		G
Clutch		H
Manual Transmission		J
Automatic Transmission	Electronically-Controlled	K
Propeller Shaft		L
Front and Rear Axles		M
Steering System		N
Braking System		P
Wheels and Tires		Q
Suspension		R
Body		S
*Body Electrical System		T
*Heater and Air Conditioner Systems		U
Technical Data		TD
Special Tools		ST
Wiring Diagram (Form No.5273-10-93H) (Part No. 9999-95-022G-94)		Z

* Refer to the 1994 RX-7 Body Electrical Troubleshooting Manual (Form No. 1380-10-93H, Part No.9999-95-085F-94) for servicing of the body electrical components.

© 1993 Mazda Motor Corporation
Printed in the U.S.A. (8/93)
Form No. 1378-10-93H
Part No. 9999-95-018B-94

GENERAL INFORMATION

SAFETY INFORMATION	GI- 2
LUBRICANTS	GI- 2
JACKING POSITIONS	GI- 2
SAFETY STAND POSITIONS	GI- 2
VEHICLE LIFT POSITIONS	GI- 3
DYNAMOMETER	GI- 3
COMPRESSED AIR	GI- 3
HOW TO USE THIS MANUAL	GI- 4
ADVISORY MESSAGES	GI- 4
PREPARATION	GI- 4
REPAIR PROCEDURE	GI- 4
SYMBOLS	GI- 5
IDENTIFICATION NUMBER LOCATIONS ...	GI- 6
UNITS	GI- 6
ABBREVIATIONS	GI- 7
SAE STANDARDS	GI- 8
FUNDAMENTAL PROCEDURES	GI-11
PROTECTION OF THE VEHICLE	GI-11
PREPARATION OF TOOLS AND MEASURING EQUIPMENT	GI-11
SPECIAL TOOLS	GI-11
REMOVAL OF PARTS	GI-11
DISASSEMBLY	GI-11
REASSEMBLY	GI-12
ADJUSTMENTS	GI-13
RUBBER PARTS AND TUBING	GI-13
HOSE CLAMPS	GI-13
TORQUE FORMULAS	GI-13
VISE	GI-13
ELECTRICAL TROUBLESHOOTING	
TOOLS	GI-14
TEST LIGHT	GI-14
JUMPER WIRE	GI-14
VOLTMETER	GI-14
OHMMETER	GI-14
ELECTRICAL PARTS	GI-15
BATTERY CABLE	GI-15
CONNECTORS	GI-15
TERMINALS	GI-16
SENSORS, SWITCHES, AND RELAYS ...	GI-17
WIRING HARNESS	GI-17
FUSE	GI-17
INSTALLATION OF MOBILE TWO-WAY RADIO SYSTEM	GI-18
AUDIO ANTITHEFT SYSTEM	GI-18
TOWING	GI-19

SAFETY INFORMATION

LUBRICANTS

Avoid prolonged and repeated contact with petroleum-based oils. Used oil may irritate the skin, and can cause skin cancer and other skin disorders.

Wash thoroughly after working with oil. We recommend water soluble hand cleaners. Do not use kerosene, gasoline, or any other solvent, to remove oil from your skin.

If repeated or prolonged contact with oil is necessary, wear protective clothing. Soiled clothing, particularly those soiled with used oils and greases containing lead, should be cleaned at regular intervals.

JACKING POSITIONS

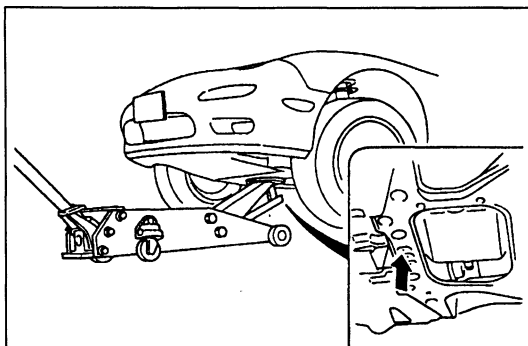
Warning

- **Improperly jacking a vehicle is dangerous. The vehicle can slip off the jack and cause serious injury. Use only the correct front and rear jacking positions and block the wheels.**

Use safety stands to support the vehicle after it has been lifted.

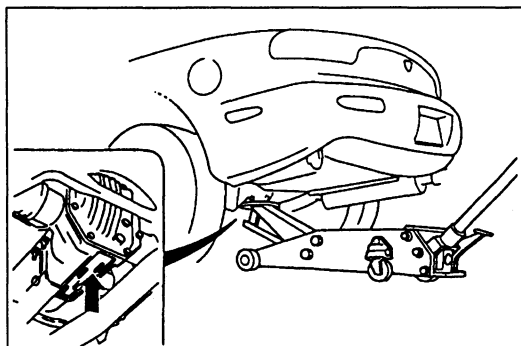
Front

At the center of the crossmember



Rear

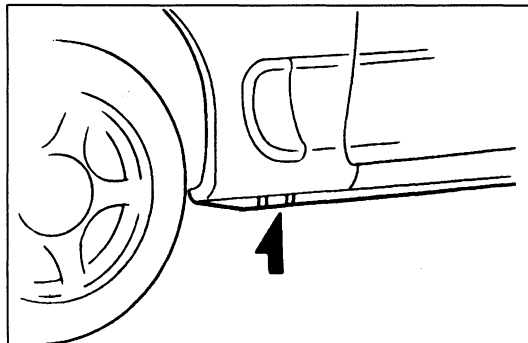
At the center of the crossmember



SAFETY STAND POSITIONS

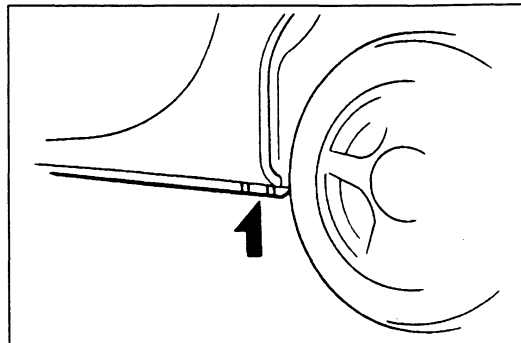
Front

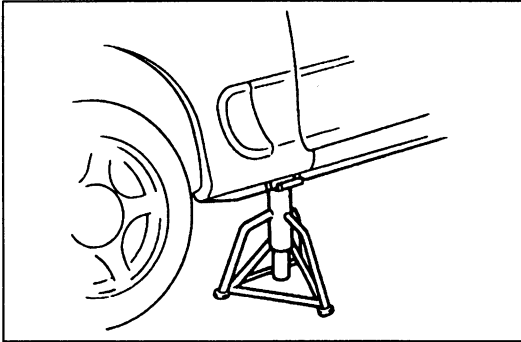
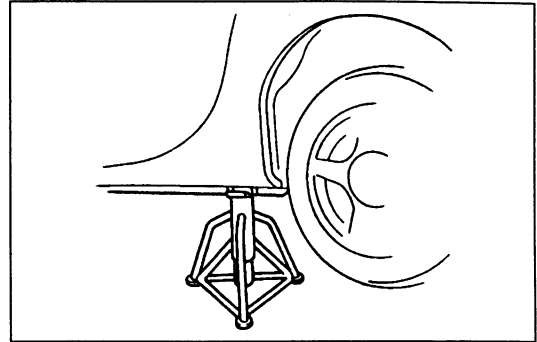
Both sides of the vehicle



Rear

Both sides of the vehicle



VEHICLE LIFT POSITIONS**Front****Rear**

GI

DYNAMOMETER

When test-running a vehicle on a dynamometer

- Place a fan, preferably a vehicle-speed proportional type, in front of the vehicle.
- Connect an exhaust gas ventilation unit.
- Cool the exhaust pipes with a fan.
- Keep the area around the vehicle uncluttered.
- Watch the water temperature gauge.

COMPRESSED AIR

When using compressed air to clean or remove parts

- Wear protective eyewear.
- Hold a rag over the opening to prevent parts from shooting out.
- Take precautions so that people around you are not struck by flying debris.

HOW TO USE THIS MANUAL

ADVISORY MESSAGES

You'll find several **Warnings**, **Cautions**, and **Notes** in this manual.

Warning

- A **Warning** indicates a situation in which serious injury or death could result if the warning is ignored.

Caution

- A **Caution** indicates a situation in which damage to the vehicle could result if the caution is ignored.

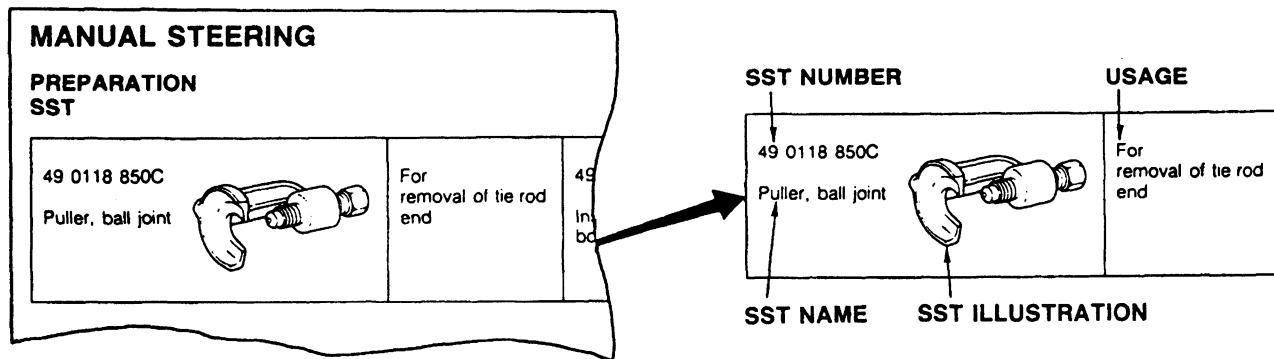
Note

- A **Note** provides added information that will help you to complete a particular procedure.

PREPARATION

This points out the needed **SSTs** for the service operation. It is best to gather all necessary **SSTs** before beginning work.

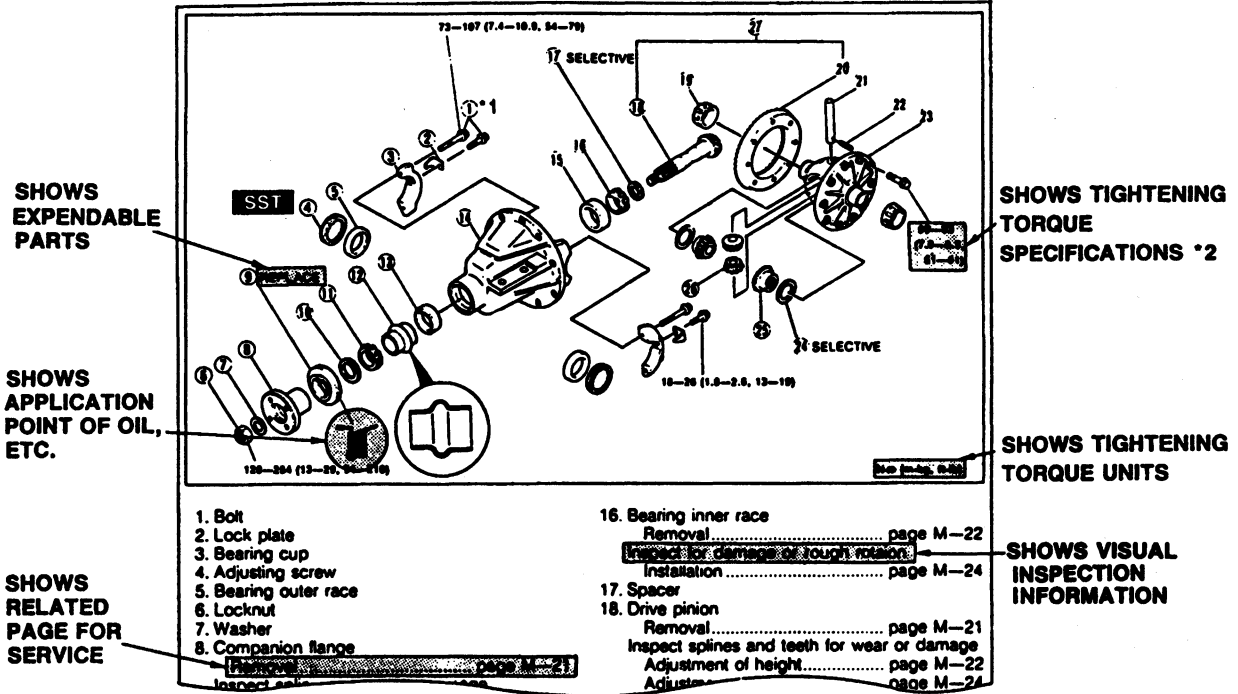
Example:



REPAIR PROCEDURE

1. Most repair operations begin with an overview illustration. It identifies the components, shows how the parts fit together, and describes visual part inspection. If a damaged or worn part is found, repair or replace it as necessary.
2. Expendable parts, tightening torques, and symbols for oil, grease, and sealant are shown in the overview illustration.
3. Pages related to service procedures are shown Under the illustration. Refer to this information when servicing the related part.

Example:



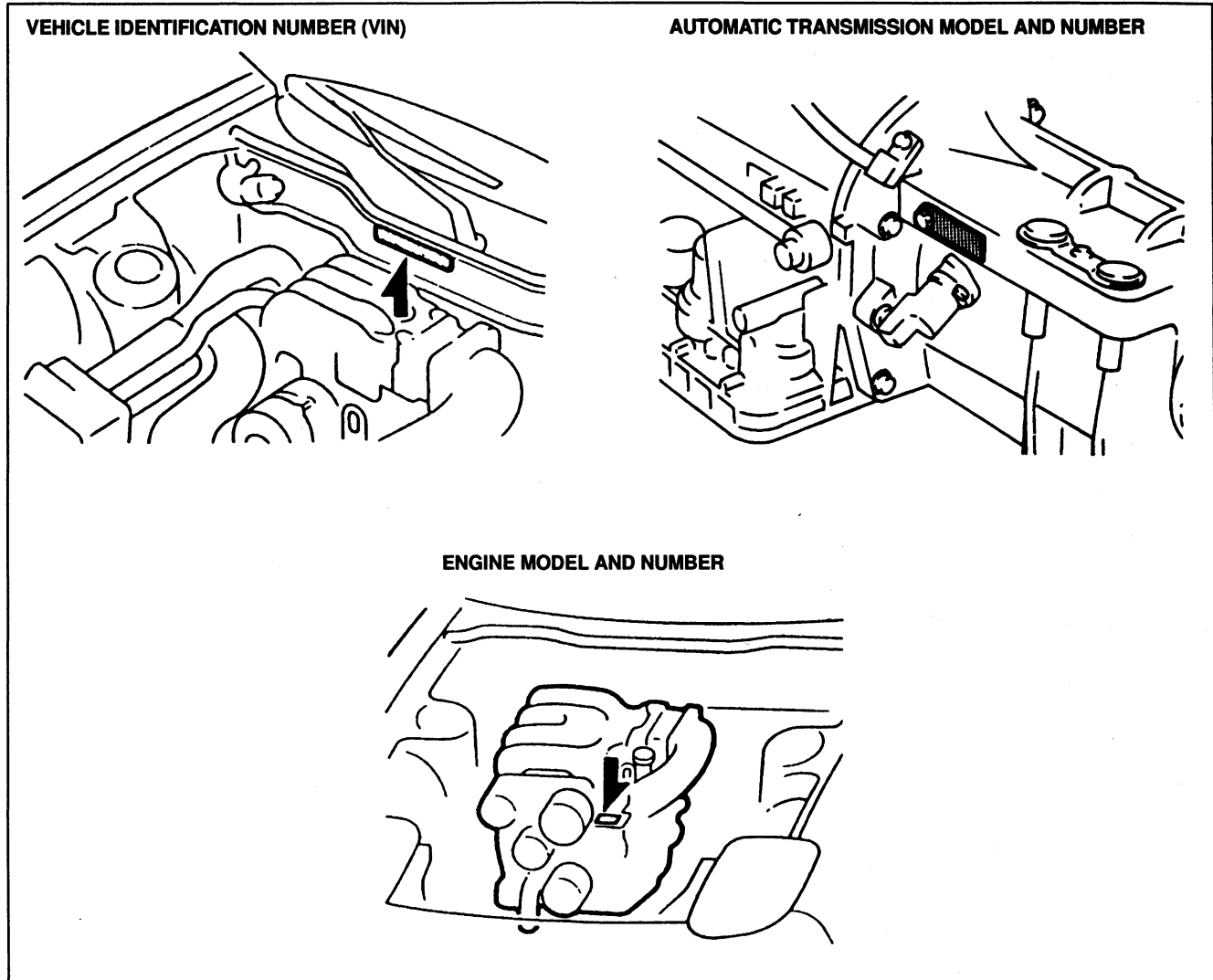
- * 1: The numbers (①, etc.) refer to part identification and servicing procedures.
- * 2: Units are in N·m {kgf·m, ft·lbf} unless otherwise specified.

SYMBOLS

There are six symbols indicating oil, grease, and sealant. These symbols show the points of applying such materials during service.

Symbol	Meaning	Kind
	Apply oil	New engine oil or gear oil as appropriate
	Apply brake fluid	FMVSS116: DOT-3
	Apply automatic transmission fluid	Dexron®II or M-III
	Apply grease	Appropriate grease
	Apply sealant	Appropriate sealant
	Apply petroleum jelly	Appropriate petroleum jelly

IDENTIFICATION NUMBER LOCATIONS



UNITS

Electrical current	A (ampere)
Electric potential	V (volt)
Electric power	W (watt)
Length	mm (millimeters) in (inches)
Negative pressure	kPa (kilo Pascal) mmHg (millimeters of mercury) inHg (inches of mercury)
Positive pressure	kPa (kilo Pascal) kgf/cm ² (kilogram force per square centimeter) psi (pounds per square inch)
Resistance	Ω (ohm)
Torque	N·m (Newton meter) kgf·m (kilogram force per meter) kgf·cm (kilogram force per centimeter) ft·lb (foot pounds) in·lb (inch pounds)
Volume	L (liter) US qt (U.S. quart) Imp qt (Imperial quart)

ABBREVIATIONS

AAS	Auto adjusting suspension
ABDC	After bottom dead center
ABS	Anti-lock braking system
ACC	Accessories
ACV	Air control valve
ASV	Air supply valve
AT	Automatic transmission
ATDC	After top dead center
ATF	Automatic transmission fluid
ATS	Ambient temperature sensor
AWS	Accelerated warm-up system
BAC	Bypass air control
BBDC	Before bottom dead center
BTDC	Before top dead center
EC-AT	Electronically controlled Automatic Transmission
ECPS	Electronically controlled power steering
ECU	Engine control unit
EGI	Electronic gasoline injection
E/L	Electrical load
ESA	Electronic spark advance
ESPS	Engine speed sensing power steering
ETS	Evaporator temperature sensor
EX	Exhaust
IC	Integrated circuit
IGN	Ignition
IN	Intake
INT	Intermittent
ISC	Idle speed control
LH	Left hand
LSD	Limited slip differential
M	Motor
MOP	Metering oil pump
MT	Manual transmission
OD	Overdrive
OFF	Switch off
ON	Switch on
PBV	Proportioning bypass valve
PCTS	Passenger compartment temperature sensor
PCV	Positive crankcase ventilation
PRC	Pressure regulator control
P/S	Power steering
P/W	Power window
RH	Right hand
RTS	Reduce torque signal
SLS	Slip lockup signal
SR	Sensor rotor
SST	Special service tool
ST	Start
SW	Switch
TDC	Top dead center
TNS	Tail number side
TRS	Torque reduced signal
VDI	Variable dynamic effect intake
VRIS	Variable resonance induction system
WSS	Wheel speed sensor
WTS	Water temperature sensor

GI

SAE STANDARDS

In accordance with new regulations, SAE (Society of Automotive Engineers) standard names and abbreviations are now used in this manual. The table below lists the names and abbreviations that have been used in Mazda manuals up to now and their SAE equivalents.

Engine and Emission Systems

Previous Standard		SAE Standard		
Abbreviation	Name	Abbreviation	Name	Remark
—	Accelerator Pedal	AP	Accelerator Pedal	
—	Air Cleaner	ACH	Air Cleaner Housing	
—	Air/Fuel (A/F) Solenoid Valve	MCS	Mixture Control Solenoid	F2 Carburetor
—	Airflow Meter	VAF	Volume Airflow Sensor	
—	Airflow Sensor	MAF	Mass Airflow Sensor	
—	Alternator	ALT	Alternator	
—	Atmospheric Pressure Sensor	BARO	Barometric Absolute Pressure Sensor	
—	Carburetor	CARB	Carburetor	
—	Catalytic Converter	OC	Oxidation Catalyst	
		TWC	Three-Way Catalyst	
		WU-TWC	Warm Up Three-Way Catalyst	#1
—	Circuit Opening Relay	FPR	Fuel Pump Relay	#2
—	Cooling Fan Control	CFC	Coolant Fan Control	
—	Crank Angle Sensor	CPS	Crankshaft Position Sensor	
—	Diagnosis Connector	DLC	Data Link Connector	
—	Direct Ignition	DLI	Distributorless Ignition	
EGI	Electronic Gasoline Injection System	CIS	Continuous Fuel Injection System	
—	Electronic Spark Ignition	EI	Electronic Ignition	#3
—	EGR Modulator Solenoid	EGRC	EGR Function Control	
—	EGR Gas Sensor	EGRS	EGR Function Sensor	#4
	EGR Position Sensor			
	EGR Position Switch			
ECU	Engine Control Unit	PCM	Powertrain Control Module	#5
		PCME	Powertrain Control Module (Engine)	
—	Engine Modification	EM	Engine Modification	
—	Engine Speed	RPM	Engine Speed	
—	Evaporative Emission Control System	EVAP	Fuel Evaporative System	
—	Exhaust Gas Recirculation System	EGR	Exhaust Gas Recirculation	System name
—	Feedback System	CLS	Closed Loop System	
—	Flexible Fuel	FF	Flexible Fuel	
—	Fuel Pump	FP	Fuel Pump	
—	IC Regulator	VR	Voltage Regulator	

#1: Directly connected to exhaust manifold

#2: In some models, there is a "Fuel Pump Relay" that controls pump speed.
That relay is now called the "Fuel Pump Relay (Speed)".

#3: Controlled by the PCME (PCM)

#4: EGR valve controller device name

#5: Device that controls engine and powertrain