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Engine/transmission assemblies

Audi 100
4-Door sedan

Type: 44
Model: 443

Audi 200
4-door wagon

Type: 44
Model: 445

Engine assemblies		Engine code	BHP net	
Displacement	Fuel injection system	letters	(SAE)	RPM
2.22 Liter	CIS Turbo	MC	157	5500
2.22 Liter (20 Valve)	Motronic	3B	217	5700
2.3 Liter	CIS-E	NF	130	5500

Transmission assemblies	Transmission type	Transmission code letters	Engine size and code	Vehicle application
Manual 5-Speed	012	AMK	2.3L (NF)	Audi 100
	016 (2WD)	APV	2.3L (NF)	Audi 200
			2.22L (3B)	
	01A	AML	2.3L (NF)	Audi 100 Quattro
	016 (AWD)	AOA	2.22L (MC)	Audi 200 Quattro
			2.22L (3B)	Audi 200 Quattro (20 Valve)
Automatic 3-speed	087	REE	2.22L (MC)	Audi 100 200
4-speed	097	AEK	2.3L (NF)	Audi 100

CAUTION
QUATTRO TRANSMISSIONS

When checking engine performance, only use dynamometer designed to brake all four wheels at the same time

Type/model identifications

Model code	Model years	Designation		Body style	Trans	Engine code*
		USA	Canada			
4431H3	1989	Audi 100E		4-Door	Auto	NF
443FH4	1989	Audi 100E		4-Door	5-Spd	NF
443FH3	1989-1990	Audi 100		4-Door	Auto	NF
443EH3	1989-1990		Audi 100	4-Door	Auto	NF
443EH4	1989		Audi 100	4-Door	5-Spd	NF
445EH4	1989		Audi 100	4-Door Wagon (Avant)	5-Spd	NF
445FH4	1989	Audi 100		4-Door Wagon	5-Spd	NF
445EH3	1989-1990		Audi 100	4-Door Wagon (Avant)	Auto	NF
445FH3	1989	Audi 100		4-Door Wagon	Auto	NF
443EH5	1989		Audi 100 Quattro	4-Door	5-Spd	NF
443FH5	1989-1991	Audi 100 Quattro		4-Door	5-Spd	NF
447EB4	1989		Audi 200 Turbo	4-Door	5-Spd	MC
447FB4	1989	Audi 200		4-Door	5-Spd	MC
447EB3	1989		Audi 200 Turbo	4-Door	Auto	MC
447FB3	1989 1990-1991	Audi 200 Audi 200 Turbo		4-Door	Auto	MC
447EB5	1989-1990		Audi 200	4-Door Quattro Turbo	5-Spd	MC
447FB5	1989 1990	Audi 200 Quattro Audi 200 Quattro Turbo		4-Door	5-Spd	MC

Type/model identifications

Model code	Model years	Designation		Body style	Trans	Engine code*
		USA	Canada			
447AB5	1989		Audi 200 Quattro Wagon (Avant) Turbo	4-Door	5-Spd	MC
447CB5	1989 1990	Audi 200 Quattro Audi 200 Quattro Turbo Wagon		4-Door	5-Spd	MC
443FH8	1991	Audi 100		4-Door	Auto (4-Spd)	NF
447C55	1991	Audi 200 Quattro 20V Turbo		4-Door Wagon	5-Spd	3B
447F55	1991	Audi 200 Quattro 20V Turbo		4-Door	5-Spd	3B
443EH8	1991		Audi 100	4-Door	Auto	NF
443EH5	1991		Audi 100 Quattro	4-Door	5-Spd	NF
447EB3	1991		Audi 200 Turbo	4-Door	Auto	MC
447EB5	1991		Audi 200 Quattro	4-Door	5-Spd	MC

*Engine Code KW @ RPM (BHP)

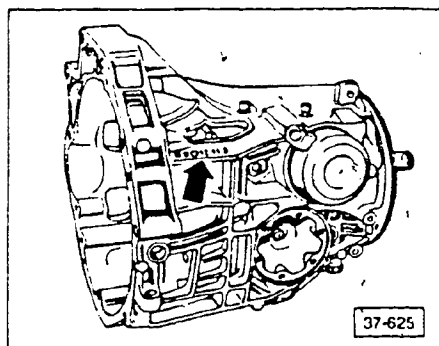
NF	100 @ 5600 (130)
MC	121 @ 5500 (157)
3B	162 @ 5700 (217)

Transmission, identifying

General Information

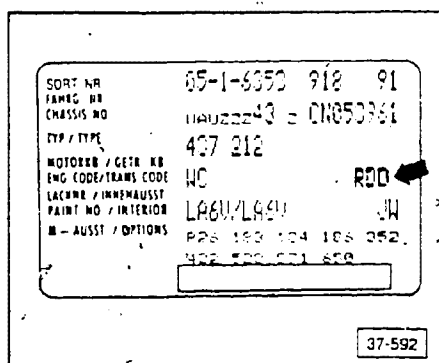
Note

The transmission code is stamped into the reinforcement rib (arrow).



Note

Transmission code letters appear on the vehicle data sticker, also (arrow).



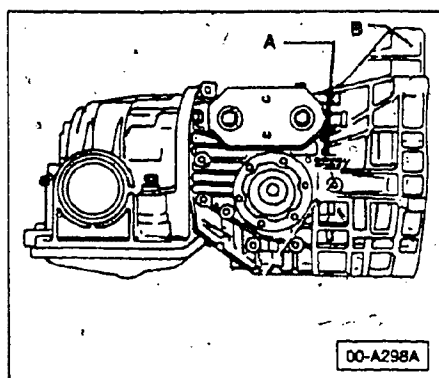
Automatic transmission (087)

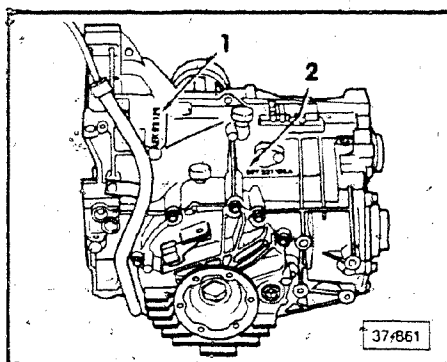
A = transmission type number 087

B = transmission code letters and date of manufacture

Example:

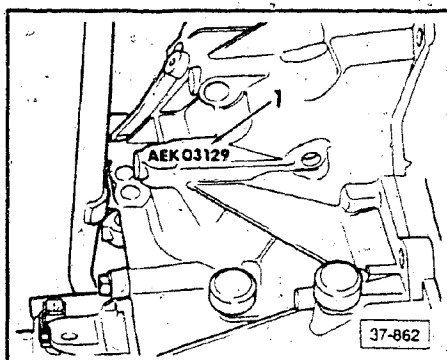
REH	08	03	8
code letters	day	month	year (88)





Automatic transmission (097)

- 1 — transmission code letters and date of manufacture
- 2 — transmission type



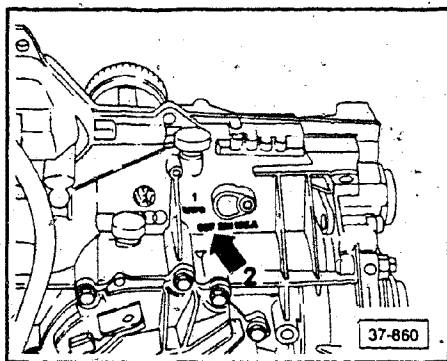
- 1 — transmission code letters and date of manufacture

Example

AEK	03	12	9
code letters	day	month	year (89)

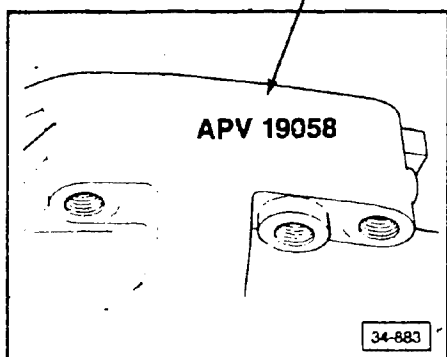
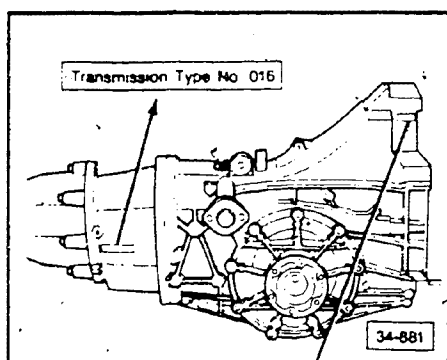
Note

Transmission code letters also appear on vehicle data stickers.



- 2 — transmission type: 097

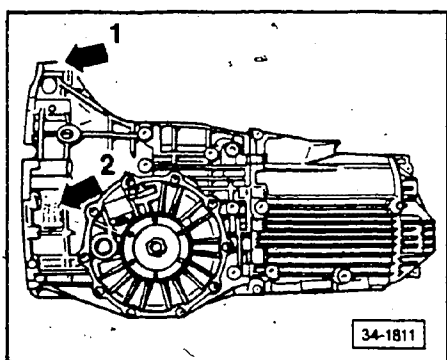
Manual transmission (016)



Transmission code letters and date of manufacture

Example

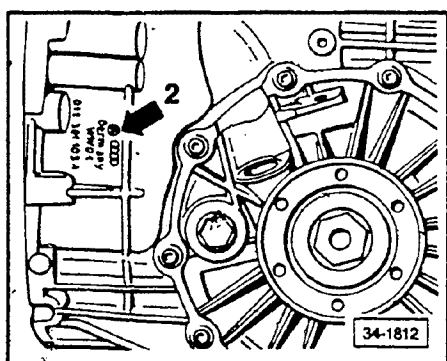
APV	19	05	8
code letters	day	month	year (88)



Manual transmission (012)

1 — transmission code letters

2 — transmission type

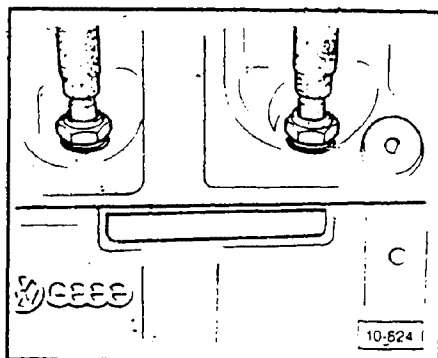


2 — transmission type: 012

Engine/vehicle identification

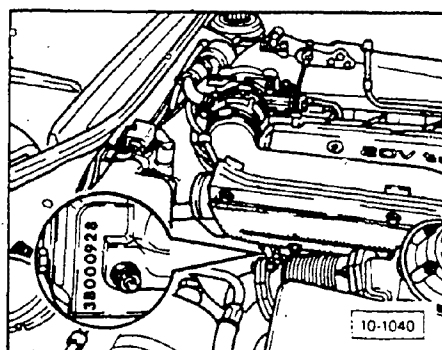
Engine code (NF, MC)

- on engine block — left side



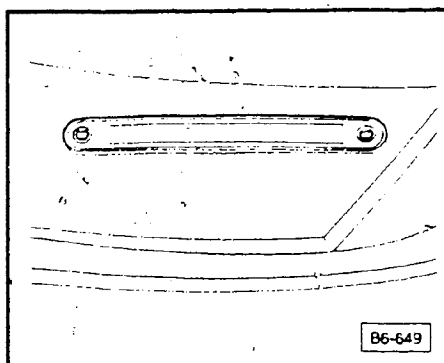
Engine code (3B)

- at rear of engine block — right side

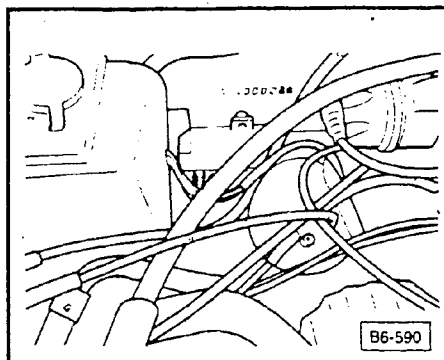


Vehicle identification number (VIN)

- on instrument panel — driver's side



- in engine compartment on cowl panel

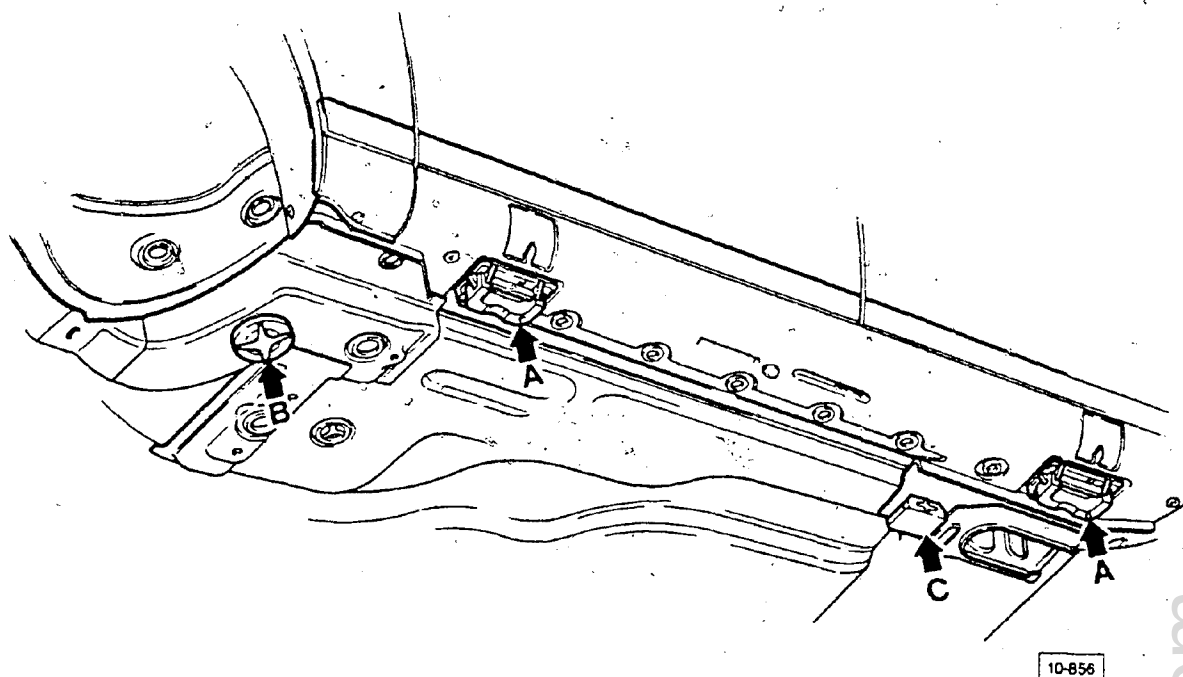


Vehicle identification number (VIN)

VIN explained: (Example shown only)

W	A	U	F	B	O	4	4	2	K	N	1	0	0	1	0	3
①			②	③	④	⑤	⑥	⑦	⑧	⑨						

Position	Digits	Description	Code
①	1-3	Manufacturer's identification	WAU Passenger Car European Production
②	4	Line and body type	F Sedan 4-Door H Turbo
③	5	Engine	B 2.3 liter 130 HP turbo gas C 2.22 liter 157 HP gas E 2.22 liter 217 HP turbo gas
④	6	Passenger restraint system	O Active restraint system
⑤	7-8	Model	44 100 200
⑥	9	Check digit (no significance for mechanic)	0 through 9 or X for 10
⑦	10	Model year	K 1989 L 1990 M 1991
⑧	11	Manufacturing plant	N Necharsulm A Ingolstadt
⑨	12-17	Sequential production number	000 001 thru 999 999

**WARNING**

When removing components such as rear axle, fuel tank, spare wheel and rear lid, place additional weight on rear end of car, or anchor car to hoist to prevent tipping, if center of gravity changes.

CAUTION

Before driving onto lift, check for clearance between lifting arms and tires to avoid cutting sidewalls.

Extend arms and check to see if arms are long enough to contact lifting point. Lift only at points shown.

Lifting vehicle with hoist/floor jack**Note**

When lifting vehicle with floor jack, use same lifting points as with hoist.

CAUTION

Do not lift vehicle by engine, transmission, front or rear suspension. Doing so may result in damage to components.

In the contact area for the lift arms, rubber contact plates are installed. Only lift car at these locations.

Take care to avoid damaging critical components which are close to the lift points.

A = Lifting points with vehicle jack only

B = Lifting point, front, with hoist/floor jack

C = Lifting point, rear, with hoist/floor jack

Emergency towing, front (front wheel drive/Quattro)**CAUTION**

- whenever possible, tow with front wheels off ground
- if a car with automatic transmission must be towed with rear wheels lifted because of extensive damage, dollies are required under front wheels to avoid damage to transmission due to lack of lubrication
- car may be lifted in rear and moved to position for front hook-up

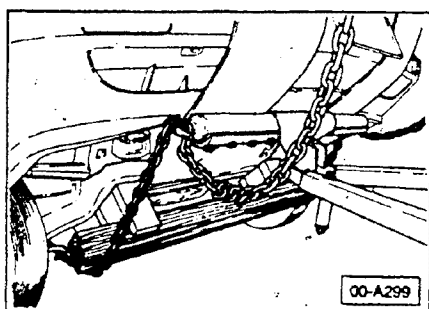
CAUTION**Quattro only**

Whenever possible, tow with front wheels off ground. The central and rear differential must be "unlocked" during towing.

Due to Torsen central differential, note the following:

- towing speed must **NOT** exceed 30 mph (48 Kph)
- towing distance must **NOT** exceed 30 miles (48 km)
- if distance exceeds 30 miles (48 km), vehicle **MUST** be transported on a flat bed

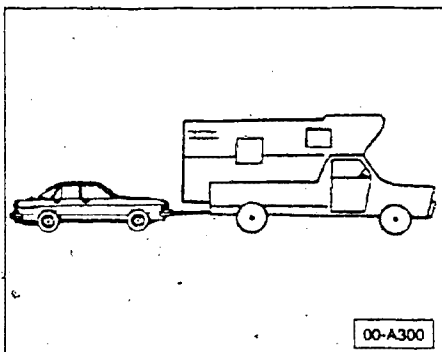
Consult owners manual for "unlocking" information.

**Front hook-up procedure**

- wrap chains around subframe, engage grab hooks
- position 4 x 4, locate spacer blocks under stabilizer mount
- attach chain in 35th link
- tow vehicle with 6 in. ground clearance under front tires, bumper position against slings

Rear hookup

- car may be lifted in rear and moved to position for front hookup
- no towing with rear hookup permissible

**Long distance towing****Vehicles with automatic transmissions**

Vehicles with automatic transmissions may be towed forward (in driving direction) behind other vehicles (motor homes, etc.) at speeds up to 30 mph for a maximum of 30 miles.

CAUTION

Towing vehicle at more than 30 mph and/or for greater distance than 30 miles will damage automatic transmission, due to lack of lubrication.

If towing speed will be greater than 30 mph or distance greater than 30 miles, temporary modifications to vehicle are required as follows:

- remove driveshaft assemblies
- remove outer CV joints from driveshaft assemblies
- install outer CV joint in wheel bearing housing and secure hub with nut
- install outer CV joint boot
- seal boot small opening against water and dirt
- wrap driveshafts and store in vehicle

Vehicles with manual transmissions (not Quattro vehicles)

There are no restrictions on speed or distance when towing manual-transmission cars behind other vehicles.

Quattro**CAUTION**

- towing speed must **NOT** exceed 30 mph or distance of 30 miles
- vehicle **MUST** be flat-bedded for any distance in excess of 30 miles
- if using a towing firm, advise them of these restrictions.

Identification of body panels (theft protection)

To discourage the theft and resale of vehicle components, the National Highway Traffic Safety Administration has enacted the Motor Vehicle Theft Law Enforcement Act.

This law requires that major vehicle components be marked with their respective Vehicle Identification Number.

The following originally installed parts will be marked by the factory with a tamper proof label using the complete V.I.N. and the "Audi" symbol:

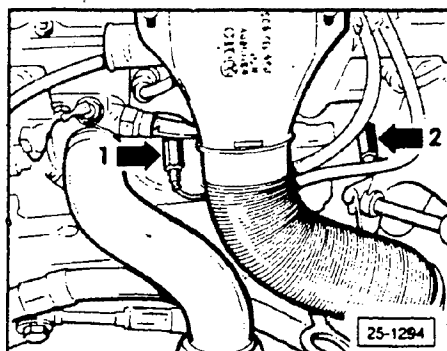
- | | |
|-----------------------|---------------------------|
| 1. Engine | 9. Right rear door |
| 2. Transmission | 10. Front bumper |
| 3. Left front fender | 11. Rear bumper |
| 4. Right front fender | 12. Left rear side panel |
| 5. Hood | 13. Right rear side panel |
| 6. Left front door | 14. Rear deck lid |
| 7. Right front door | |
| 8. Left rear door | |

The Motor Vehicle Theft Law Enforcement Act also requires that all REPLACEMENT parts for the above components be factory marked with a tamper proof label bearing the "Audi" symbol and an "R DOT" (replacement) designation:

The replacement part identification label is covered with a transparent mask to prevent it from being damaged during repairs.

REMOVE MASK AFTER PAINTING OR UNDERCOATING TO MAKE LABEL VISIBLE BEFORE DELIVERING THE CAR TO CUSTOMER.

Identifying the modified turbo engine (engine code MC)



Location of knock sensors on modified MC engine

Note

Starting in November 1988 as a running change, the MC turbo engine was modified. Most of the changes were internal; however, the modified engine can easily be identified as having **two** knock sensors (**arrows**).

Technical data

2.22L Engine - Gasoline Turbo

Engine code	MC
Start of production	June 1988
Displacement	2.22 liter (136 cu. in.)
Power output	121 kW (157 BHP SAE) @ 5500 RPM
Torque	225 Nm (166 ft. lb.) @ 3000 RPM
Cylinder bore diameter	81 mm (3.19 in.)
Stroke	86.4 mm (3.40 in.)
Compression ratio	7.8:1
Valve timing at 1 mm valve lift and zero clearance	
inlet opens before TDC	0°
inlet closes after BDC	41.1°
outlet opens before BDC	40.0°
outlet closes before TDC	1.1°
Fuel octane AKI minimum recommended	87 91
Fuel injection	CIS
Exhaust gas recirculation	No
Catalytic converter	Yes
Oxygen regulation	Yes
Turbocharger	Yes

Technical data

2.22L Engine — Gasoline Turbo

Engine code	MC
Start of production	November 1988
Displacement	2.22 liter (136 cu. in.)
Power output	121 kW (157 BHP SAE) @ 5500 RPM
Torque	240 Nm (177 ft. lb.) @ 3000 RPM
Cylinder bore diameter	81.0 mm (3.19 in.)
Stroke	86.4 mm (3.40 in.)
Compression ratio	8.4:1
Valve timing at 1 mm valve lift and zero clearance	
inlet opens before TDC	4°
inlet closes after BDC	41°
outlet opens before BDC	46°
outlet closes before TDC	5°
Fuel octane AKI minimum recommended	87 91
Fuel injection system	CIS
Catalytic converter	Yes
Oxygen sensor	Yes
Turbocharger	Yes

Technical data

2.22L Engine — Gasoline Turbo 20 Valve

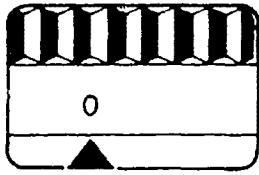
Engine code	3B
Start of production	May 1990
Displacement	2.22 liter (136 cu. in.)
Power output	162 KW (217 BHP SAE) @ 5700 RPM
Torque	309 Nm (228 ft. lb.) @ 1950 RPM
Cylinder bore diameter	81.0 mm (3.19 in.)
Stroke	86.4 mm (3.40 in.)
Compression ratio	9.3:1
Valve timing at 1 mm valve lift and zero clearance	
intake valve opens before TDC	3°
intake valve closes after BDC	25°
exhaust valve opens before BDC	42°
exhaust valve closes before TDC	9°
Fuel octane AKI minimum recommended	87 91
Fuel injection system	CIS-E Motronic
Catalytic converter	Yes
Oxygen sensor	Yes
Turbocharger	Yes

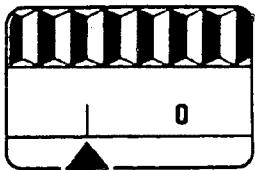
Technical data

2.3L Engine – Gasoline

Engine code		NF
Start of production	from	8/86
Cylinders	no.	5
Displacement	liters	2.30
Output	KW @ RPM (BHP)	100/5600 (130)
Torque	Nm @ RPM (ft lb)	190/4000 (140)
Bore	bore 0 mm	82.5
Stroke	mm	86.4
Compression ratio	:1	10.0
Valve timing at 1 mm valve lift and zero clearance	inlet opens before TDC inlet closes after BDC outlet opens before BDC outlet closes before TDC	0° 41.1° 40.0° 1.1°
Fuel octane	AKI minimum recommended	87 91
Fuel injection		CIS-E III
Exhaust gas recirculation		California only
Catalytic converter		Yes
Oxygen regulation		Yes
Turbocharger		Yes

*use of 87 AKI results in poor performance

Tuneup specifications		U.S.A./Calif./Canada
Engine code letters		MC
Start of production		November 1988
Ignition distributor		035 905 206 AF
Ignition timing		0° TDC
Timing mark location: on flywheel (Not adjustable; marks on distributor body and aperture rotor should line up with cylinder no. 1 at TDC)		
Centrifugal advance (vacuum advance/retard)		Intake air temperature, intake manifold pressure and position of throttle plate are monitored by control unit for electronic ignition after each engine rotation. Checking not necessary.
Firing order		1 - 2 - 4 - 5 - 3
Spark plugs	Bosch	WR7DS or W7DTC
	Beru	RS35 or 14-7DTU
	Champion	N8GY or N9BYC
	electrode gap mm (in.)	0.7 ± 0.1 (0.028 ± 0.004)
	tightening torque Nm (ft lb)	20 (14)
Idle speed RPM		720 ± 20 RPM
Engine speed limiter switching OFF RPM		6700 ± 200
CO-content (oxygen sensor probe disconnected)	checking value	0.3-3.0 vol. %
	adjusting value	0.6-1.0 vol. %
	(oxygen sensor probe connected, as control)	0.3-1.2 vol. %

Tuneup specifications		U.S.A.
Engine code letters		NF
Ignition distributor		034 905 205 H
Ignition timing	checking value	13-17° before TDC
	adjusting value	15 ± 1° before TDC
Timing mark location: on flywheel		
Firing order		1-2-4-5-3
Spark plugs	Bosch	W7DTC
	Beru	14-7DTU
	electrode gap mm (in.)	0.8 ± 0.1 (0.031 ± 0.004)
Idle RPM*	tightening torque Nm (ft lb)	20Nm (15 ft lb)
	manual transmission RPM	720 ± 50
	automatic transmission RPM	720 ± 50
CO ₂ -content (oxygen sensor probe disconnected)		0.3-3.0 vol. %
adjusting value		0.6-1.0 vol. %
(oxygen sensor probe connected, as control)		0.3-1.2 vol. %

Idle speed **CANNOT** be adjusted using air screw on throttle body, idle speed is regulated by CIS-E III control unit.

Tuneup specifications

2.22 liter 20 Valve Turbo		
Engine code		3B
Ignition timing sender resistance checking, see Repair Group 28		approximately 1000 ohms
Engine speed sensor resistance checking, see Repair Group 28		approximately 1000 ohms
Spark plugs	part number tightening torque electrode gap	F 5 DPOR N100 807 05 30 Nm (22 ft lb) 0.6 + 0.1 mm (0.024 + 0.004 in.)
Firing order	cylinders	1 2 4 5 3
RPM cutoff (upper limit) via CIS-E Motronic control unit		7200 ± 40 rpm
Ignition coil	Secondary resistance Primary resistance	approximately 5000 to 9000 ohms approximately 0.5 to 1.5 ohms
Distributor rotor Note The ignition rotor must NOT be turned for any reason.	resistance	approximately 1000 ohms
Ignition wire	resistance	approximately 1000 ohms
Spark plug connector	resistance	approximately 5000 ohms
Ignition timing		Ignition timing is determined by the control unit map and CANNOT be adjusted.
*Idle speed	checking value	800 ± 30 rpm
*CO content	checking value	0.7 ± 0.2 vol. %

*Checking conditions

- activate fault memory, see Repair Group D2 for additional information
- engine warm, oil temperature 80°C (176°F) minimum
- throttle in idle position (against stop)
- all electrical consumers switched **OFF**
- A/C switched **OFF**
- **NO** fuel pressure measuring devices connected
- radiator cooling fan **NOT** running during measurements

This is what's new:

Since the last filming of this fiche, we added or changed:

Group 13

- adjustment of the alternator belt has been removed, and now may be found in Repair Group 27
- the content page has been revised

INDEX

