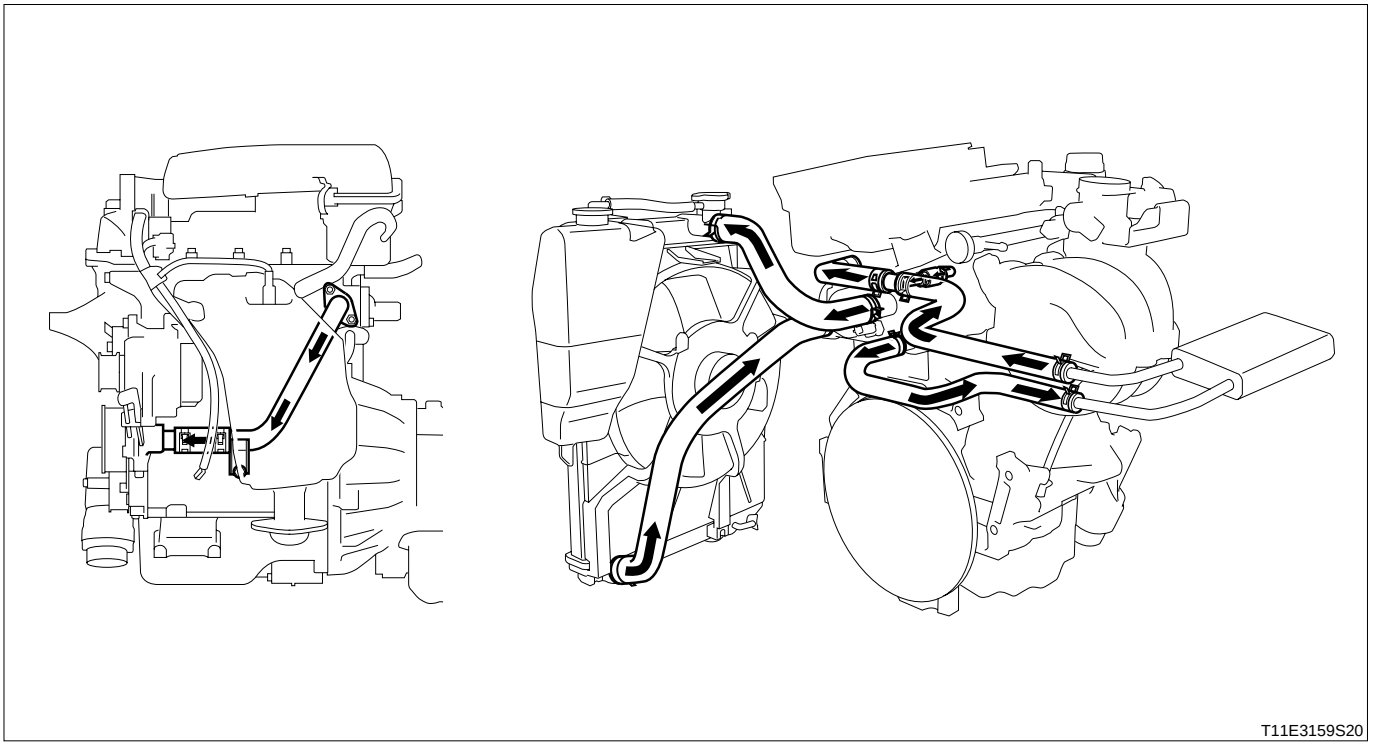
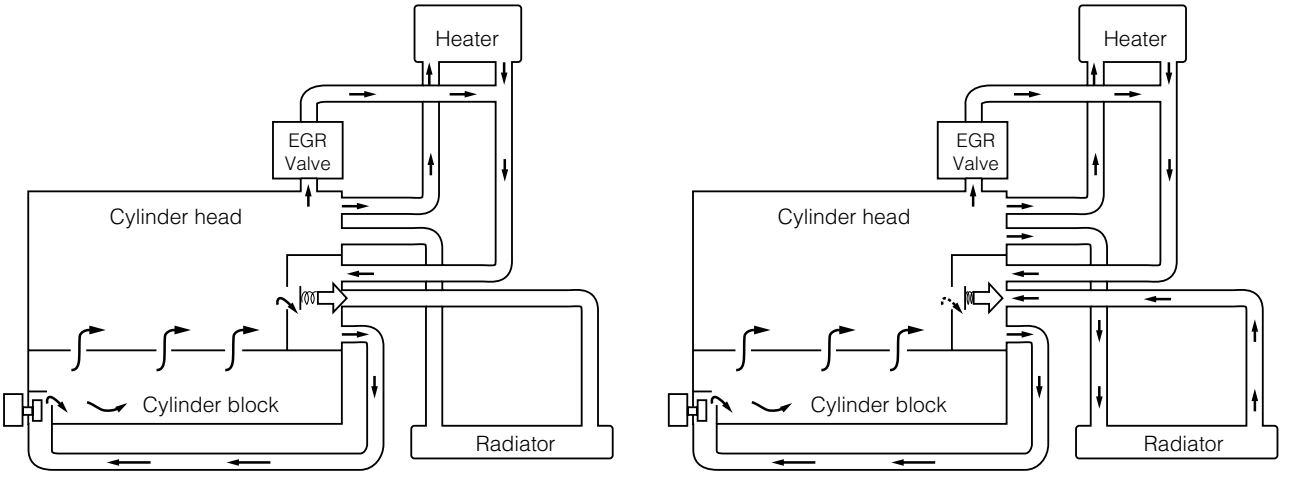
TO INDEX

B6 COOLING SYSTEM

1KR
1 OUTLINE
1-1 DESCRIPTION
The cooling method is the water-cooled pressure forced circulation type. The thermostat with bypass valve is adopted to improve heater performance by feeding total volume when cooling the machine.
The cooing water is circulated from the cylinder head water jacket through the water bypass pipe of the external piping to the water pump.
The cooling water is also circulated to the stepper motor type EGR valve.
The drain cock is provided to the chain cover.
1-2 COOLING SYSTEM LAYOUT

T11E3159S20

1-3 SCHEMATIC DIAGRAM OF COOLING SYSTEM PASSAGE INSIDE ENGINE



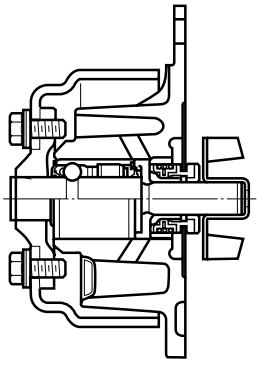
＜Before warming-up＞ ＜After warming-up＞

T11E3152ES20

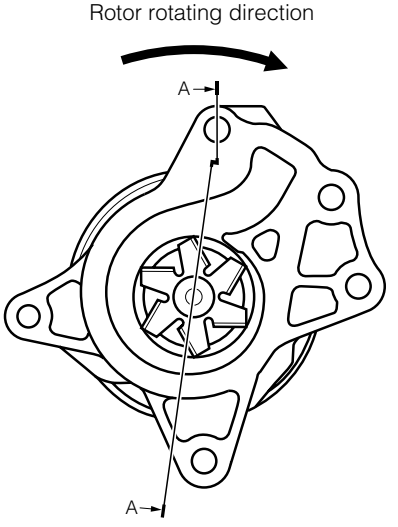
2 CONSTRUCTION AND OPERATION

2-1 WATER PUMP

A steel water pump is adopted. The swirl chamber is integrated with the chain cover.



Cross-section A－A

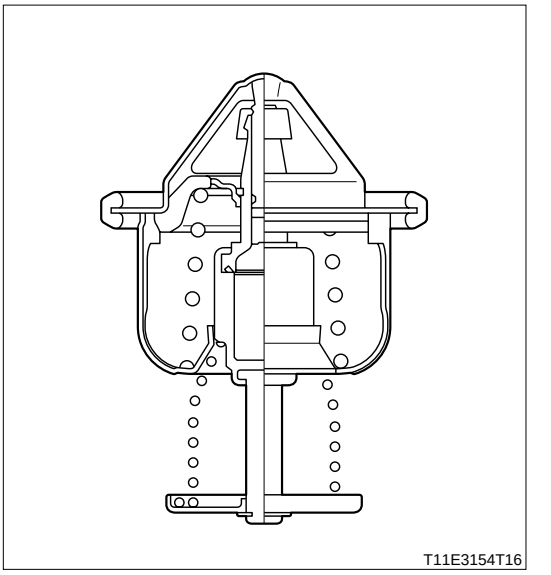


T11E3161ES16

2-2 THERMOSTAT

The thermostat with differential pressure regulating valve, that allows the bottom bypass by a differential pressure, is adopted.

When cold, both the thermostat and differential pressure regulating valve are closed, so the total volume flows to the heater. When the engine revolution speed becomes high and the amount of cooling water increases, the differential pressure regulating valve opens to allow bypassing. Even when warm, if the large amount of fluid flows, the differential pressure regulating valve opens to reduce cavitations.



Thermostat specifications

Installation position	Water inlet
Valve opening temperature (℃)	82±2.0
Full opening lift amount (mm)	8.5mm or more (at 95℃)

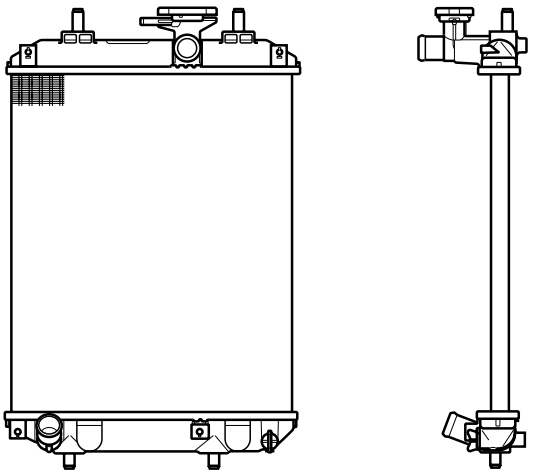
2-3 RADIATOR

A aluminum core radiator with plastic upper and lower tanks is employed to realize weight saving.

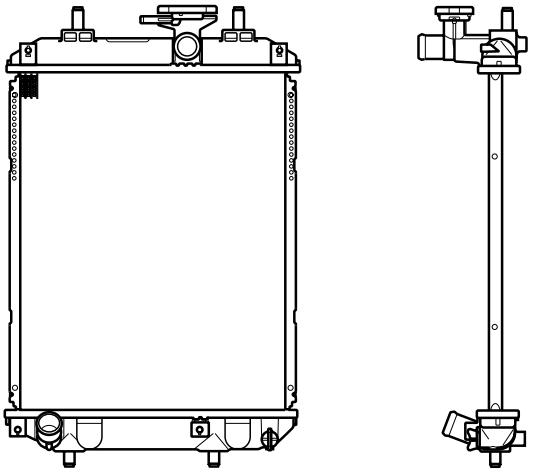
Radiator specifications

		EU,GENERAL spec.	AUS , TOROPICAL spec.
Radiator	Heat radiating rate (kW)	21.5	34.5
	Core type	EAR	NSR
	Core dimensions [width×height×depth](mm)	330.6×399.2×21	330.6×399.2×16
	Fin pitch	1.25	2.25
	Coolant capacity (ℓ)	0.95	0.98
Radiator cap opening pressure (kPa)		108	108

EU Spec.
GENERAL Spec.



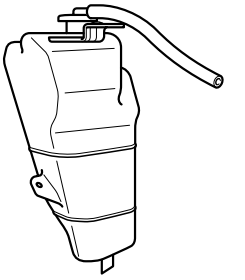
AUS Spec.
TROPICAL Spec.



T11E3162ES30

2-4 RESERVE TANK

The reserve tank is mounted to the fan shroud.



T11E3157T10

2-5 COOLANT

Coolant specifications

Diluting water			Tap water
Capacity (ℓ)	Total capacity (except reservoir tank)		3.3
	Reservoir tank capacity	FULL	0.6
		LOW	0.15

2-6 FORCED COOLING DEVICE

2-6-1 DESCRIPTION

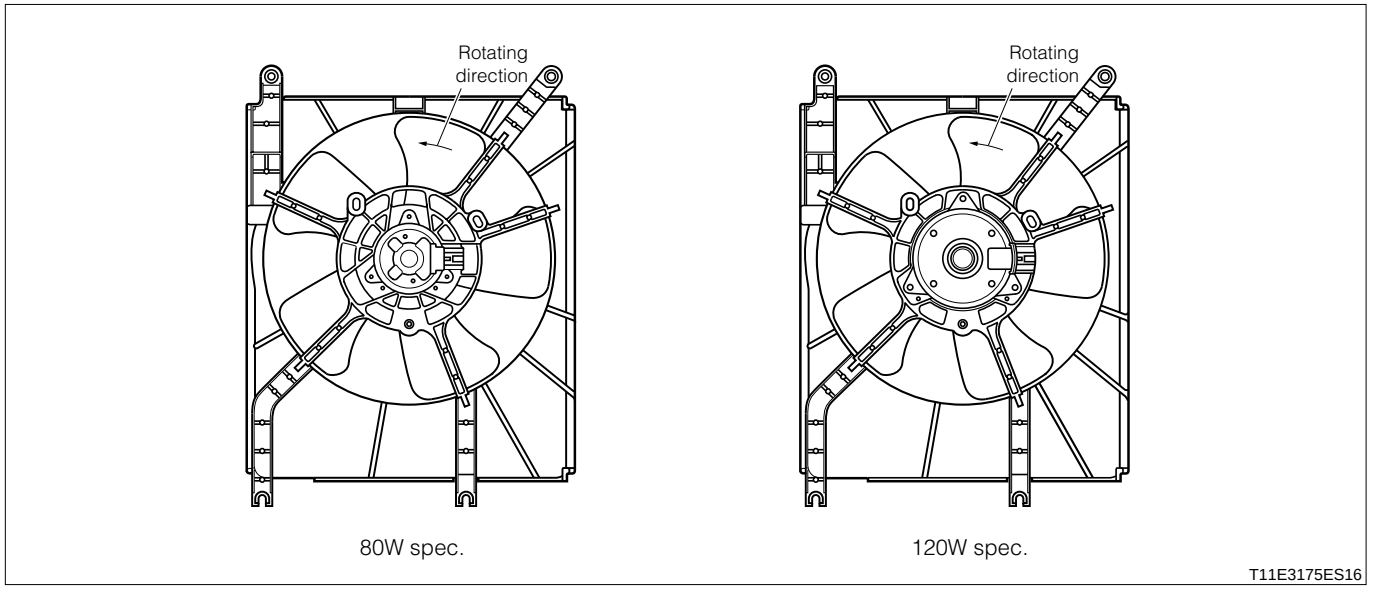
The radiator fan motor is controlled by the signal from the engine control computer.

2-6-2 RADIATOR FAN

A sucking type powered fan is adopted. The reserve tank is mounted to the fan shroud.

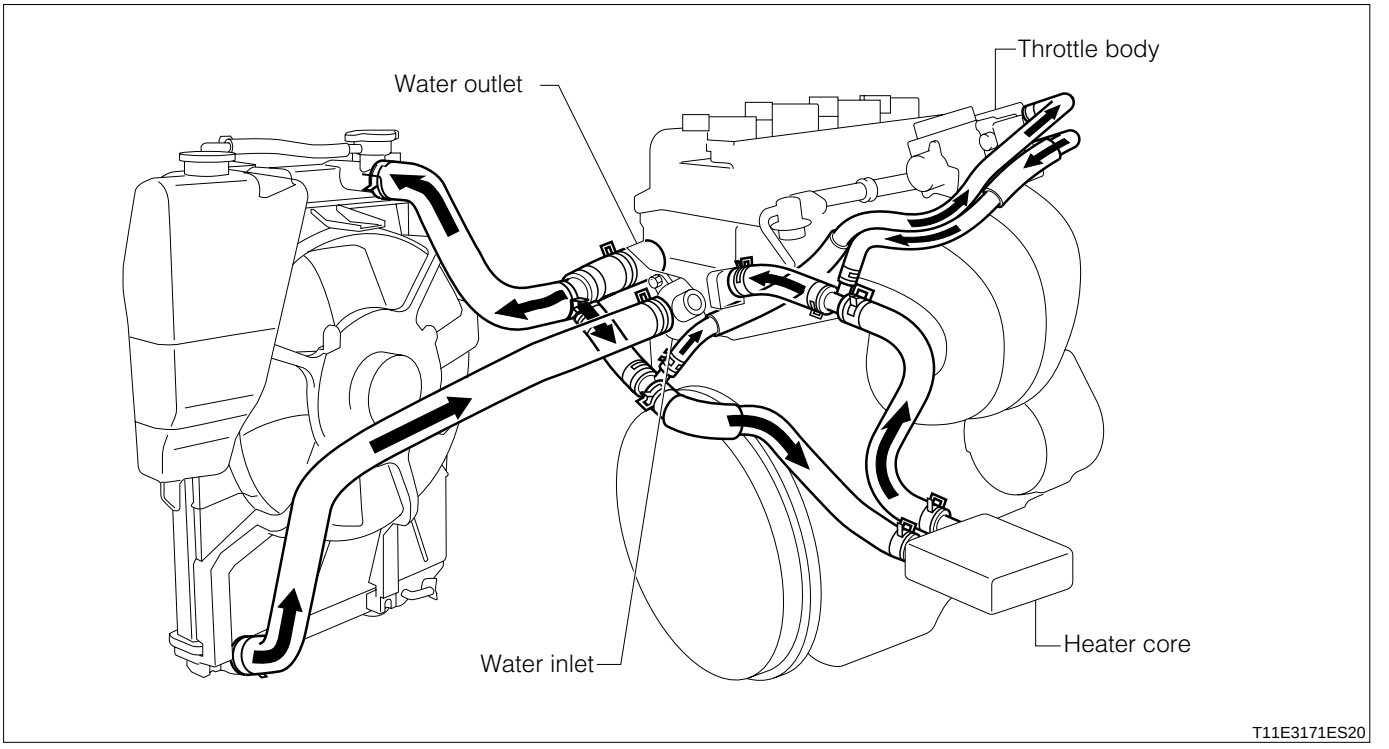
Radiator fan specifications

		EU,AUS , GENERAL spec.	TOROPICAL spec.
Motor	Type	Direct current ferrite	Direct current ferrite
	Rated voltage (V)	12	12
	Output(W)	80	120
Fan	Outer diameter(mm)	300 Dia.	300 Dia.
	Number of blades	5	5

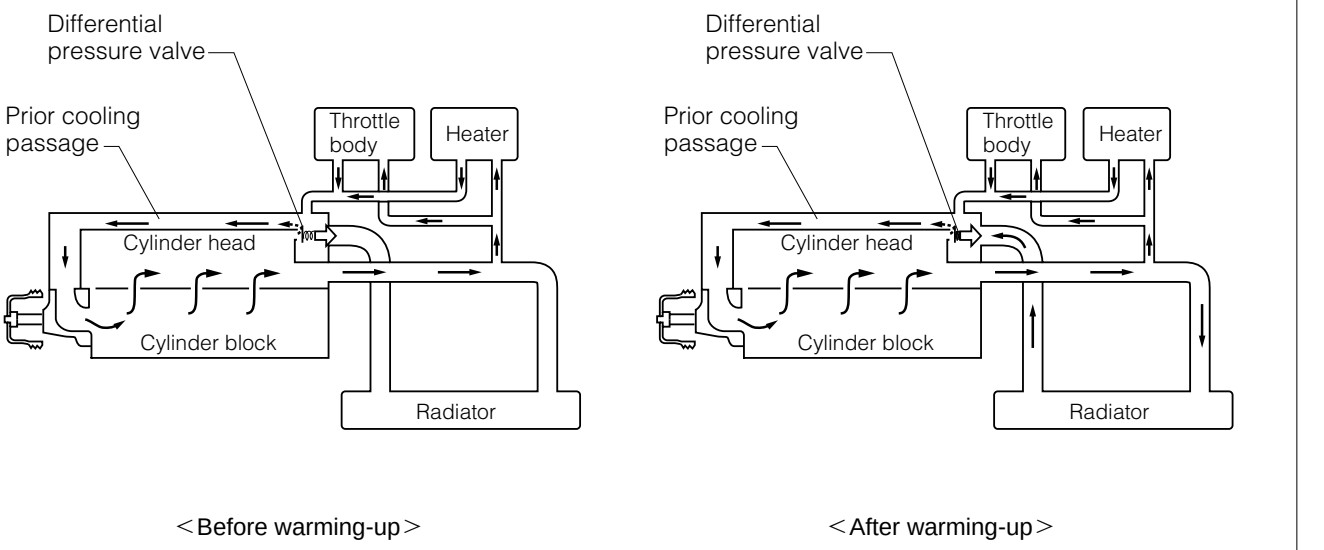


80W spec. 120W spec.

T11E3175ES16

K3
1 OUTLINE
1-1 DESCRIPTION
The cooling method is the water-cooled pressure forced circulation type. The thermostat with bypass valve is adopted to improve heater performance by feeding total volume when cooling the machine.
For improved performance, the cooling water returned from the radiator and cooled is fed first to the intake side of the cylinder head (intake precedence cooling method) to lower the temperature of the combustion chamber and intake port wall to improve anti-knocking ability.
For changing the cooling water, the air bleeding valve is provided to the cylinder head and the heater.
1-2 COOLING SYSTEM LAYOUT


1-3 SCHEMATIC DIAGRAM OF COOLING SYSTEM PASSAGE INSIDE ENGINE



＜Before warming-up＞ ＜After warming-up＞

T04E1020ES20

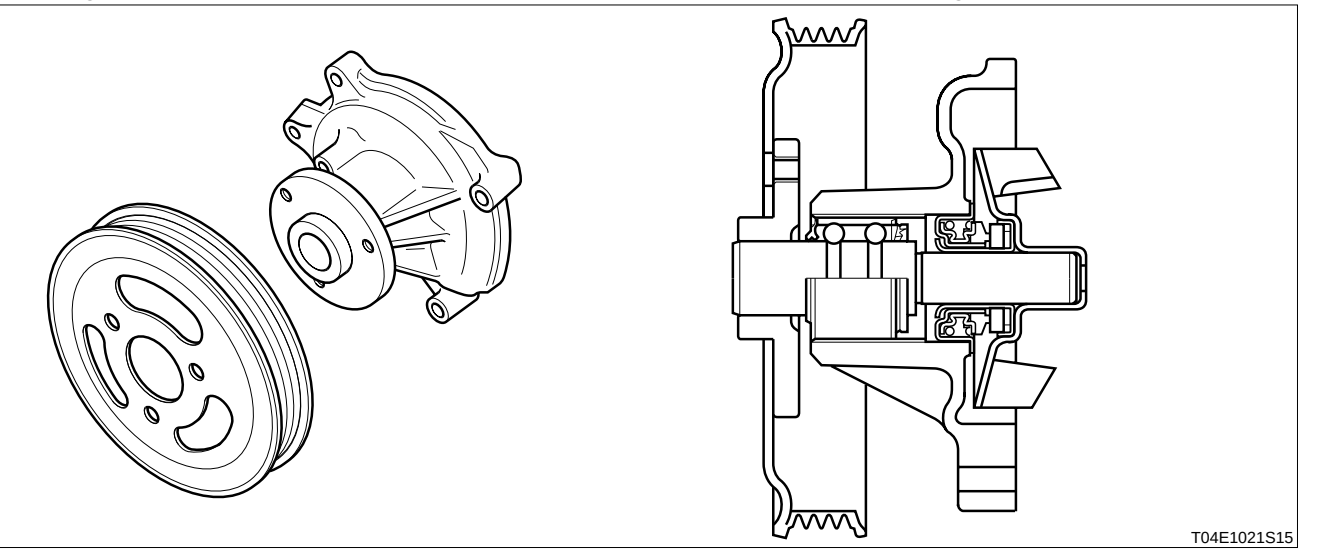
2 CONSTRUCTION AND OPERATION

2-1 WATER PUMP AND WATER PUMP PULLEY

A centrifugal water pump is adopted. For driving the pulley, the V ribbed belt contacts the upper and lower sections of the pulley, thus reducing the load to the bearing when excessive tension occurs.

SiC and sintered carbon are used for the mechanical seal of the water pump. Also, three-layer lip structure is adopted to the bearing to improve reliability.

The two-stage type water pump pulley drives the pulley for the power steering pump.

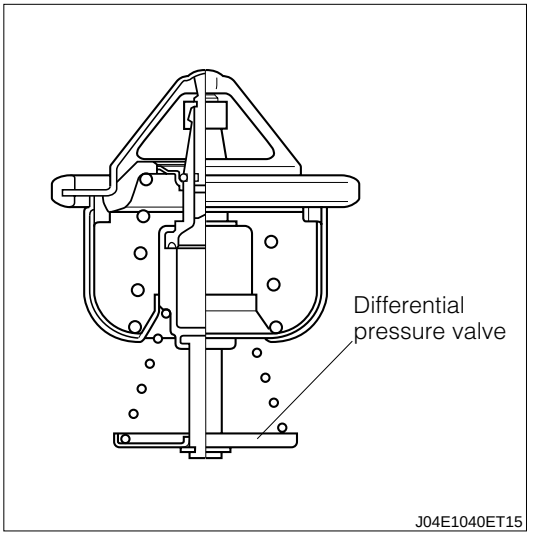


T04E1021S15

2-2 THERMOSTAT

The thermostat with differential pressure regulating valve, that allows the bottom bypass by a differential pressure, is adopted.

When cold, both the thermostat and the differential pressure regulating valve are closed, so the total volume flows to the heater. When the engine revolution speed becomes high and the amount of cooling water increases, the differential pressure regulating valve opens to allow bypassing to the intake precedence cooling path. Even when warm, if a large amount of fluid flows, the differential pressure regulating valve opens to reduce cavitations.



Thermostat specifications

Installation position	Water inlet
Valve opening temperature (℃)	80±2.0
Full opening lift amount (mm)	8.5mm or more (at 93℃)

2-3 RADIATOR

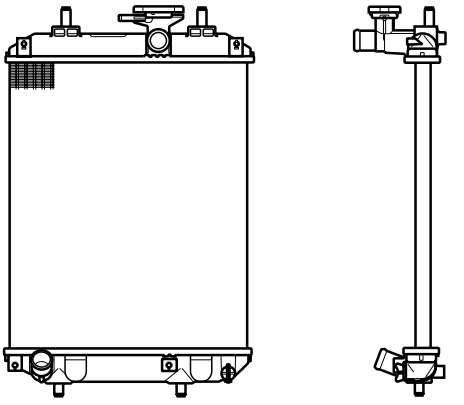
A aluminum core radiator with plastic upper and lower tanks is employed to realize weight saving.

Radiator specifications

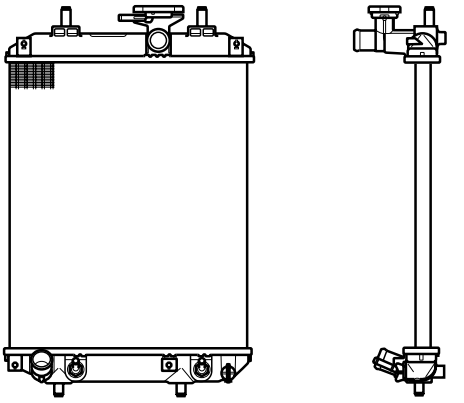
		EU spec.	GENERAL A/T spec.	AUS M/T, GENERAL M/T spec.	AUS A/T, TOROPICAL spec.
Radiator	Heat radiating rate (kW)	21.5	32.6	34.5	41.4
	Core type	EAR	NSR	NSR	NSR
	Core dimensions [width×height×depth](mm)	330.6×399.2×21	312.2×399.2×16	312.2×399.2×16	330.6×399.2×21
	Fin pitch	1.25	2.5	2.25	2.5
	Coolant capacity (ℓ)	A/T:0.92 M/T:0.95	0.95	0.98	1.15
Radiator cap opening pressure (kPa)		108	108	108	108
Oil cooler	Heat radiating rate (kW)	1.08	1.08	—	1.37
	Automatic fluid capacity (ℓ)	0.03	0.03	—	0.04

EU Spec.

M/T

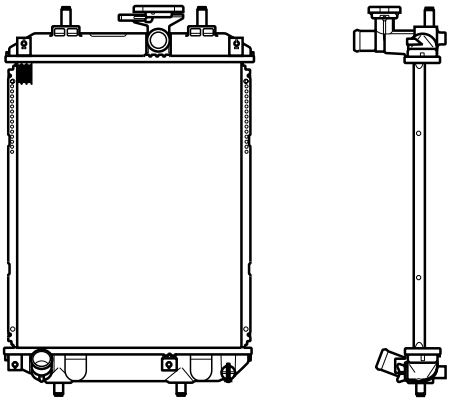


A/T

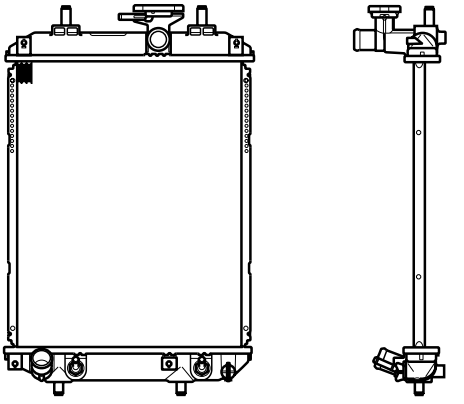


GENERAL Spec.

M/T

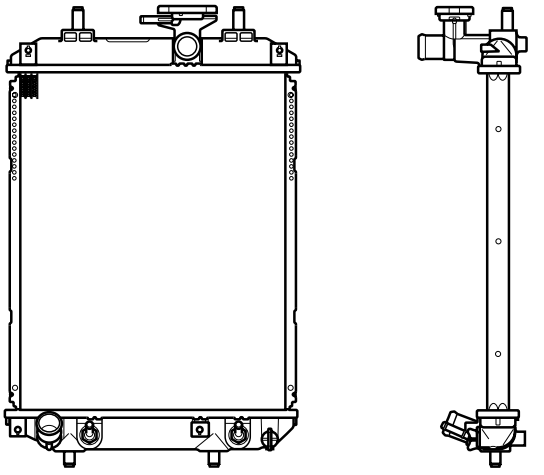


A/T



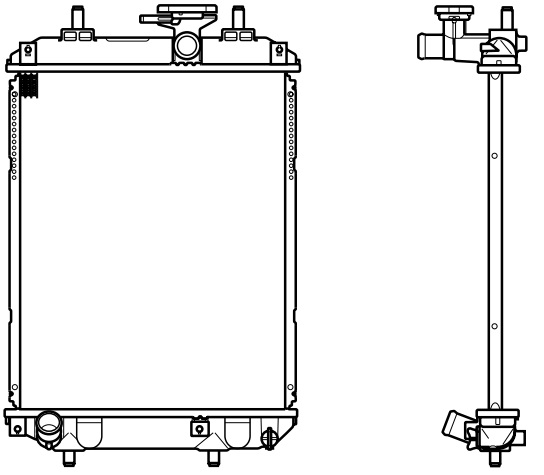
T11E3176ES45

TROPICAL Spec.

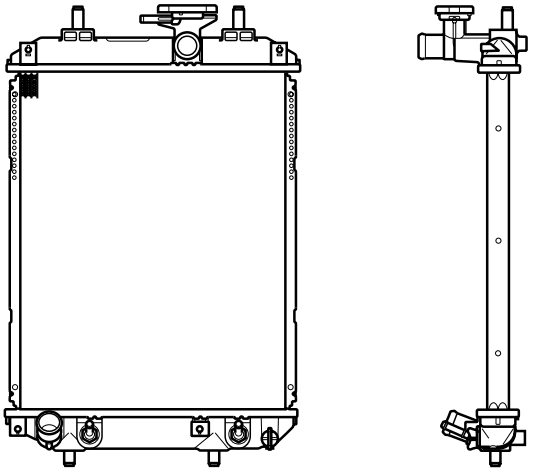


AUS Spec.

M/T



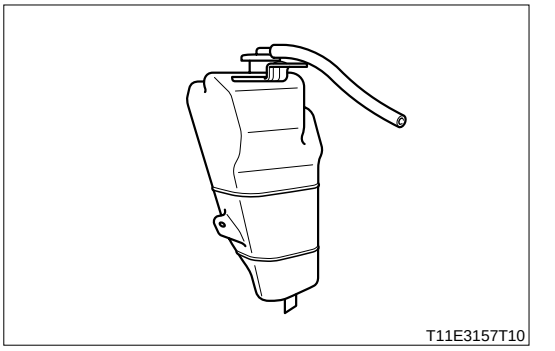
A/T



T11E3177ES45

2-4 RESERVE TANK

The reserve tank is mounted to the fan shroud.



2-5 COOLANT

Coolant specifications

Diluting water			Tap water
Capacity (ℓ)	Total capacity (except reservoir tank)		3.5
	Reservoir tank capacity	FULL	0.6
		LOW	0.15

2-6 FORCED COOLING DEVICE

2-6-1 DESCRIPTION

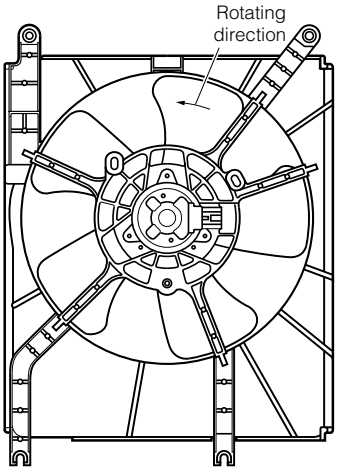
The radiator fan motor is controlled by the signal from the engine control computer.

2-6-2 RADIATOR FAN

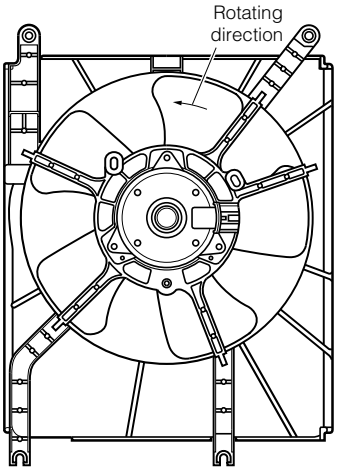
A sucking type powered fan is adopted. The reserve tank is mounted to the fan shroud.

Radiator fan specifications

		EU,AUS M/T, GENERAL spec.	AUS A/T, TOROPICAL spec.
Motor	Type	Direct current ferrite	Direct current ferrite
	Rated voltage (V)	12	12
	Output(W)	80	120
Fan	Outer diameter(mm)	300 Dia.	300 Dia.
	Number of blades	5	5



80W spec.



120W spec.

T11E3175ES16

TO INDEX TO NEXT SECTION