



# C87TE1PV.F550 ROHS2



Brochure main description	@1500rpm	@1800rpm
Application & simbol	Power Generation	
Engine identification main	C87	
Engine identification rating	kW 294	330
Engine features	G-Drive	
Emission feature	RoHS2 Directive 2011/65/EU	

Main characteristics	@1500rpm	@1800rpm
Emission certification	RoHS2 Directive 2011/65/EU	
Commercial code (for order)	C87TE1PV.F550	
Technical code (Pregnana productions, if needed)		
Technical code (original plant engine code, on engine block)	F2CCP615A*H	
Stand-by power (gross) [mech]	kW 294	330
Specific power	kW/l 34,1	37,9
Electric commercial power (estimation alternator power output)	kWe [kVA] 330	335
BMEP	bar 27.28	25.31
Oil consumption on mission (average)	% fuel consumption	<0.25
Cycle	diesel 4 stroke	
Air charging system pattern	Turbo aftercooler air/air	
Number of cylinder	6	
Configuration (cylinder arrangement)	in Line	
Bore	mm 117	
Stroke	mm 135	
Stroke / Bore	1.15	
Displacement	l 8.7	
Unit Displacement	l 1.45	
Bore pitch	mm 138	
Valves per cylinder	4	
Cooling system pattern	Liquid	
Direction of rotation (looking flywheel)	anti clockwise viewed from flywheel	
Compression ratio	16,5:1	
Firing order	1-4-2-6-3-5	
Injection type	direct common rail	
Engine brake configuration	-	
Be10	8000	
Cylinder Head		
Single / Multiple	single	
Material	Cast Iron w/o Ni	
Head air circulation	Cross Flow	
Intake valve dia.	mm 40	
Exhaust valve dia.	mm 39	
Camshaft		
Layout	SOHC	
Cam carrier	NO	
Material and Heat treatment	C53 - 50CrMo4 ind.	
Valve train	N/A	
Drivetrain (timing system)	Rear Gears	



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Main characteristics		@1500rpm	@1800rpm
Valve actuation		Roller rocker arms	
Variable valve actuation system		no	
Cylinder block (crankcase)		non structural with ladder frame	
Material of cylinder block		grey cast Iron	
Type of liners		wet	
Liners replaceable; (slip fit or interference fit)		yes	
Bearing caps		machined cast iron	
Crankcase Ventilation		YES	
Oil separator		centrifugal coalescent	
<b>Crankshaft &amp; counterweights</b>			
Material		forged steel	
Acceptable Inertia (clutch)	kgm <sup>2</sup>	0.75	
Balancing		NO	
<b>Turbocharger &amp; EGR system</b>			
Turbocharger type		fix geometry / wastegate	
Turbocharger supplier		HTT	
Turbocharger control		WG pneumatic control	
Max turbine inlet temperature	°C	700	
Max boost pressure	mbar	3 bar rel @1800	
Method of cooling the turbocharger		lubricated /Oil	
Turbo protection devices		(WG - Software strategy open loop)	
EGR		Internal	
EGR control strategy		Mechanical	
Rate		-	
Valve		-	
Cooler		-	
Control		-	
Air mass measurement		-	
<b>Exhaust flap</b>			
Exhaust flap supplier		N/A	
Actuation type		N/A	
Exhaust flap cooling		N/A	
Switchability (1500-1800 rpm)	yes/no		
Emission level 1500 rpm		Stage3A	
Emission level 1800 rpm		Tier3	
<b>Front power take off</b>			
PTO type		N/A	
Max torque available from front of crankshaft (no side load)	Nm	-	
<b>Power take off on gear train</b>			
SAE A 9 teeth		N/A	
SAE A 11 teeth		N/A	
SAE B 13 teeth		N/A	
SAE B (DIN 5482)		N/A	
SAE 2B 15 teeth( ANSI B92,1)		N/A	
<b>References values</b>			
Engine dimension LxWxH (indicative values)	mm	1174x800x1013	
G-Drive Dimension LxWxH (indicative values)	mm	2129x1079x1381	
Max permissible engine inclination	deg	35° All directions	



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Main characteristics		@1500rpm	@1800rpm
Engine Weight - Dry (no fluids, value purely indicative)	kg		860
Engine Weight - Wet (with fluids, value purely indicative)	kg		890
G-Drive Weight - Dry (no fluids, value purely indicative)	kg		1050
G-Drive Weight - Wet (with fluids, value purely indicative)	kg		1090
Center of gravity (FFOB or RFOB according to picture, standard engine layout)	mm		
Principal moment of inertia (reference on center of gravity, standard engine layout)	kgm <sup>2</sup>		
Principal moment of inertia (reference matrix based on center of gravity, standard engine layout)	kgm <sup>2</sup>		
Center of gravity (FFOB or RFOB according to picture, standard IPU/G-Drive layout)	mm		
Principal moment of inertia (reference on center of gravity, standard IPU/G-Drive layout)	kgm <sup>2</sup>		
Principal moment of inertia (reference matrix based on center of gravity, standard IPU/G-Drive layout)	kgm <sup>2</sup>		
Mass moment of inertia - rotating components (excluding flywheel)	kgm <sup>2</sup>		0.3
Mass moment of inertia - standard flywheel	kgm <sup>2</sup>		1.9
Bending moment on the flywheel housing	Nm		
Bending moment on PTO	Nm		N/A
Max static mounting surface load	N		
Crankshaft thrust bearing pressure limit			
Intermittent load:	MPa		
Continuous load:	MPa		
Rear main bearing load	MPa		
Max bending moment available from front of the crankshaft:			
0 deg	Nm		
90 deg	Nm		
180 deg	Nm		
Environmental operating conditions			
Max altitude for declared performances	m		1000
Max ambient temperature for declared performances	°C		40
Min guaranteed temperature for cold start w/o any aid (stand alone engine)	°C		-10
Min guaranteed temperature for cold start with grid heater (stand alone engine)	°C		-20
Min guaranteed temperature for cold start with grid heater and block heater (stand alone engine)	°C		-
Time preheating for manifold heater	s		
Time post heating for manifold heater	s		
Low idle continuous operation time (reccomended)	h		
Engine performance			
Continuous power (gross) [mech]	kW	214	218
Prime power (gross) [mech]	kW	267	273
Stand-by power (gross) [mech]	kW	294	300
Fan consumption [mech]	kW	6	9
Continuous power (net) [mech]	kW	208	209
Prime power (net) [mech]	kW	261	264
Stand-by power (net) [mech]	kW	288	291



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Main characteristics		@1500rpm	@1800rpm
Typical generator output	kW	300	300
Generator available power @ Prime power	kW	N/A	N/A
Generator available power @ Stand by	kW	N/A	N/A
Power limitation according to ambient conditions			
Ambient temperature above xx°C	%/5°C (xx°C)		3
Altitude > 1000 < 3000m above sea level	%/500m		3
Altitude > 3000m above sea level	%/500m		6
Power limitation due to safety protections			
Max water temperature (Switch on of the MIL lamp)	°C		
Start derating: switch on of the warning coolant temperature lamp (amber color)	°C		
Max derating (50% derating) switch on of the high coolant temperature lamp (redcolor)	°C		
Altitude level: gradual reduction of transient response by smoke map correction from	m		
Fuel temperature	°C		
Intake manifold air temperature	°C		
Max allowed exhaust temperature	°C		
Turbine overheating protection	°C		
Turbine overspeed protection	rpm		
Oil temperature protection	°C		
Oil pressure protection	bar		
<b>Fuel System</b>			
Fuel density	kg/l		0.835
Injection system type			Common Rail
Injection pump manufacturer			Bosch
Injection model type			Common Rail
Injection model pump			CP3.3
Injection pressure	bar		1393
Injector			CRIN2-16-BL
Injector installation (sleeve, sealing flat or conical)			
Injector nozzle			
Engine fuel compatibility			
Feed pump			
Max flow	l/h		
Nominal feed pressure	bar		
Fuel filter		M16X1,5 DIAM.93/212,5 COD. 6M.24.396.20	
Delta pressure on fuel filter	bar		0.17
Max continuous allowable fuel temperature (without derating)	°C		
Max relative pressure at gear pump inlet	bar		
Min relative pressure at gear pump inlet	bar		
Max back flow relative pressure	bar		
Max back flow restriction	bar		
Max heat rejection to return fuel	kW		
Max fuel flow	kg/h		
Min fuel tank venting requirement	m³/h		
Prefilter / Water separator micron size	µm		



### Air Intake System

Aftercooling type (air to air or water to air)		air to air
Interstage cooling type		
RoA (Temperature raise between ambient and inlet to engine)	°C	
Filter air intake temperature (warm air ricirculatuion)	°C	
Max intake manifold temperature	°C	
Compressor inlet pressure (with new air filter)	hPa	
Compressor inlet pressure (with dirty air filter)	hPa	
Air filter type		dry
Loads on turbocharger on compressor intake	kg	
Loads on turbocharger on compressor outlet	kg	
Charge air flow (max)	kg/h	

### Exhaust System

Max back pressure (after exhaust flap) @ rated power with clean system	hPa	0
Max mechanical load on turbine flange	kg	0
Max exhaust flow rate	kg/h	
Energy to exhaust	kcal/kWh	

### Lubrication System

Oil sump capacity	l	23
Max	l	23
Min	l	15
Oil system capacity including filter	l	28
Oil pump type		volumetric
Oil pump drive arrangement		by gear
Min oil pump flow	l/min	
Max oil pump flow (@rated speed)	l/min	
Min oil pressure @ low idle (engine oil temp at 120°C)	kPa (bar)	
Min oil pressure @ rated speed (engine oil temp at 120°C)	kPa (bar)	
Max oil pressure @ rated speed (engine oil temp at 120°C)	kPa (bar)	
Max oil temperature @ full load (in main gallery)	°C	
Max oil pressure peak on cold engine	bar	
Oil cooler type		
Transducer for indicating oil temperature and pressure		
Max engine angularity - longitudinal / transversal (std oil pan)	0/360°	25 all directions
Allowed engine gradability during installation on vehicle	deg	
Oil servicing intervals	h	600
Oil filter type		spin-on
Oil filter capacity	l	1
Max oil content admitted in blow by gas (after filter)	g/h	
Approved engine oil specifications		SAE 15W40 CLASSE APPART.T2
Oil for cold condition mission (T° ambient < -25°C)		

### Cooling system

Type (water to water or air to water)		air to water
Recommended coolant		



## Cooling system

Min radiator cap pressure	kPa	0.7
Warnnig setting first threshold	°C	103
Max additional restriction	Pa	196000
Air to boil (prime power, open genset configuration)	°C	59
Air to boil (stand by, open genset configuration)	°C	60
EGR Cooler water flow (for ΔT=6°C)	l/s	
LP-CAC water flow (for ΔT=6°C)	l/s	
Fan		
Diameter	mm	700
Number of blades		8
Drive ratio		1.03:1
Radiator		
Core dimensions LxWxh	mm	500x1054x1357
Dry weight	kg	160
Radiator coolant capacity	l	33
Optimum coolant temperature range @engine out (50% glycol)	°C	
Engine Water pump Type		
Engine water pump drive		
Coolant capacity (engine only)	l	
Coolant capacity (radiator & hoses)	l	
Thermostat type		
Thermostat position		
Thermostat opening / fully open temperature	°C	
Recommended coolant circuit pressurization range (relative)	hPa	
Coolant engine pressure outlet – inlet (delta pressure, open thermostat, high idle conditions)	hPa	
Coolant engine pressure outlet – inlet (only with remote thermostat, ex. retarder)	hPa	
Min coolant pressure (no pressure cap and thermostat closed)	hPa	
Coolant water pump inlet pressure (water temperature 60-100°C)	hPa	
Coolant flow to radiator @rated speed	l/h	
Min coolant expansion space (% total cooling system capacity)	%	
Max coolant flow to accessories @ rated speed from cab heater	l/min	
Engine out coolant to ambient @rated speed	delta °C	
Engine out coolant to ambient @torque speed	delta °C	
Charge air cooler outlet to ambient @max rpm - CAC dT	delta °C	
Coolant engine flow	l/min	

## Electrical, Electronic and Control Systems

System voltage	V	24
Engine control unit		MD1CE101
ECU software		P1603v452
ECU Vehicle connection		
ECU operating range	°C	
Temperature of ECU case for <5' after power up	°C	
ECU rated continuous temperature	°C	



### Electrical, Electronic and Control Systems

ECU communication protocol		-
Min power supply for ECU operation	V	
Max power supply for ECU operation	V	
Battery wire connection resistance value @20°C (from battery to ECU)	mΩ	
Diagnostic system		
Min cranking speed TDC @-30°C	rpm	
Average cranking speed	rpm	
N° tooth pinion/crown gear		
Min battery voltage	V	
Mean battery voltage	V	
Min battery current	Ah	
Mean battery current	Ah	
Max starting circuit resistance ( to starter)	mΩ	

### Cold starting

Without air preheating	°C	-10
With air preheating (if available)	°C	-25

### Emission gaseus and particulales

NOX (Oxides of nitrogen)	g/kWh	3.5
HC (Hydrocarbons)	g/kWh	0.12
NOX+HC	g/kWh	3.64
CO (Carbon monoxide)	g/kWh	0.7
PT (Particlutes)	g/kWh	0.12
CO2 (Carbon Dioxide)	g/kWh	

### Maintenance

Oil drain interval	600 hours/1 year
Oil filter change	600 hours/1 year
Oil refilling time	Daily
CCV filter change	1200 hours/2 years
Fuel filter change	600 hours/1 year
Fuel pre-filter change	600 hours/1 year
Belt replacement	1200 hours
Valve lash check /adjustment	3000 hours
Coolant change	1200 hours/2 years

### Engine Noise

Overall sound pressure (engine only)	dBA	-
Overall sound pressure (with accessories only)	dBA	-
Exahust noise (w/o Muffler)	dBA	-
Noise spectrum (octave analysis performed at the position of maximum noise) - diagram	Table dB-Hz	-

### Step Load

		@1500rpm	@1800rpm
G1 (% of PrP)	%	-	-
G2 (% of PrP)	%	50	50
G3 (% of PrP)	%	36	40
G1 (% of PrP) [open flap]	%	N/A	N/A



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Step Load		@1500rpm	@1800rpm
G2 (% of PrP)[open flap]	%	N/A	N/A
G3 (% of PrP)[open flap]	%	N/A	N/A
G1 (% of PrP) [ closed flap]	%	N/A	N/A
G2 (% of PrP) [closed flap ]	%	N/A	N/A
G3 (% of PrP) [closed flap]	%	N/A	N/A
Removal load (G1)	%	100	100
Removal load (G2)	%	100	100
Removal load (G3)	%	100	100
Emergency (xxx)	%	-	-
Emergency (xxx)	%	-	-
Emergency (xxx)	%	-	-

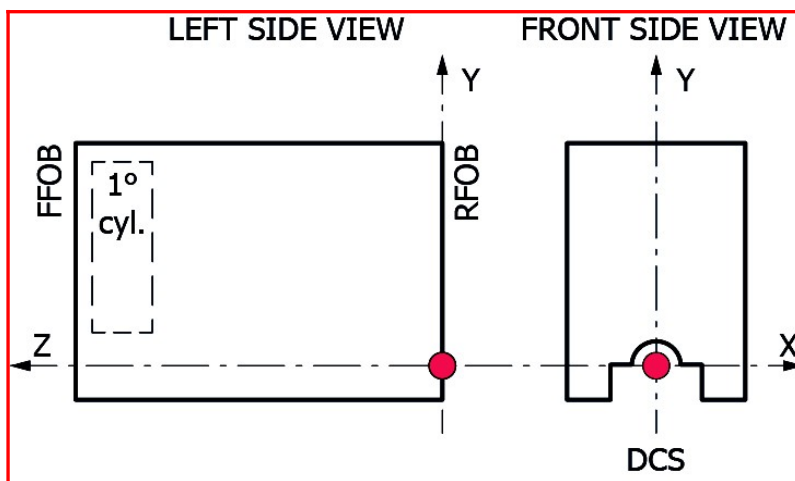
Maximum Rating Performance Data		@1500rpm	@1800rpm
Torque	Nm		
Ambient Temperature	°C	22	22
EGR Rate	%		
Fuel Flow	g/s		
Fuel consumption (BSFC) (prime power)	(kg/h) [g/kWh]	221	212
Fuel consumption (BSFC) (stand by)	(kg/h) [g/kWh]	213	208
Fuel consumption (BSFC) (80% prime power)	(kg/h) [g/kWh]	238.25	238.52
Fuel consumption (BSFC) (50% prime power)	(kg/h) [g/kWh]	222.5	227.3
Fuel consumption (BSFC) (25% prime power)	(kg/h) [g/kWh]	234.3	233.4
Exhaust Gas Flow	kg/h		

Design air handling system data			
EGR flow	kg/h		
EGR pressure	kPa		
Boost pressure (compressor outlet)	kPa		
Pressure drop on charge air cooling system	kPa		
Max temperature after HP-Compressor	°C		
Boost temperature (includes EGR effect)	°C		
Back pressure before DOC	kPa	N/A	N/A
Exhaust Gas Temp between HP-TC	°C		
Max Exhaust Gas Temp (after TC)	°C		
Max admitted back pressure after SCR	kPa	N/A	N/A
Max admitted back pressure after TC	kPa		
Power engine coolant without EGR & CAC (prime power)	kW [kcal/kWh]		
Power engine coolant without EGR & CAC (stand by)	kW [kcal/kWh]		
Power high Temperature EGR Cooler (engine water) (prime power)	kW [kcal/kWh]		
Power high Temperature EGR Cooler (engine water) (stand by)	kW [kcal/kWh]		
Power LP-CAC (engine water) (prime power)	kW [kcal/kWh]		
Power LP-CAC (engine water) ( stand by)	kW [kcal/kWh]		
Total water cooling power of engine (prime power)	kW [kcal/kWh]		
Total water cooling power of engine (stand by)	kW [kcal/kWh]		
Total pump water flow	l/s		
Radiator Coolant Flow (5% less if continuous deaerating system, coolant according to FPT norms)	l/min		
EGR Cooler water flow (for ΔT=6°C)	l/s		

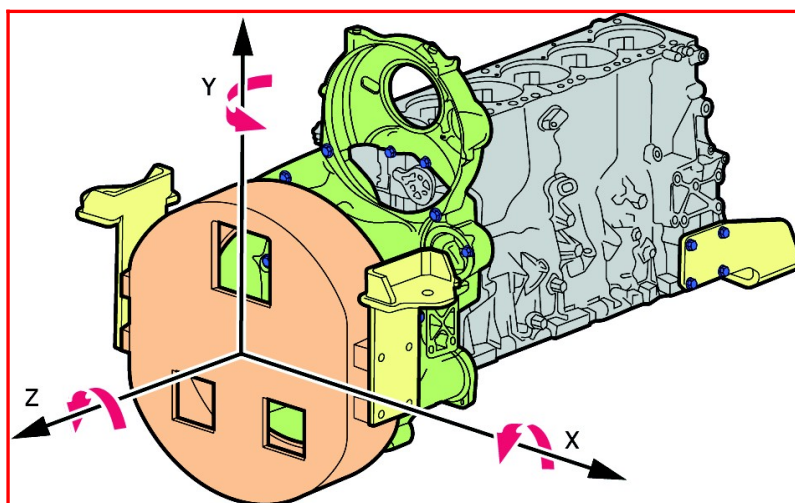


**Design air handling system data**

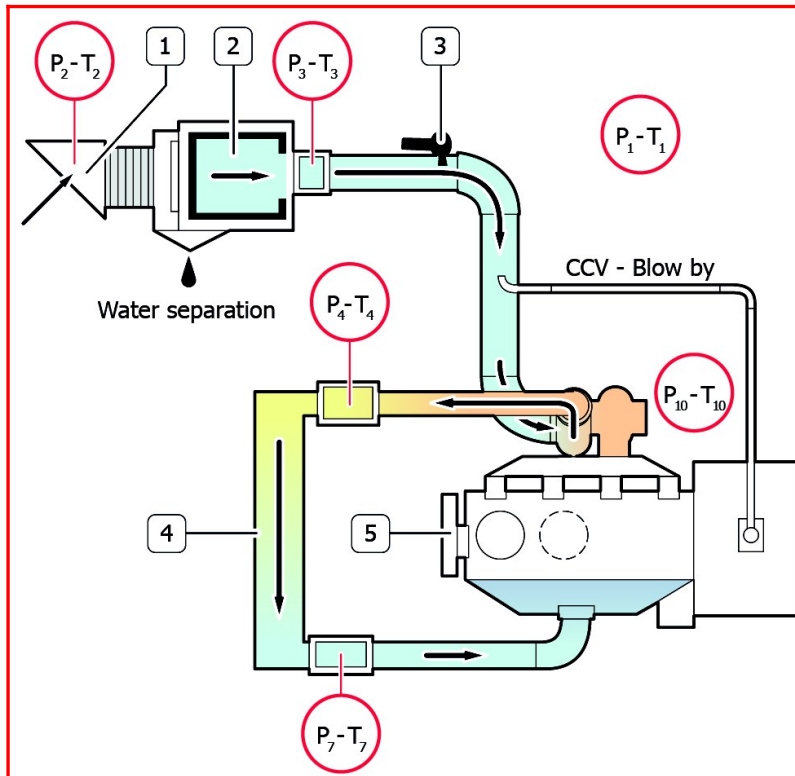
LP-CAC water flow (for $\Delta T=6^{\circ}\text{C}$ )	l/s	
Power of HP CAC (prime power)	kW [kcal/kWh]	
Power of HP CAC (stand by power)	kW [kcal/kWh]	
Total CAC power (air to air) (prime power)	kW [kcal/kWh]	
Total CAC power (air to air) (stand by power)	kW [kcal/kWh]	



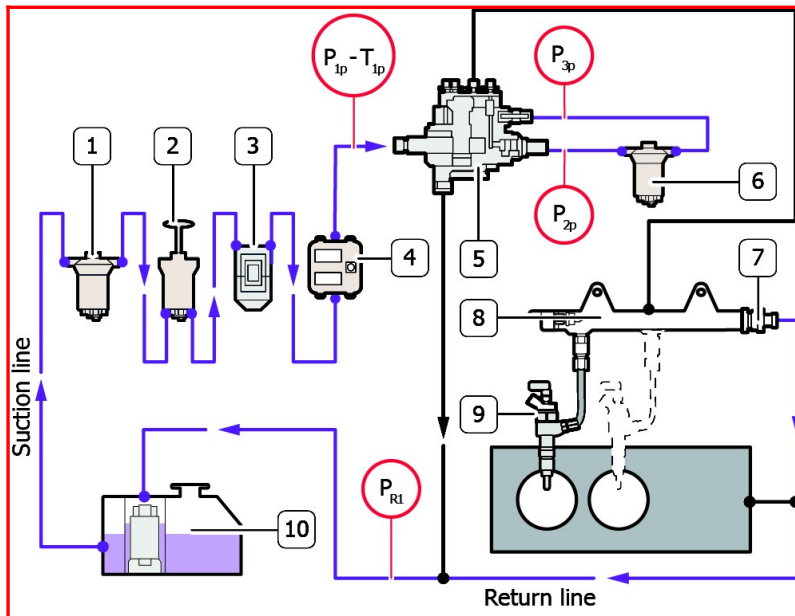
Principal Moment of Inertia



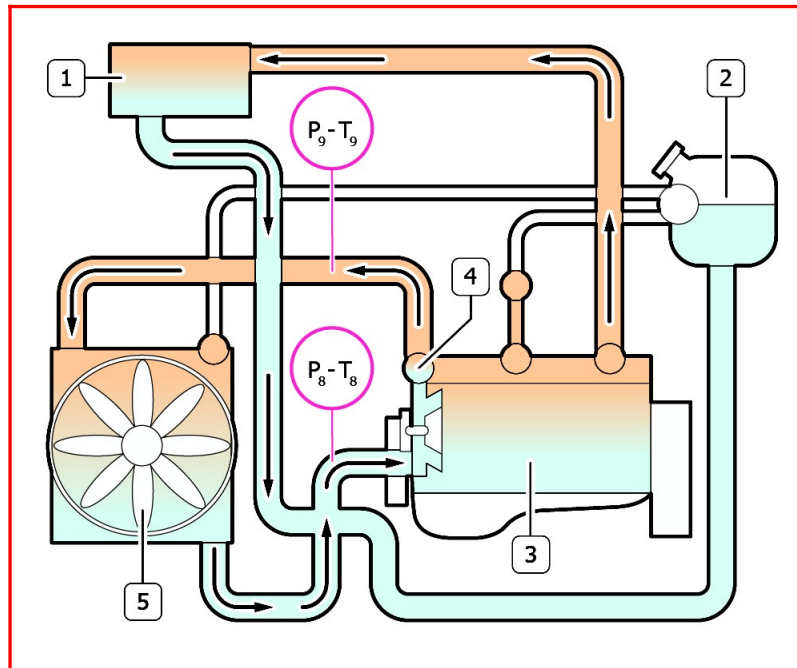
Components



1.Snorkel 2.Air Filter 3.Humidity sensor 4.Intercooler



1.Inspection glass with strainer 2.Prime pump 3.Pre-filter with water separator 4.ECU 5.High Pressure pump 6.Fuel Filter 7.Overpressure valve 8.Common Rail 9.Injectors 10.Fuel tank



1.Heating element 2.Expansion tank 3.Engine 4.Thermostat 5.Radiator



## ACRONYMS LIST

Acronyms	Description
-	Not Needed
2stTC	Two Stage Turbo (sequential)
Ag	Agricultural
ASC	Ammonia Slip Catalyst (same as CUC)
ATS	After Treatment System
BSFC	Brake Specific Fuel Consumption
CAC	Charge Air Cooler
CCDPF	Close Coupled DPF
CCV	Crankcase Ventilation
CE	Construction Equipment
CI	Cast Iron
CRS	Common Rail System
CRSN	Common Rail System NKW (Commercial vehicles)
CUC	Clean Up Catalyst for ammonia (same as ASC)
DAVNT	Dual Axis Variable Nozzle Turbine
DCS	Drawing Coordinate System
DI	Direct Injection
DOC	Diesel Oxidation Catalyst
DOHC	Double Over Head Camshaft
DPF	Diesel Particulate Filter
ECEGR	External Cooled EGR
ECU	Engine Control Unit
EEGR	External EGR
EGR	Exhaust Gas Recirculation
epWG	Electro pneumatic WG
eVGT	Electrical VGT
eWG	Electrical WG
FFOB	Front Face of Block
FGT	Fixed Geometry Turbocharger (no WG)
FIE	Fuel Injection System
HD	Heavy Duty
HLA	Hydraulic Lash Adjusters
IDI	Indirect Injection

Acronyms	Description
IEGR	Internal EGR
IPU	Industrial Power Unit
ISC	Interstage Cooling
LD	Light Duty
LDCV	Light Duty Commercial Vehicles
LH	Left Hand Side
LWR	Laser Welded Rail
MD	Medium Duty
n/a	Not Available
NA	Natural Aspirated
NS	Non Structural
OHV	Over Head Valves
OPT	Option
PCP	Peak Cylinder Pressure
PTO	Power Take Off
RFOB	Rear Face of Block
RH	Right Hand Side
S	Structural
SAPS	Sulphated Ash, Phosphorus, Sulphur
SCR	Selective Catalytic Reduction catalyst
SCRoF	SCR on filter
SOHC	Single Over Head Camshaft
STD	Standard
TC	Turbocharged
TCA	Turbocharged, Charge Air Cooled
THM	Thermal Management
UFDPF	Under Floor DPF
UQS	Urea Quality Sensor
VE	Bosch Distributor Mechanical Pump
VFT	Variable Flow Turbine
VGT	Variable Geometry Turbocharger
WG	Waste Gate Turbocharger
XPI	Extra high Pressure Injection (Scania, Cummins)

*Unit of misure according to international system of unit. Engine accessories and Options available on Option List. All data is subject to change without notice.*

## UPDATING

Revision	Description	Date
Revision 1.0_Nov 2019		November/2019