



# N45TE1P.S550 ROHS2



Brochure main description		@1500rpm	@1800rpm
<b>Application &amp; simbol</b>		Power Generation	
Engine identification main		N45	
Engine identification rating	kW	72	78
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)		N45TE1P.S550	
Technical code (Pregnana productions, if needed)		N45TE1P.S550	
Technical code (original plant engine code, on engine block)		F4HE0485C*J	
Stand-by power (gross) [mech]	kW	82	90
Specific power	kW/l	18	20
Electric commercial power (estimation alternator power output)	kWe [kVA]	72	78
BMEP	bar	14,6	13,3
Oil consumption on mission (average)	% fuel consumption	<0,1	
Cycle		Diesel 4 Stroke	
Air charging system pattern		Turbo aftercooler air/air	
Number of cylinder		4	
Configuration (cylinder arrangement)		in line	
Bore	mm	104	
Stroke	mm	132	
Stroke / Bore		1,27	
Displacement	l	4.5	
Unit Displacement	l	1,12	
Bore pitch	mm	1,125	
Valves per cylinder		4	
Cooling system pattern		liquid	
Direction of rotation (looking flywheel)		anti-clockwise	
Compression ratio		17,5:1	
Firing order		1 - 3 - 4 - 2	
Injection type		direct common rail	
Engine brake configuration		N/A	
Be10		8000	
<b>Cylinder Head</b>			
Single / Multiple		single	
Material		cast iron	
Head air circulation		crossflow	
Intake valve dia.	mm	33 +/-0,13	
Exhaust valve dia.	mm	33 +/-0,13	
<b>Camshaft</b>			
Layout		OHV	
Cam carrier		on inlet valve	
Material and Heat treatment		chilled cast iron	
Valve train		mechanical tappet & push rod	
Drivetrain (timing system)		gear tappet	



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Main characteristics		@1500rpm	@1800rpm
Valve actuation		tappet & push rod	
Variable valve actuation system		no	
Cylinder block (crankcase)		No Structural	
Material of cylinder block		cast iron	
Type of liners		block liners	
Liners replaceable; (slip fit or interference fit)		no	
Bearing caps		machined cast iron	
Crankcase Ventilation		Closed	
Oil separator		coalescent filter	
<b>Crankshaft &amp; counterweights</b>			
Material		forged Steel	
Acceptable Inertia (clutch)	kgm <sup>2</sup>	0,71	
Balancing		N/A	
<b>Turbocharger &amp; EGR system</b>			
Turbocharger type		wastegate	
Turbocharger supplier		Garrett	
Turbocharger control		WG pneumatic control	
Max turbine inlet temperature	°C	760	
Max boost pressure	mbar		
Method of cooling the turbocharger		lubricated / oil	
Turbo protection devices		-	
EGR		internal	
EGR control strategy		-	
Rate		-	
Valve		-	
Cooler		-	
Control		-	
Air mass measurement		-	
<b>Exhaust flap</b>			
Exhaust flap supplier		-	
Actuation type		-	
Exhaust flap cooling		-	
<b>Switchability (1500-1800 rpm)</b>			
Emission level 1500 rpm		stage 3A	
Emission level 1800 rpm		N/A	
<b>Front power take off</b>			
PTO type		-	
Max torque available from front of crankshaft (no side load)	Nm	-	
<b>Power take off on gear train</b>			
SAE A 9 teeth		-	
SAE A 11 teeth		-	
SAE B 13 teeth		-	
SAE B (DIN 5482)		-	
SAE 2B 15 teeth( ANSI B92,1)		-	
<b>References values</b>			
Engine dimension LxWxH (indicative values)	mm	832 x 711 x 917	
G-Drive Dimension LxWxH (indicative values)	mm	1302 x 780 x 1112	
Max permissible engine inclination	deg	25	



Main characteristics		@1500rpm	@1800rpm
Engine Weight - Dry (no fluids, value purely indicative)	kg		430
Engine Weight - Wet (with fluids, value purely indicative)	kg		450
G-Drive Weight - Dry (no fluids, value purely indicative)	kg		500
G-Drive Weight - Wet (with fluids, value purely indicative)	kg		520
Center of gravity (FFOB or RFOB according to picture, standard engine layout)	mm	-0,6; 145; -308	
Principal moment of inertia (reference on center of gravity ,standard engine layout)	kgm <sup>2</sup>		N/A
Principal moment of inertia (reference matrix based on center of gravity,standard engine layout)	kgm <sup>2</sup>		N/A
Center of gravity (FFOB or RFOB according to picture, standard IPU/G-Drive layout)	mm		N/A
Principal moment of inertia (reference on center of gravity ,standard IPU/G-Drive layout)	kgm <sup>2</sup>		N/A
Principal moment of inertia (reference matrix based on center of gravity,standard IPU/G-Drive layout)	kgm <sup>2</sup>		N/A
Mass moment of inertia - rotating components (excluding flywheel)	kgm <sup>2</sup>		0,14
Mass moment of inertia - standard flywheel	kgm <sup>2</sup>		0,71
Bending moment on the flywheel housing	Nm		N/A
Bending moment on PTO	Nm		-
Max static mounting surface load	N		N/A
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		-
<b>Environmental operating conditions</b>			
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		-25
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		-
<b>Engine performance</b>			
Continuous power (gross) [mech]	kW	59.6	65.5
Prime power (gross) [mech]	kW	74.5	81.8
Stand-by power (gross) [mech]	kW	82	90
Fan consumption [mech]	kW	1,6	2,8
Continuous power (net) [mech]	kW	58	62.7
Prime power (net) [mech]	kW	72.9	79
Stand-by power (net) [mech]	kW	80.4	87.2



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Main characteristics		@1500rpm	@1800rpm
Typical generator output	kW	72	78
Generator available power @ Prime power	kW	66	71
Generator available power @ Stand by	kW	72	78
<b>Power limitation according to ambient conditions</b>			
Ambient temperature above xx°C	%/5°C (xx°C)		2
Altitude > 1000 < 3000m above sea level	%/500m		3
Altitude > 3000m above sea level	%/500m		6
<b>Power limitation due to safety protections</b>			
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		60
Intake manifold air temperature	°C		-
Max allowed exhaust temperature	°C		760
Turbine overheating protection	°C		760
Turbine overspeed protection	rpm		140000
Oil temperature protection	°C		125
Oil pressure protection	bar		5
<b>Fuel System</b>			
Fuel density	kg/l		0,835
Injection system type			common rail
Injection pump manufacturer			Bosch
Injection model type			-
Injection model pump			CP3.3
Injection pressure	bar		800
Injector			CRIN2-16
Injector installation (sleeve, sealing flat or conical)			-
Injector nozzle			-
Engine fuel compatibility			see GOLD Documentation on fluids
Feed pump			-
Max flow	l/h		-
Nominal feed pressure	bar		-
Fuel filter			multilayer stratapore
Delta pressure on fuel filter	bar		0,09
Max continuous allowable fuel temperature (without derating)	°C		90
Max relative pressure at gear pump inlet	bar		N/A
Min relative pressure at gear pump inlet	bar		N/A
Max back flow relative pressure	bar		N/A
Max back flow restriction	bar		-
Max heat rejection to return fuel	kW		-
Max fuel flow	kg/h		N/A
Min fuel tank venting requirement	m³/h		-
Prefilter / Water separator micron size	µm		40



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<b>Air Intake System</b>		<b>@1500rpm</b>	<b>@1800rpm</b>
Aftercooling type (air to air or water to air)			air to air
Interstage cooling type		80-120EL 21 NEF P6 130-180E 21/24 NEF P6	
RoA (Temperature raise between ambient and inlet to engine)	°C		
Filter air intake temperature (warm air ricirculatuion)	°C		23
Max intake manifold temperature	°C		-
Compressor inlet pressure (with new air filter)	hPa		N/A
Compressor inlet pressure (with dirty air filter)	hPa		N/A
Air filter type			dry
Loads on turbocharger on compressor intake	kg		0
Loads on turbocharger on compressor outlet	kg		0
Charge air flow (max)	kg/h	N/A	N/A

<b>Exhaust System</b>		
Max back pressure (after exhaust flap) @ rated power with clean system	hPa	100
Max mechanical load on turbine flange	kg	0
Max exhaust flow rate	kg/h	567
Energy to exhaust	kcal/kWh	630 (@1500rpm)

<b>Lubrication System</b>		
Oil sump capacity	l	8,5
Max	l	8,5
Min	l	5,5
Oil system capacity including filter	l	12,8
Oil pump type		volimetric
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)	N/A
Min oil pressure @ rated speed (engine oil temp at 120°C)	kPa (bar)	N/A
Max oil pressure @ rated speed (engine oil temp at 120°C)	kPa (bar)	N/A
Max oil temperature @ full load (in main gallery)	°C	N/A
Max oil pressure peak on cold engine	bar	N/A
Oil cooler type		Modine (coolant/oil)
Transducer for indicating oil temperature and pressure		-
Max engine angularity - longitudinal / transversal (std oil pan)	0/360°	25
Allowed engine gradability during installation on vehicle	deg	0
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	N/A
Approved engine oil specifications		SAE 15W40-CLASS T2 - ACEA E7/04-PETRONAS URANIA LD7-MINERAL
Oil for cold condition mission (T° ambient < -25°C)		N/A

<b>Cooling system</b>		<b>@1500rpm</b>	<b>@1800rpm</b>
Type (water to water or air to water)			air to water



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Cooling system		@1500rpm	@1800rpm
Recommended coolant		see FPT specific document	
Min radiator cap pressure	kPa	75	
Warnnig setting first threshold	°C	103	
Max additional restriction	Pa	0,196	
Air to boil (prime power, open genset configuration)	°C	65	
Air to boil (stand by, open genset configuration)	°C	N/A	
EGR Cooler water flow (for ΔT=6°C)	l/s	-	
LP-CAC water flow (for ΔT=6°C)	l/s	-	
<b>Fan</b>			
Diameter	mm	500	
Number of blades		10	
Drive ratio		1,41:1	
<b>Radiator</b>			
Core dimensions LxWxh	mm	341 x 783 x 1105	
Dry weight	kg	47	
Radiator coolant capacity	l	7	
Optimum coolant temperature range @engine out (50% glycol)	°C	N/A	
Engine Water pump Type		volumetric	
Engine water pump drive		by belt	
Coolant capacity (engine only)	l	N/A	
Coolant capacity (radiator & hoses)	l	7	
Thermostat type		wax (Stant)	
Thermostat position		on cylinder head	
Thermostat opening / fully open temperature	°C	96	
Recommended coolant circuit pressurization range (relative)	hPa	1500 (max 3000)	
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	-	-
<b>Electrical, Electronic and Control Systems</b>			
System voltage	V	12	
Engine control unit		MD1CE101	
ECU software		P1603v454r28	
ECU Vehicle connection		by interface Box	
ECU operating range	°C	N/A	
Temperature of ECU case for <5' after power up	°C	N/A	



### Electrical, Electronic and Control Systems

ECU rated continuous temperature	°C	N/A
ECU communication protocol		N/A
Min power supply for ECU operation	V	N/A
Max power supply for ECU operation	V	N/A
Battery wire connection resistance value @20°C (from battery to ECU)	mΩ	N/A
Diagnostic system		N/A
Min cranking speed TDC @-30°C	rpm	N/A
Average cranking speed	rpm	N/A
N° tooth pinion/crown gear		N/A
Min battery voltage	V	6
Mean battery voltage	V	N/A
Min battery current	Ah	N/A
Mean battery current	Ah	N/A
Max starting circuit resistance ( to starter)	mΩ	N/A

### Cold starting

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

### Emission gaseus and particulales

NOX (Oxides of nitrogen)	g/kWh	3.28
HC (Hydrocarbons)	g/kWh	0.21
NOX+HC	g/kWh	3.5
CO (Carbon monoxide)	g/kWh	1.11
PT (Particlutes)	g/kWh	0.17
CO2 (Carbon Dioxide)	g/kWh	-

### Maintenance

Oil drain interval	see dedicated GOLD Book document
Oil filter change	see dedicated GOLD Book document
Oil refilling time	daily check to evaluate oil refill necessity
CCV filter change	see dedicated GOLD Book document
Fuel filter change	see dedicated GOLD Book document
Fuel pre-filter change	see dedicated GOLD Book document
Belt replacement	1200 h
Valve lash check /adjustment	3000 h
Coolant change	see dedicated GOLD Book document

### Engine Noise

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

### Step Load

		@1500rpm	@1800rpm
G1 (% of PrP)	%	95	-
G2 (% of PrP)	%	89	-
G3 (% of PrP)	%	80	94



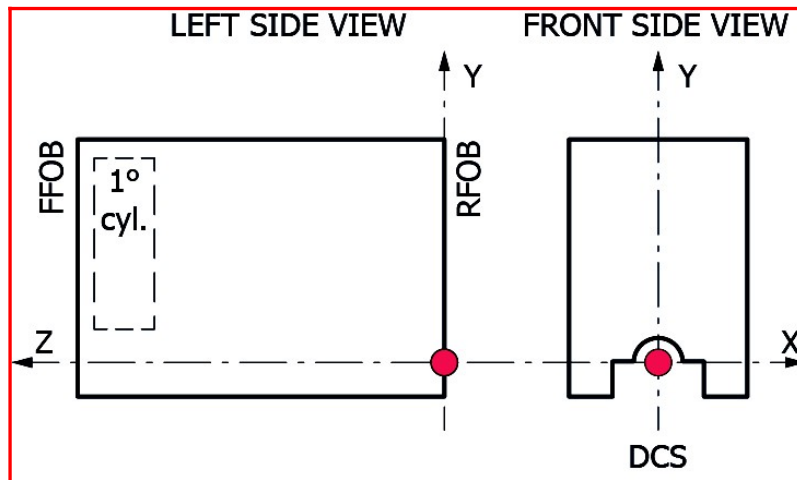
# N45TE1P.S550 ROHS2



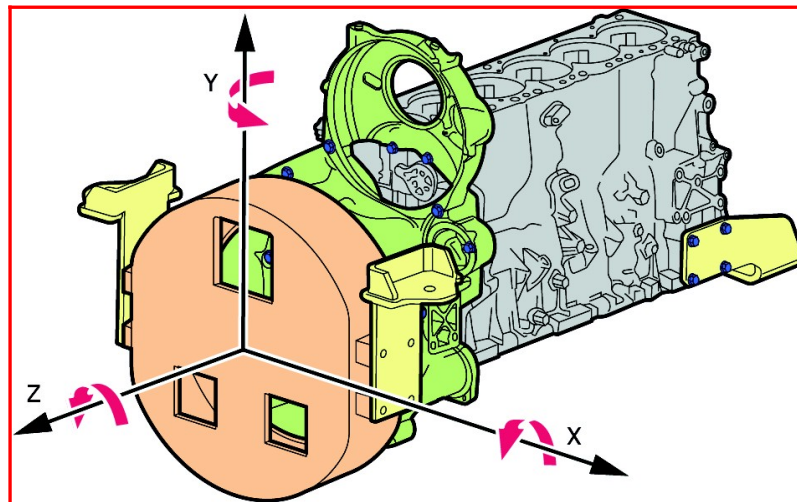
Maximum Rating Performance Data		@1500rpm	@1800rpm
Torque	Nm		
Ambient Temperature	°C	23	23
EGR Rate	%	-	-
Fuel Flow	g/s	N/A	N/A
Fuel consumption (BSFC) (prime power)	(kg/h) [g/kWh]	(15.8) [212.5]	(18.4) [224]
Fuel consumption (BSFC) (stand by)	(kg/h) [g/kWh]	(17.2) [209.7]	(19.8) [221]
Fuel consumption (BSFC) (80% prime power)	(kg/h) [g/kWh]	(13.2) [220]	(15.7) [227]
Fuel consumption (BSFC) (50% prime power)	(kg/h) [g/kWh]	(9.6) [234]	(11.1) [242]
Fuel consumption (BSFC) (25% prime power)	(kg/h) [g/kWh]	-	-
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	-	-
Exhaust Gas Temp between HP-TC	°C	-	-
Max Exhaust Gas Temp (after TC)	°C	-	-
Max admitted back pressure after SCR	kPa	-	-
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	N/A	N/A
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	-	-
LP-CAC water flow (for ΔT=6°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]	-	-

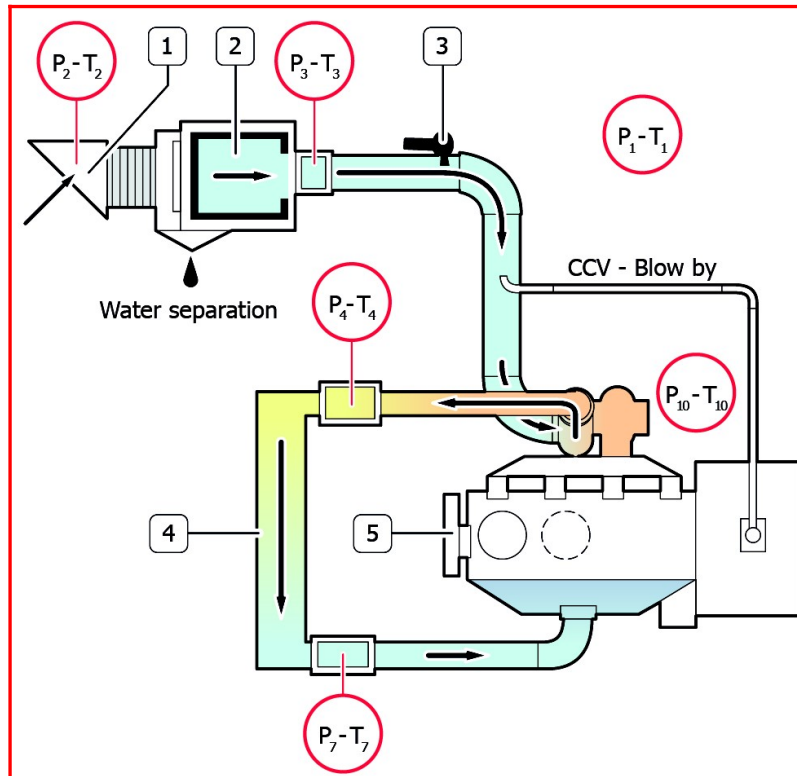




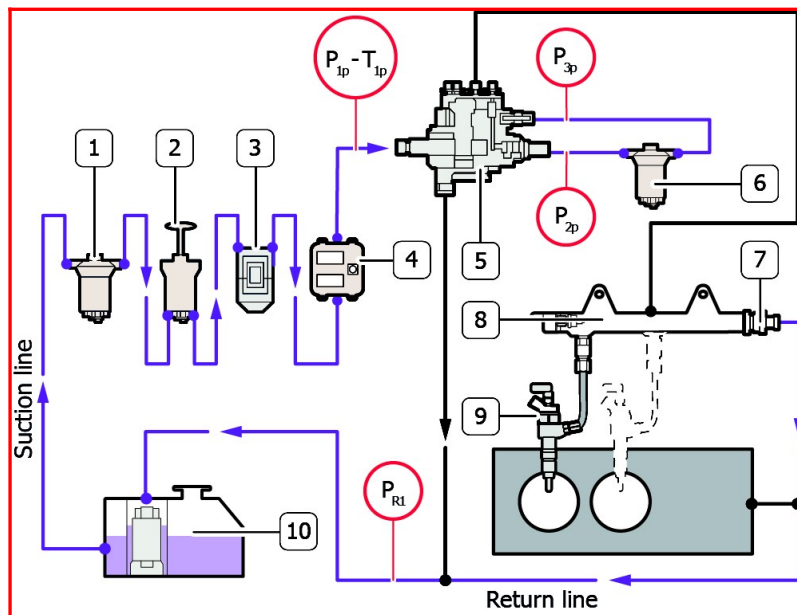
Principal Moment of Inertia



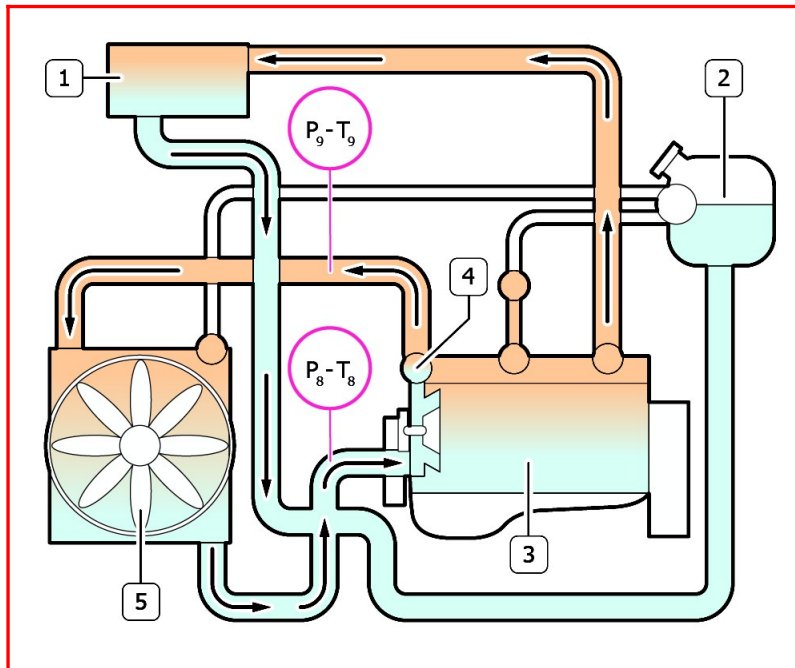
Components



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_Jan 2020		February/2020