N67MNTX20.00
LOW REGULATED EMISSION

Brochure main description		
Application & simbol		Off Road
Engine identication main		N67
Engine identication rating	kW	129
Engine features		Pivot
Emission feature		Low Regulated Emissioned

Main characteristics		
Emission certification		Low Regulated Emissioned
Commercial code (for order)		N67MNTX20.00
Other Commercial code		
Technical code (original plant engine code, on engine block)		F4GE9684A*J606
Technical homologation code		F4GE9684A*J
Oil consumption on mission (average)	% fuel comsumption	0,3
Cycle		diesel - 4 stroke
Air charging system pattern		Turbocharged aftercooled
Number of cylinder		6
Configuration (cylinder arrangement)		in line
Bore	mm	104
Stroke	mm	132
Stroke / Bore		1,27
Displacement	l	6,7
Unit Displacement	l	1,12
Bore pitch	mm	120
Valves per cylinder		2
Cooling system type		liquid
Direction of rotation (looking flywheel)		anti-clockwise
Compression ratio		17,5 : 1
Firing order		1 - 5 - 3 - 6 - 2 - 4
Injection type		direct, mechanical injection
Engine brake configuration		-
Be10		8000 h
Cylinder Head		
Single / Multiple		single
Material		cast Iron
Head air circulation		crossflow
Intake valve dia.	mm	45
Exhaust valve dia.	mm	42
Camshaft		
Layout		specific patented for int EGR
Cam carrier		on inlet valve
Material and Heat treatment		chilled cast iron
Valve train		mechanical tappet & push rod
Drivetrain (timing system)		gear tappet
Valve actuation		tappet & push rod
Variable valve actuation system		no
Cylinder block (crankcase)		No Structural
Material of cylinder block		cast iron

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Main characteristics		
Type of liners		no liners
Liners replaceable; (slip fit or interference fit)		no
Bearing caps		machined cast iron
Crankcase Ventilation		yes
Oil separator		on engine
Crankshaft & counterweights		
Material		cast iron
Acceptable Inertia (clutch)	kgm^2	
Balancing		option if required
Turbocharger & EGR system		
Turbocharger type		fixed geometry with wastegate valve
Turbocharger supplier		Holset
Turbocharger control		WG pneumatic control
Pressure after turbocharger compressor	mbar	1550 (depending on rating)
Max turbine inlet temperature	°C	700
Temperature after turbocharger compressor	°C	
Method of cooling the turbocharger		oil lubricated
Turbo protection devices		no
EGR type		Internal EGR
EGR control strategy		No
EGR recirculation rate		-
Valve		-
Cooler		-
Control		-
Air mass measurement		-
Exhaust flap		
Exhaust flap supplier		-
Actuation type		-
Exhaust flap cooling		-
Front power take off		
PTO type		front and side
Max torque available from front of crankshaft (no side load)	Nm	150
Power take off on gear train		
SAE A 9 teeth	Nm	100
SAE A 11 teeth	Nm	150
SAE B 13 teeth	Nm	240
SAE B (DIN 5482)	Nm	-
SAE 2B 15 teeth(ANSI B92,1)	Nm	-
References values		
Engine dimension LxWxH (indicative values)	mm	1054 x 671 x 685
Max permissible engine inclination	deg	35 all direction
Engine Weight - Dry (no fluids, value purely indicative)	kg	530
Engine Weight - Wet (with fluids, value purely indicative)	kg	560
Center of gravity (FFOB or RFOB according to picture, standard engine layout)	mm	x = - 4 ; y = 143 ; z = - 421
Principal moment of inertia (reference on center of gravity ,standard engine layout)	kgm^2	I1 = 7.10e+04 ; I2 = 5.87e+04 ; I3 = 2.62e+04

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Main characteristics		
Principal moment of inertia (reference matrix based on center of gravity,standard engine layout)	kgm^2	
Mass moment of inertia - rotating components (excluding flywheel)	kgm^2	0,33
Mass moment of inertia - standard flywheel	kgm^2	0,7 - 1,3
Mass moment of inertia - fan	kgm^2	
Stiffness - Engine standard layout		
Stiffness - rotating components (excluding flywheel)		
Stiffness - Standard flywheel		
Stiffness - Fan		
Bending moment on the flywheel housing	Nm	Point 1 = Within safety factor with mass @ max Z : 350 mm ; Point 2 = Within safety factor with mass @ max Z : 750 mm ; Point 3 = Within safety factor with mass @ max Z : 1050 mm
Flywheel housing SAE sizing		SAE 3
Flywheel SAE sizing		11" 1/2
Bending moment on PTO	Nm	
Max static mounting surface load	N	
Crankshaft thrust bearing pressure limit		
Intermittent load:	MPa	
Continuous load:	MPa	15
Rear main bearing load	MPa	
Max bending moment available from front of the crankshaft:		
0 deg	Nm	100
90 deg	Nm	300
180 deg	Nm	300
Environmental operating conditions		
Max altitude for declared performances	m	2000
Max ambient temperaturefor declared performances	°C	25
Min guaranteed temperature for cold start w/o any aid (stand alone engine)	°C	- 15
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	- 30
Time preheating for manifold heater	s	- 3°C = 0 s ; - 30°C = 21
Time post heating for manifold heater	s	- 3°C : 0 s ; - 20°C : 200
Low idle continuous operation time (reccomended)	h	
Power limitation according to ambient conditions		
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
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	
ATS Max gas inlet temperature	°C	

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Main characteristics		
Max allowed exhaust temperature	°C	
Turbine overheating protection	°C	-
Turbine overspeed protection	rpm	-
Oil temperature protection	°C	
Oil pressure protection (min engine rpm)	bar	

Fuel System		
Fuel density	kg/l	0,835
Injection system type		mechanical injection
Injection pump manufacturer		Bosch
Injection model type		Bosch VE
Injection model pump		VE pump
Injection pressure	bar	up to 600 bar
Injector		
Injector installation (sleeve, sealing flat or conical)		sleeve
Injector nozzle		Bosch DSLA145P1679
Engine fuel compatibility		see dedicated GOLD Book document on fluids
Feed pump on engine		on engine
Max fuel flow supply line	l/h	110 (1800 rpm)
Nominal feed pressure	bar	0,47 - 0,61 (1800rpm)
Fuel filter		single cartridge, left side
Fuel filter clogging sensor		
Max continuous allowable fuel temperature (without derating)	°C	70
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 return line	kg/h	26
Min fuel tank venting requirement	m^3/h	
Prefilter / Water separator micron size	µm	

Air Intake System		
Aftercooling system type		air to air
Interstage cooling type		-
RoA (Temperature raise between ambient and inlet to engine	°C	≤ 30
Filter air intake temperature (warm air ricirculatuion)	°C	
Max intake manifold temperature	°C	≤ 60
Compressor inlet pressure (with new air filter)	hPa	≥- 35
Compressor inlet pressure (with dirty air filter)	hPa	≥ - 65
Air filter type		
Loads on turbocharger on compressor intake	kg	
Loads on turbocharger on compressor outlet	kg	

Exhaust System		
Max back pressure (after exhaust flap) @ rated power with clean system	hPa	100
Max mechanical load on turbine flange	kg	0
Max ambient temperature for exhaust flap actuator	°C	-

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Exhaust System		
Max exhaust temperature After Treatment System	°C	-
Energy to exhaust	kW	
After Treatment System		
After Treatment System		-
POC		-
DPF		-
DOC		-
SCR		-
Urea Dosing System		-
AdBlue mixer		-
ATS sensors		-
DPF regeneration strategy		-
Lubrication System		
Oil sump capacity, max level	l	15
Oil sump capacity, min level	l	9
Oil system capacity including filter	l	
Oil pump type		gear pump
Oil pump drive arrangement		driven by gear
Min oil pump flow	l/min	~ 12
Max oil pump flow (@rated speed)	l/min	~ 50
Min oil pressure @ low idle (engine oil temp at 120°C)	kPa (bar)	60 (0,6)
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)	350 (3,5)
Max oil temperature @ full load (in main gallery)	°C	140
Max oil pressure peak on cold engine	bar	
Oil cooler type		water cooled
Transducer for indicating oil temperature and pressure		
Max engine angularity - longitudinal / transversal (std oil pan)	deg	35°
Allowed engine gradability during installation on vehicle	deg	± 4
Oil servicing intervals	h	see dedicated GOLD Book document on fluids
Oil filter type		single cartridge, right side
Oil filter capacity	l	1
Max oil content admitted in blow by gas (after filter)	g/h	0,3
Oil for cold condition mission (T° ambient < -25°C)		see dedicated GOLD Book document on fluids
Cooling system		
Type (water to water or air to water)		water to water
Recommended coolant		see dedicated GOLD Book document on fluids
Min radiator cap pressure	kPa	0,7
Warnnig setting first threshold	°C	
Max additional restriction (cooling system)	Pa	
EGR Cooler water flow (for ΔT=6°C)	l/s	-
LP-CAC water flow (for ΔT=6°C)	l/s	-
Fan		
Diameter	mm	-

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Cooling system		
Number of blades		-
Drive ratio		-
Speed		-
Air flow		-
Power consumption		-
Radiator		
Core dimensions LxWxh	mm	-
Dry weight	kg	-
Radiator coolant capacity	l	-
Optimum coolant temperature range @engine out (50% glycol)	°C	83 ÷ 99
Engine Water pump Type		centrifugal pump
Engine water pump drive		driven by belt
Coolant capacity (engine only)	l	10,5
Coolant capacity (radiator & hoses)	l	-
Thermostat type		wax type
Thermostat position		on cylinder head
Thermostat opening / fully open temperature	°C	83 ÷ 99
Recommended coolant circuit pressurization range (relative)	hPa	700 - 1200
Coolant engine pressure outlet – inlet (delta pressure, open thermostat, high idle conditions)	hPa	350
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)	%	Expansion Tank volume (and max level) must consider also coolant thermal expansion to avoid coolant loss in high temperature conditions. This can be checked in ATB Power Test
Max coolant flow to accessories @ rated speed from cab heater	l/min	
Engine out coolant to ambient @rated speed	delta °C	
Charge air cooler outlet to ambient @max rpm - CAC dT	delta °C	30
Pump water flow	l/min	

Electrical, Electronic and Control Systems		
System voltage	V	
Engine control unit		-
ECU software		-
ECU Vehicle connection		-
ECU operating range	°C	-
Temperature of ECU case for <5' after power up	°C	-
ECU rated continuous temperature	°C	-
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 connector type		-

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Electrical, Electronic and Control Systems		
Min cranking speed TDC @-30°C	rpm	75
Average cranking speed	rpm	115
N° tooth pinion/crown gear		10 / 132
Min battery voltage	V	9 (12V System) / 16 (24V System)
Mean battery voltage	V	11 (12V System) / 18,4 (24V System)
Min battery current	Ah	180
Mean battery current	Ah	
Max starting circuit resistance (to starter)	mΩ	< 70

Cold starting		
Without air preheating	°C	- 15
With air preheating (if available)	°C	- 25

Emission gaseus and particulales		
NOx (Oxides of nitrogen) [NRSC]	g/kWh	-
HC (Hydrocarbons) [NRSC]	g/kWh	-
NOX+HC [NRSC]	g/kWh	-
CO (Carbon monoxide) [NRSC]	g/kWh	-
PM (Particlutes) [NRSC]	g/kWh	-
CO2 (Carbon Dioxide) [NRSC]	g/kWh	-
NOx (Oxides of nitrogen) [NRTC]	g/kWh	-
HC (Hydrocarbons) [NRTC]	g/kWh	-
NOX+HC [NRTC]	g/kWh	-
CO (Carbon monoxide) [NRTC]	g/kWh	-
PM (Particlutes) [NRTC]	g/kWh	-
CO2 (Carbon Dioxide) [NRTC]	g/kWh	-

Maintenance	
Oil drain interval	see dedicated GOLD Book document on fluids
Oil filter change	see dedicated GOLD Book document on fluids
Oil refilling time	daily check to evaluate oil refill necessity
Approved engine oil specifications	see dedicated GOLD Book document on fluids
CCV filter change	1500 hours or 1 year
Fuel filter change	see dedicated GOLD Book document on fluids
Fuel pre-filter change	see dedicated GOLD Book document on fluids
Belt replacement	1200
Valve lash check /adjustment	2400
DPF filter service	-
Coolant change	see dedicated GOLD Book document on fluids

Engine Noise		rated speed	max power	max torque
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		N/A	
AdBlue consumption (average on mission)	% of fuel cons	-	-	-

Design air handling system data		rated speed	max power	max torque
EGR flow	kg/h	-	-	-

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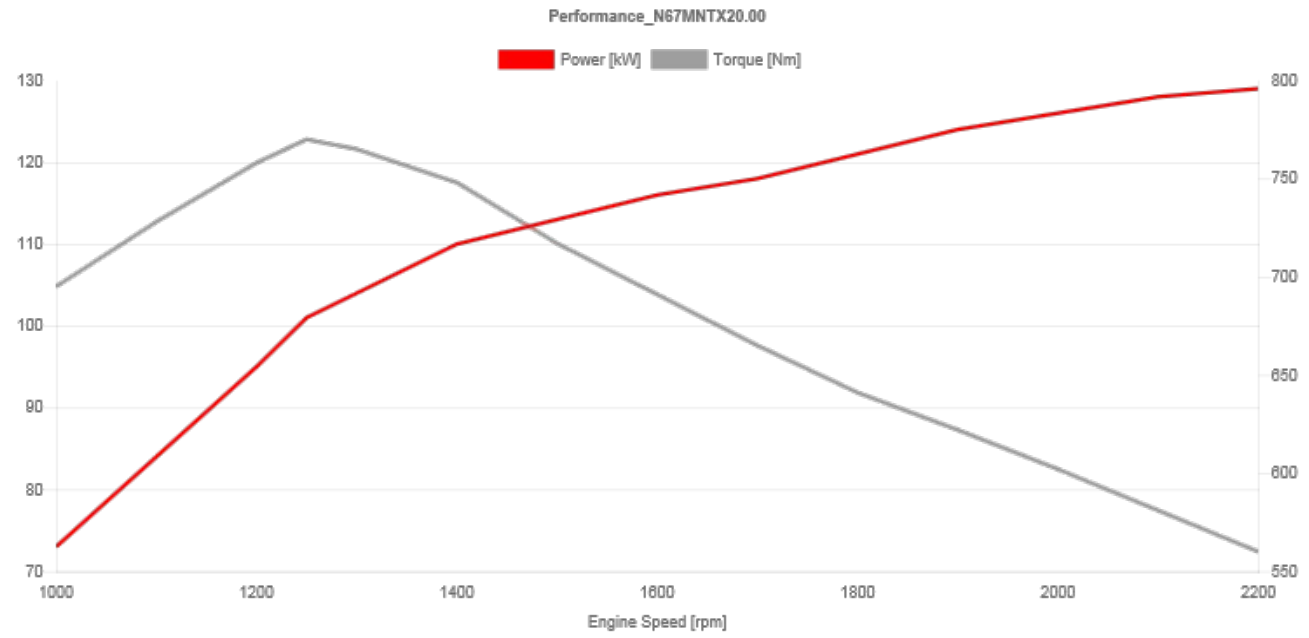
Design air handling system data		rated speed	max power	max torque
EGR pressure	kPa	-	-	-
Boost pressure (compressor outlet)	kPa	155	-	100
Pressure drop on charge air cooling system	kPa			
Max temperature after HP-Compressor	°C	150		110
Boost temperature (includes EGR effect)	°C	50		30
ATS back pressure	kPa	-	-	-
Exhaust Gas Temp between HP-TC	°C			
Max Exhaust Gas Temp (after TC)	°C	480	-	500
Max admitted back pressure after SCR	kPa	-	-	-
Max admitted back pressure after TC	kPa	10	-	4
Power engine coolant without EGR & CAC	kW			
Power high Temperature EGR Cooler (engine water)		-	-	-
Power to coolant due to EGR LP-Circuit		-	-	-
Power Radiated	kW			

Engine Performance data



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Engine Speed [rpm]	Power [kW] Power [kW]	Torque [Nm] Torque [Nm]
Rated Power	kW	129
Rated speed	rpm	2200
Specific Power (rated)	kW/l	19,2
Max Power (peak)	kW	129
Power speed (peak)	rpm	2200
Specific Power (peak)	kW/l	19,2
BMEP @max Power	bar	10,5
Mean Piston Speed	m/s	10,1

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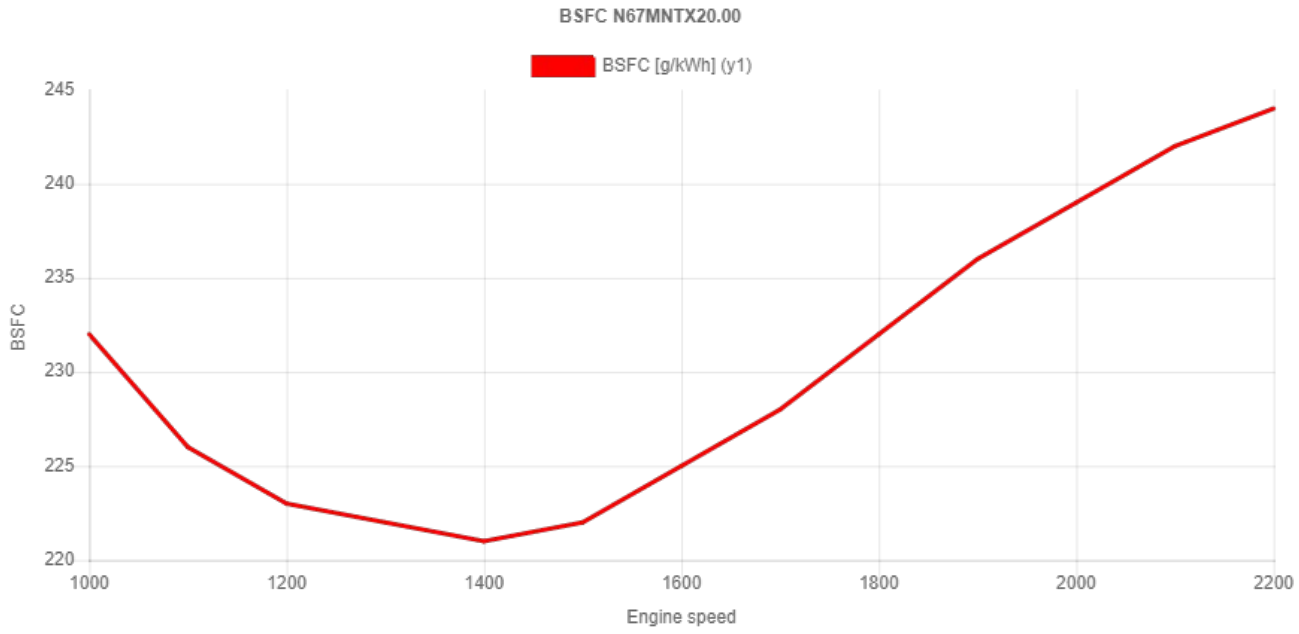
Max Torque	Nm	770
Max Torque speed	rpm	1500
Specific Torque	Nm/l	115
BMEP @ max Torque	bar	
Torque rise	%	37,5
Torque @ 1000 rpm	Nm	695
Max no load governor speed	rpm	2430
Nominal idling speed	rpm	800
Best Point BSFC	g/kWh	214
Engine brake power @ rated speed	kW	30
Engine brake power in over speed	kW	35

Maximum Rating Performance Data [*]

Power output	kW	129	129	113
Torque	Nm	560	560	770
Speed	rpm	2200	2200	1500
Ambient Temperature	°C	25	25	25
Frictional torque	Nm	-	-	-
Fuel Flow	g/s	8,8	-	6,2



BSFC N67MNTX20.00

Charge Air Flow	g/s	264	-	140
Exhaust Gas Flow	g/s	272,8	-	146,2
Total Water cooling power of engine	kW	58,3	-	-
Total CAC power (air to air)	kW	21,8	-	12

Images

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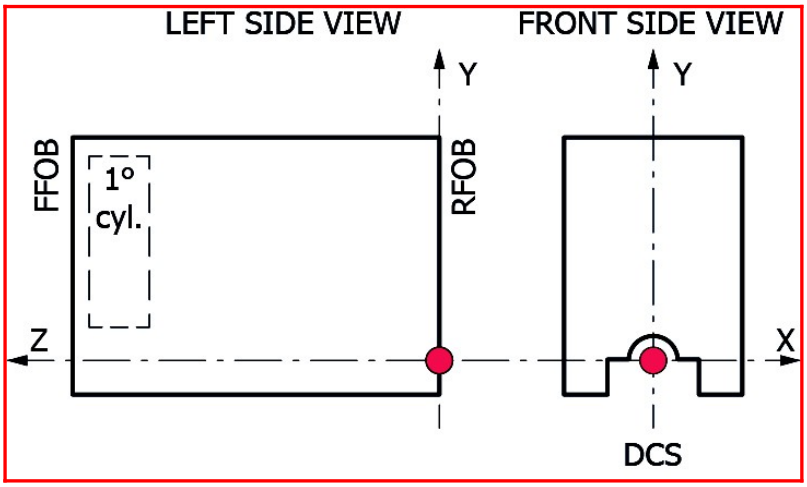
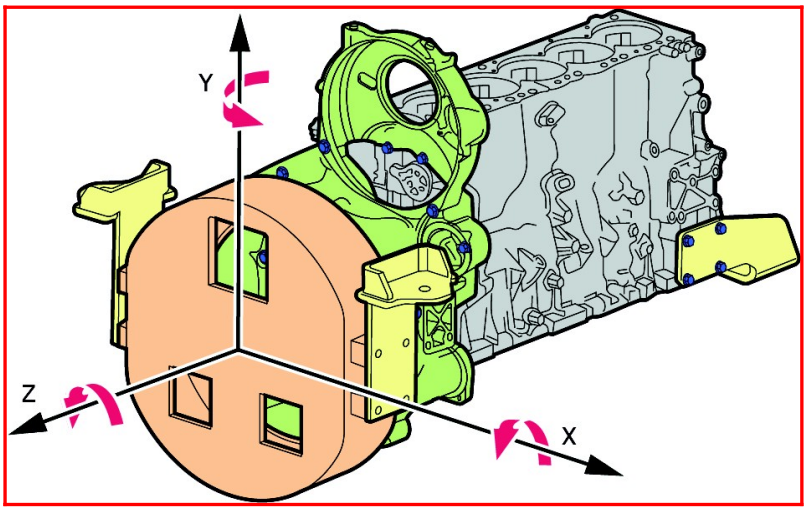


Principal Moment of Inertia



Components

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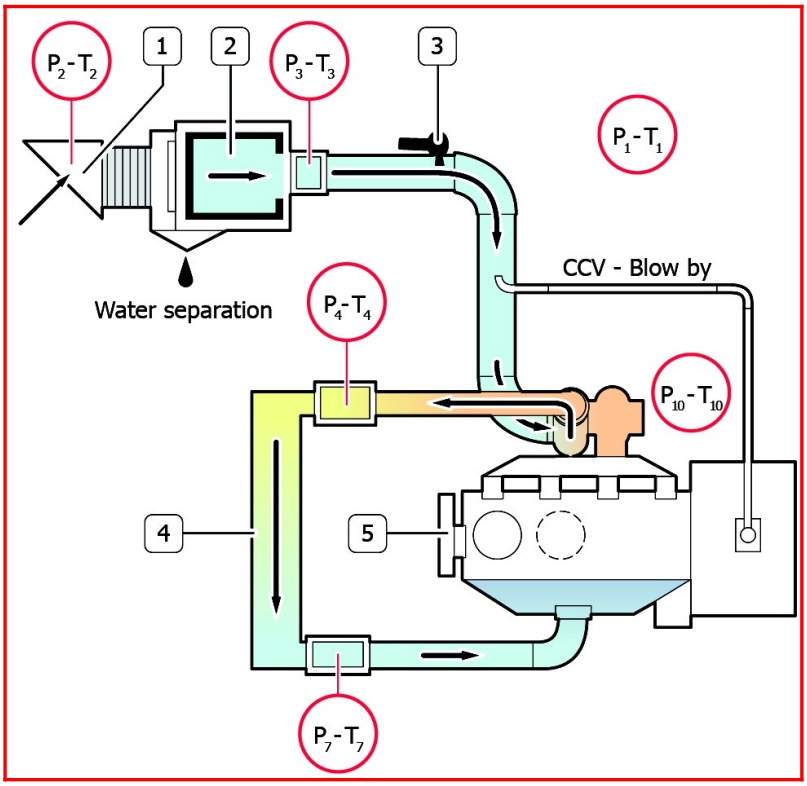
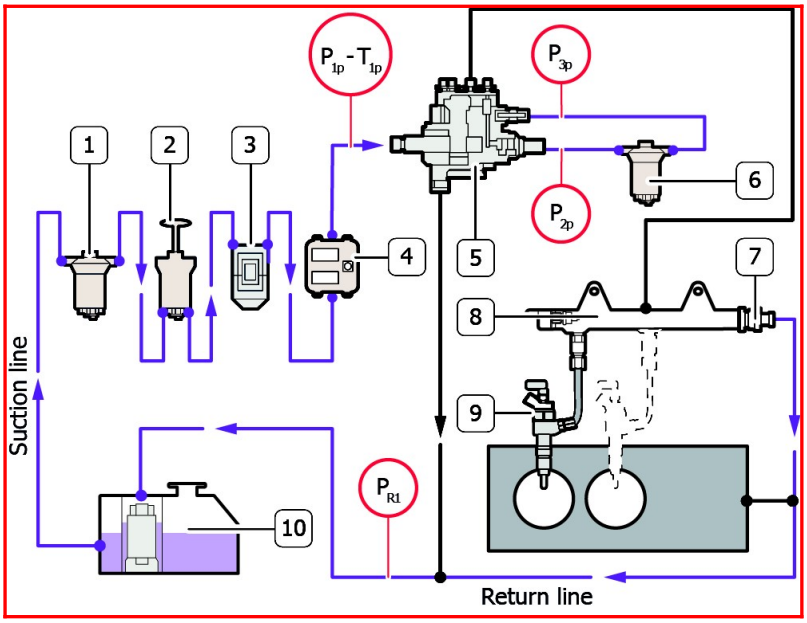


1.Snorkel 2.Air Filter 3.Humidity sensor 4.Intercooler



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

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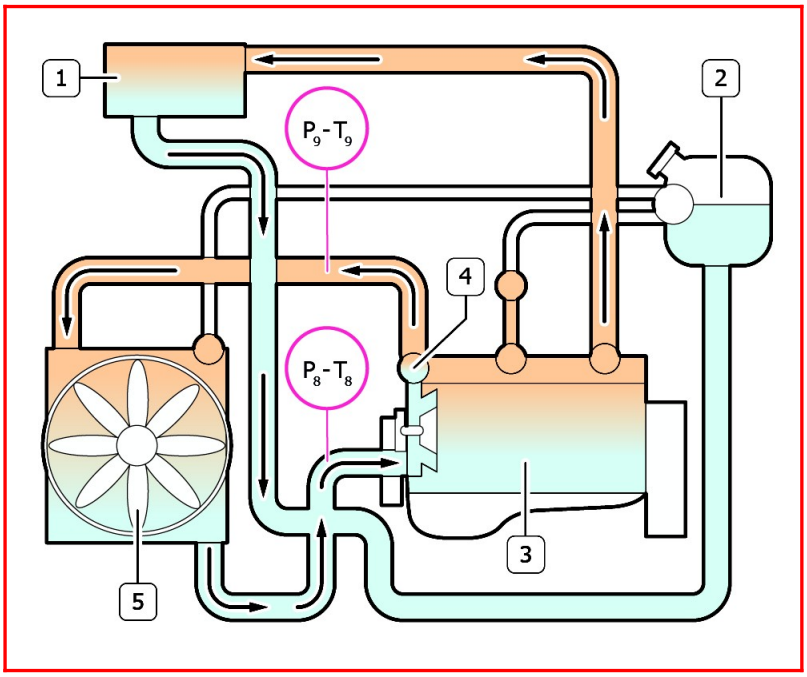

1.Heating element 2.Expansion tank 3.Engine 4.Thermostat 5.Radiator

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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	SCRon 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 2.0_Dec 2022		December/2022

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