F34TEVP04.00_50 kW
G-DRIVE TIER 4B_STAGE V

Brochure main description		@1500rpm	@1800rpm
Application & simbol		Power Generation	
Engine identication main		F34	
Engine identication rating	kW	46	50
Engine features		PG G-Drive	
Emission feature		Tier 4B_Stage V	

Main characteristics		@1500rpm	@1800rpm
Emission certification		Tier4B_Stage V	
Commercial code (for order)		F34TEVP04.00	
Other Commercial code		F5HGL465A	
Technical code (original plant engine code, on engine block)		F5HGL465A*X001	
Technical homologation code		F5HGL465A*X	
Stand-by power (gross) [mech]	kW	46	50
Specific power	kW/l	13,5	14,7
Electric commercial power (estimation alternator power output)	kWe [kVA]	40 [50] (generator efficiency 0,88)	43 [53] (generator efficiency 0,88)
BMEP	bar	10,9	9,8
Oil consumption on mission (average)	% fuel comsumption	0,25	
Cycle		diesel - 4 stroke	
Air charging system pattern		Turbocharged	
Number of cylinder		4	
Configuration (cylinder arrangement)		in line	
Bore	mm	99	
Stroke	mm	110	
Stroke / Bore		1,11	
Displacement	l	3,4	
Unit Displacement	l	0,85	
Bore pitch	mm	110	
Valves per cylinder		2	
Cooling system type		liquid	
Direction of rotation (looking flywheel)		anti-clockwise	
Compression ratio		17 : 1	
Firing order		1 - 3 - 4 - 2	
Injection type		direct - electronic common rail	
Be10		8000 h	
Cylinder Head		N/A	
Single / Multiple		single	
Material		cast iron	
Head air circulation		reverse flow	
Intake valve dia.	mm	41	
Exhaust valve dia.	mm	37	
Camshaft		N/A	
Layout		OHV	
Cam carrier		on block cylinder	
Material and Heat treatment		C53 bon - hardness 55 hrc on cammes	
Valve train		OHV valve train with valve pushrod and lower camshaft	
Drivetrain (timing system)		gear tappet	

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		parent metall cylinder block	
Liners replaceable; (slip fit or interference fit)		no	
Bearing caps		machined cast iron	
Crankcase Ventilation		closed	
Oil separator		centrifugal	
Crankshaft & counterweights		N/A	
Material		GH 90-52-05 AS 15-2218	
Acceptable Inertia (clutch)	kgm^2	0,8	
Balancing		no	
Turbocharger & EGR system		N/A	
Turbocharger type		fixed geometry with wastegate valve	
Turbocharger supplier		BorgWarner	
Turbocharger control		WG pneumatic control	
Pressure after turbocharger compressor	mbar	2,6 bar	
Max turbine inlet temperature	°C	740 cont. / 760 peak °C	
Temperature after turbocharger compressor	°C	N/A	
Method of cooling the turbocharger		oil lubricated	
Turbo protection devices		wastegate and ECU derating	
EGR type		yes	
EGR control strategy		external cooler EGR	
EGR recirculation rate		<10%	
Valve		Ø 21	
Cooler		water cooler	
Control		from engine ECU	
Air mass measurement		no	
Exhaust flap		N/A	
Switchability (1500-1800 rpm)		N/A	
Emission level 1500 rpm		StageV	
Emission level 1800 rpm		Tier4B	
Front power take off		N/A	
Power take off on gear train		N/A	
References values		N/A	
Engine dimension LxWxH (indicative values)	mm	890x665x880	
G-Drive Dimension LxWxH (indicative values)	mm	1215x740x965	
Max permissible engine inclination	deg	30	
Engine Weight - Dry (no fluids, value purely indicative)	kg	390	
Engine Weight - Wet (with fluids, value purely indicative)	kg	400	
G-Drive Weight - Dry (no fluids, value purely indicative)	kg	422	
G-Drive Weight - Wet (with fluids, value purely indicative)	kg	438	
Center of gravity (FFOB or RFOB according to picture, standard IPU/G-Drive layout)	mm	x = 9 ; y = 148 ; z = -208	
Principal moment of inertia (reference on center of gravity ,standard IPU/G-Drive layout)	kgm^2	I1 = 21 kgm^2; I2 = 32 kgm^2; I3 = 40	

Main characteristics		@1500rpm	@1800rpm
Principal moment of inertia (reference matrix based on center of gravity,standard IPU/G-Drive layout)	kgm^2	N/A	
Mass moment of inertia - rotating components (excluding flywheel)	kgm^2	N/A	
Mass moment of inertia - standard flywheel	kgm^2	1,19	
Bending moment on the flywheel housing	Nm	N/A	
Flywheel housing SAE sizing		N/A	
Flywheel SAE sizing		N/A	
Max static mounting surface load	N	N/A	
Crankshaft thrust bearing pressure limit		N/A	
Intermittent load:	MPa	N/A	
Continuous load:	MPa	N/A	
Rear main bearing load	MPa	N/A	
Max bending moment available from front of the crankshaft:		N/A	
0 deg	Nm	100	
90 deg	Nm	300	
180 deg	Nm	300	
Environmental operating conditions		N/A	
Max altitude for declared performances	m	1676	
Max ambient temperaturefor declared performances	°C	40	
Min guaranteed temperature for cold start w/o any aid (stand alone engine)	°C	- 15 (with glow plugs)	
Min guaranteed temperature for cold start with Air Heater (stand alone engine)	°C	- 23 (with glow plugs and fuel heater)	
Min guaranteed temperature for cold start with grid heater and block heater (stand alone engine)	°C	- 32 (with glow plugs, fuel heater and block heater)	
Low idle continuous operation time (reccomended)	h	N/A	
Engine performance [*]		N/A	
Continuous power (gross) [mech]	kW	33,3	36
Prime power (gross) [mech]	kW	41,8	45,5
Stand-by power (gross) [mech]	kW	46	50
Fan consumption [mech]	kW	1	1,4
Continuous power (net) [mech]	kW	31,8	35,2
Prime power (net) [mech]	kW	40,8	44,1
Stand-by power (net) [mech]	kW	45	48,6
Typical generator output		[typical generator efficiency 0.88]	[typical generator efficiency 0.88]
Generator available power @ Prime power	kW	(generator eff. 0,88) 35,9	(generator eff. 0,88) 38,8
Generator available power @ Stand by	kW	(generator eff. 0,88) 39,6	(generator eff. 0,88) 42,8
Power limitation according to ambient conditions		N/A	
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		N/A	
Pre-Warning: first advice of high coolant temperature [**]. Switch-on of the amber lamp	°C	104	
Warning: second advice of high coolant temperature [**]. Switch-on of the red lamp	°C	110	
Start of derating	°C	108	
Altitude level: gradual reduction of transient response by smoke map correction from	m	2000	

Fuel temperature	°C	70
Intake manifold air temperature	°C	70
ATS Max gas inlet temperature	°C	600
Max allowed exhaust temperature	°C	740°C (760°C peak)
Turbine overheating protection	°C	N/A
Turbine overspeed protection	rpm	N/A
Oil temperature protection	°C	125
Oil pressure protection (min engine rpm)	bar	N/A

Fuel System		
Fuel density	kg/l	0,84
Injection system type		electronic common rail
Injection pump manufacturer		Bosch
Injection model type		common rail
Injection model pump		CP4N1
Injection pressure	bar	1600
Injector		CRI 2-16 OHW
Injector installation (sleeve, sealing flat or conical)		sealing flat
Injector nozzle		8 x 350
Engine fuel compatibility		See dedicated GOLD Book document on fluids
Feed pump on engine		integrated in high pressure pump
Max fuel flow supply line	l/h	50
Nominal feed pressure	bar	1600
Fuel filter		single cartridge on left side
Fuel filter clogging sensor		yes
Max continuous allowable fuel temperature (without derating)	°C	70
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	N/A
Max heat rejection to return fuel	kW	N/A
Max fuel flow return line	kg/h	@1500rpm: 9,9 kg/h @1800rpm: 9,97
Min fuel tank venting requirement	m^3/h	N/A
Prefilter / Water separator micron size	µm	>99 % @ 30 micron ISO 19438 (not on Engine)

Air Intake System		**@1500rpm**	**@1800rpm**
RoA (Temperature raise between ambient and inlet to engine	°C	10	
Filter air intake temperature (warm air ricirculatuion)	°C	40	
Max intake manifold temperature	°C	150	
Compressor inlet pressure (with new air filter)	hPa	>-20	
Compressor inlet pressure (with dirty air filter)	hPa	>-50	
Air filter type		cartridge	
Loads on turbocharger on compressor intake	kg	0	
Loads on turbocharger on compressor outlet	kg	0	
Charge air flow (max)	kg/h	194	226

Exhaust System		**@1500rpm**	**@1800rpm**
Max back pressure (after exhaust flap) @ rated power with clean system	hPa	220	
Max mechanical load on turbine flange	kg	0	

Exhaust System		@1500rpm	@1800rpm
Max exhaust temperature After Treatment System	°C	740 cont. / 760 peak	
Max exhaust flow rate	kg/h	226	
Energy to exhaust	kW	30	33,4

After Treatment System	
After Treatment System	DOC + DPF
DPF	yes
DOC	yes
ATS sensors	DPF Delta Pressure - US/DS DOC Temperature sensor
DPF regeneration strategy	Active and Passive

Lubrication System		
Oil sump capacity, max level	l	8
Oil sump capacity, min level	l	6
Oil system capacity including filter	l	9,5
Oil pump type		gear pump
Oil pump drive arrangement		driven by gear
Min oil pump flow	l/min	N/A
Max oil pump flow (@rated speed)	l/min	70
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	125
Max oil pressure peak on cold engine	bar	N/A
Oil cooler type		water cooled
Transducer for indicating oil temperature and pressure		signal from ECU
Max engine angularity - longitudinal / transversal (std oil pan)	deg	35
Allowed engine gradability during installation on vehicle	deg	± 4
Oil servicing intervals	h	600
Oil filter type		cartridge
Oil filter capacity	l	0,5
Max oil content admitted in blow by gas (after filter)	g/h	< 0,5
Oil for cold condition mission (T° ambient < -25°C)		see dedicated GOLD Book document on fluids

Cooling system		@1500rpm	@1800rpm
Type (water to water or air to water)		air to water	
Recommended coolant		50% water and 50% coolant (depending on mission)	
Min radiator cap pressure	kPa	100	
Warnnig setting first threshold	°C	106	
Max additional restriction (cooling system)	Pa	N/A	
Air to boil (prime power, open genset configuration). For further information see GB document	°C	N/A	
Air flow (prime power, open genset configuration)	m^3/s	N/A	
Air to boil (stand by, open genset configuration). For further information see GB document	°C	N/A	
Air flow (stand by, open genset configuration)	m^3/s	N/A	
EGR Cooler water flow (for ΔT=6°C)	l/s	N/A	
Fan		N/A	

Cooling system		@1500rpm	@1800rpm
Diameter	mm	450	
Number of blades		7	
Drive ratio		1,1	
Speed		"3,3 m/s @1500rpm 4,3 m/s @1800rpm "	
Air flow		"1 m3/s @1500rpm 1,3 m3/s @1800rpm "	
Power consumption		"@1500rpm: 1 kW @1800rpm: 1,4 kW"	
Radiator		N/A	
Core dimensions LxWxh	mm	590 x 80 x 880	
Dry weight	kg	18	
Radiator coolant capacity	l	3	
Optimum coolant temperature range @engine out (50% glycol)	°C	80	
Engine Water pump Type		centrifugal pump	
Engine water pump drive		driven by belt	
Coolant capacity (engine only)	l	5	
Coolant capacity (radiator & hoses)	l	N/A	
Thermostat type		wax type	
Thermostat position		on cylinder head	
Thermostat opening / fully open temperature	°C	79 ± 2 / 94 ± 2	
Recommended coolant circuit pressurization range (relative)	hPa	1000	
Coolant engine pressure outlet – inlet (delta pressure, open thermostat, high idle conditions)	hPa	300	
Min coolant pressure (no pressure cap and thermostat closed)	hPa	N/A	
Coolant water pump inlet pressure (water temperature 60-100°C)	hPa	60	
Coolant flow to radiator @rated speed	l/h	N/A	
Min coolant expansion space (% total cooling system capacity)	%	N/A	
Max coolant flow to accessories @ rated speed from cab heater	l/min	N/A	
Engine out coolant to ambient @rated speed	delta °C	N/A	
Engine out coolant to ambient @torque speed	delta °C	N/A	
Pump water flow	l/min	111	134

Electrical, Electronic and Control Systems		
System voltage	V	12
Engine control unit		MD1CS069
ECU software		P1738v51.1
ECU Vehicle connection		with CAN line
ECU operating range	°C	- 40 ÷ + 105
Temperature of ECU case for <5' after power up	°C	85
ECU rated continuous temperature	°C	80
ECU communication protocol		SAE J1939
Min power supply for ECU operation	V	10
Max power supply for ECU operation	V	16
Battery wire connection resistance value @20°C (from battery to ECU)	mΩ	≤ 70
Diagnostic connector type		ISO 14229
Min cranking speed TDC @-30°C	rpm	70
Average cranking speed	rpm	110

Electrical, Electronic and Control Systems		
N° tooth pinion/crown gear		10 / 126
Min battery voltage	V	10
Mean battery voltage	V	14 ± 0,5
Min battery current	Ah	N/A
Mean battery current	Ah	101
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	N/A
HC (Hydrocarbons) [NRSC]	g/kWh	N/A
NOX+HC [NRSC]	g/kWh	N/A
CO (Carbon monoxide) [NRSC]	g/kWh	N/A
PM (Particlutes) [NRSC]	g/kWh	N/A
CO2 (Carbon Dioxide) [NRSC]	g/kWh	N/A
NOx (Oxides of nitrogen) [NRTC]	g/kWh	N/A
HC (Hydrocarbons) [NRTC]	g/kWh	N/A
NOX+HC [NRTC]	g/kWh	N/A
CO (Carbon monoxide) [NRTC]	g/kWh	N/A
PM (Particlutes) [NRTC]	g/kWh	N/A
CO2 (Carbon Dioxide) [NRTC]	g/kWh	N/A

Maintenance	
Oil drain interval	see dedicated GOLD Book document on fluids
Oil filter change	600 h
Oil refilling time	daily check to evaluate oil refill necessity
Approved engine oil specifications	N/A
CCV filter change	1800 h
Fuel filter change	600 h
Fuel pre-filter change	600 h
Belt replacement	3000 h
Valve lash check /adjustment	for life
DPF filter service	600 h
Coolant change	3000 h

Engine Noise			
Overall sound pressure (engine only)	dBA	92,5	
Overall sound pressure (with accessories only)	dBA	N/A	
Exhaust noise (w/o Muffler)	dBA	N/A	
Noise spectrum (octave analysis performed at the position of maximum noise) - diagram	Table dB-Hz	N/A	
A-weight sound power level LW function of power (value calculated respecting standard ISO 3744 and 3746. For further information see GB document)		N/A	
0% (no load)	dBA	N/A	
75% (partial load)	dBA	N/A	
100% (full load)	dBA	N/A	

Engine Noise			
110% (overload)	dBA	N/A	

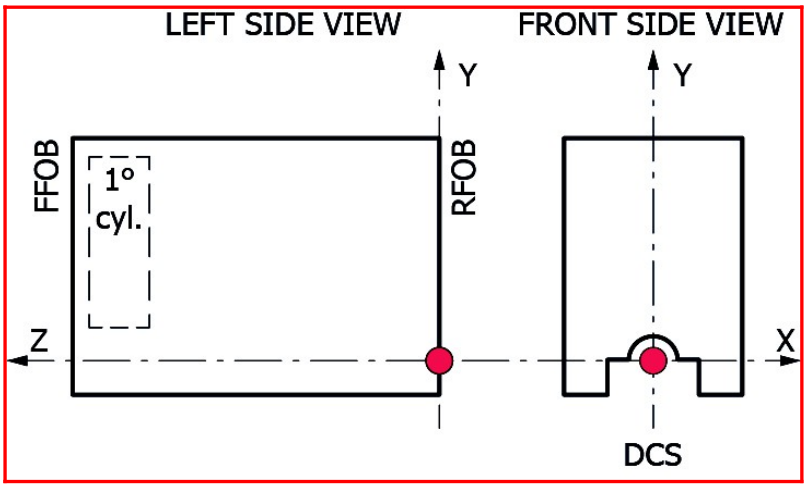
Step Load (for further information see GB document)		@1500rpm	@1800rpm
G1 (% of PrP)	%	N/A	N/A
G2 (% of PrP)	%	N/A	N/A
G3 (% of PrP)	%	N/A	N/A
Removal load (G1)	%	N/A	N/A
Removal load (G2)	%	N/A	N/A
Removal load (G3)	%	N/A	N/A
Emergency (xxx)	%	N/A	N/A
Emergency (xxx)	%	N/A	N/A
Emergency (xxx)	%	N/A	N/A

Maximum Rating Performance Data		@1500rpm	@1800rpm
Torque	Nm	295	264
Ambient Temperature	°C	22	22
EGR Rate	%	<10	<10
Fuel Flow	g/s	2,7	2,77
Fuel consumption (BSFC) (prime power)	(kg/h) [g/kWh]	[212]	[221]
Fuel consumption (BSFC) (stand by)	(kg/h) [g/kWh]	[214]	[217]
Fuel consumption (BSFC) (80% prime power)	(kg/h) [g/kWh]	[217]	[227]
Fuel consumption (BSFC) (50% prime power)	(kg/h) [g/kWh]	[230]	[252]
Fuel consumption (BSFC) (25% prime power)	(kg/h) [g/kWh]	[275]	[306]
Exhaust Gas Flow	kg/h	205	239

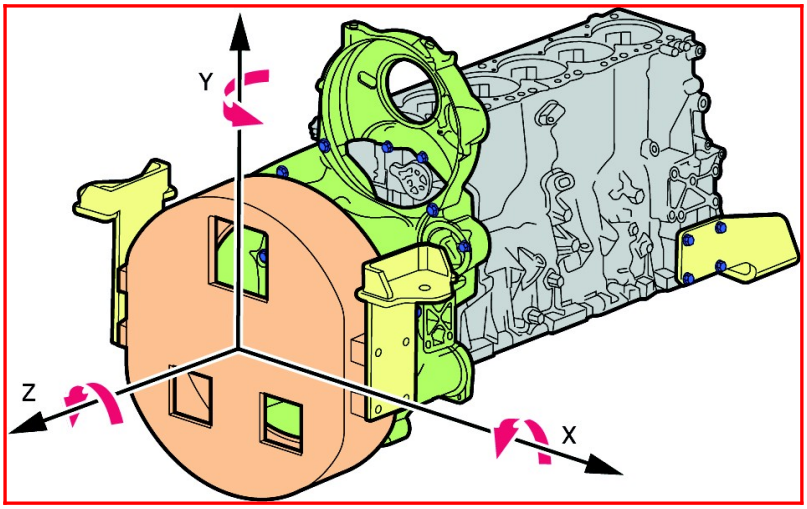
Design air handling system data		@1500rpm	@1800rpm
EGR flow	kg/h	N/A	N/A
EGR pressure	kPa	N/A	N/A
Boost pressure (compressor outlet)	kPa	N/A	N/A
Pressure drop on charge air cooling system	kPa	N/A	N/A
Max temperature after HP-Compressor	°C	N/A	N/A
Boost temperature (includes EGR effect)	°C	N/A	N/A
ATS back pressure	kPa	N/A	N/A
Exhaust Gas Temp between HP-TC	°C	N/A	N/A
Max Exhaust Gas Temp (after TC)	°C	N/A	N/A
Max admitted back pressure after TC	kPa	N/A	N/A
Power high Temperature EGR Cooler (engine water) (prime power)	kW [kcal/kWh]	N/A	N/A
Power high Temperature EGR Cooler (engine water) (stand by)	kW [kcal/kWh]	N/A	N/A
Power to coolant due to EGR LP-Circuit (prime power)	kW [kcal/kWh]	N/A	N/A
Power to coolant due to EGR LP-Circuit (stand by)	kW [kcal/kWh]	N/A	N/A
Total Power to coolant (prime power)	kW [kcal/kWh]	27,7	30
Total Power to coolant (stand by)	kW [kcal/kWh]	30	33,6
Total pump water flow	l/s	1,85	2,23
Radiator Coolant Flow (5% less if continuous deareating system, coolant according to FPT norms)	l/min	N/A	N/A
EGR Cooler water flow (for ΔT=6°C)	l/s	N/A	N/A
Power Radiated	kW	6,5	7,1

Design air handling system data		@1500rpm	@1800rpm
Charge Air Flow	g/s	N/A	
[*] Power at flywheel according dir. 97/68 EC (w/o fan), after 50 hours of run-in, tolerance ±5%, fuel EN 590; Test according ISO 3046/1, turbo air inlet temperature 25°C, atmospheric pressure 100 kPa, humidity 30 %			N/A
[**] according to temperature sensor tolerance			N/A

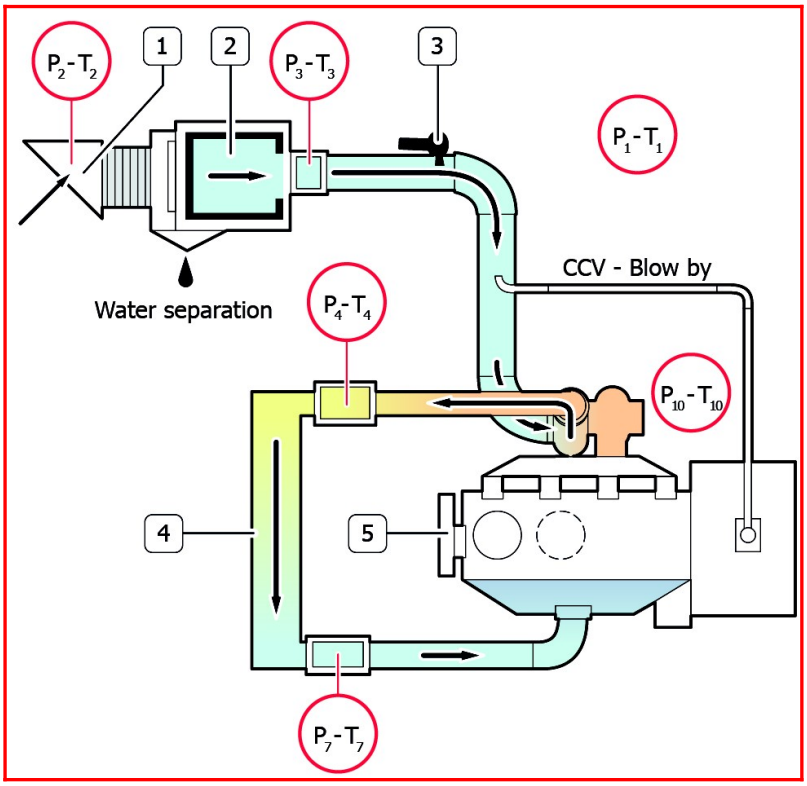
Images



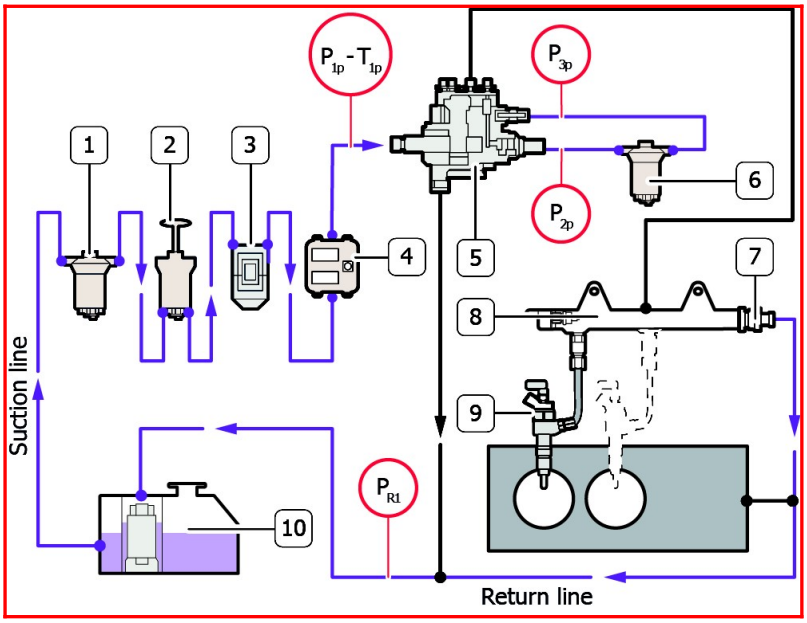
Principal Moment of Inertia



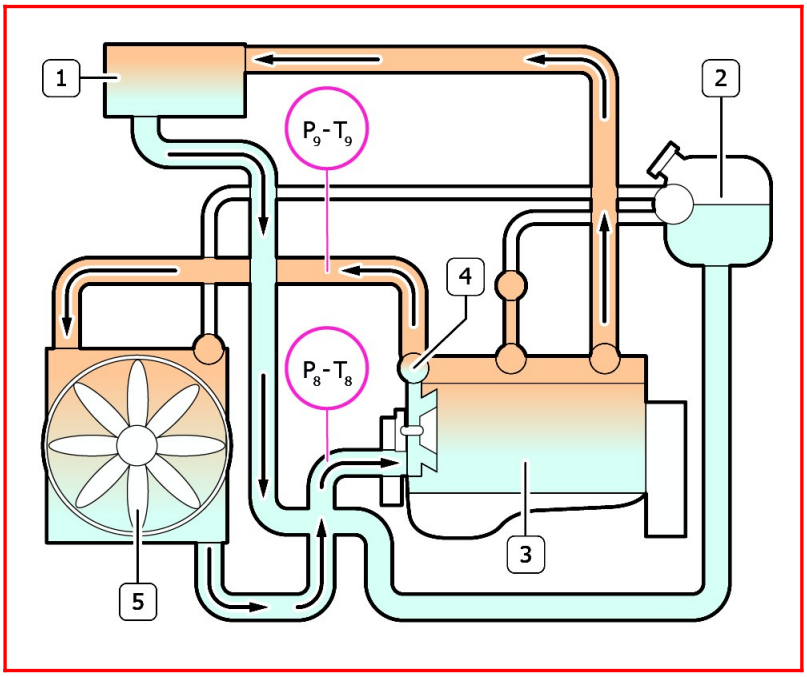
Components



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	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 1.5_Jul 2021		July/2021
Revision 2.0_Sep 2022		October/2022
Revision 3.0_Feb 2023		February/2023
Revision 3.1_Apr 2023		April/2023