

Description

Stationary, nature gas powered, turbocharged engine, six in-line cylinders, OHV, water cooled, four-stroke, spark ignited. Aluminium alloy pistons cooled by crank case oil spray. Gear driven cam-shaft and oil pump. Water cooled exhaust gas manifold.

- Complete intake system: air filter *, air-gas mixer *, turbocharger, throttle valve *, intake manifold
- Complete exhaust system: exhaust gas manifold, turbocharged (shared part of intake and exhaust system), exhaust piping *, silencer *
- Complete fueling system: gas line with „zero pressure“ regulator *, air-gas mixer * (shared part of intake and fueling system)
- Complete cooling system: liquid cooling system, centrifugal circulating pump *, radiator or heat exchanger *, thermostat housing *, expansion tank with overpressure and filling cap *
- Complete lubricating system: pressure lubrication by gear driven oil pump with high pressure section, multiplate oil cooler with control and relief valve, full-flow replaceable oil filter with relief valve, renewable centrifugal filter in by-pass, filling neck and wire-bound oil dipstick on engine block

*) marked components are optional equipment

Technical data

- engine type: TG 158 DV TW 86
- engine working cycle: four-stroke, spark ignition, turbocharged, operating with „lean burn“ mixture, with intercooler
- fuel: natural gas (according to TEDOM No. 61-0-0282.1 Regulation)
- cylinder arrangement: vertical, 6 in-line
- bore: 130 mm 5,12 in
- stroke: 150 mm 5,91 in
- displacement: 11,946 dm³ 728,99 cu-in
- compression ratio: 11,0 : 1
- firing order: 1 - 5 - 3 - 6 - 2 - 4
- rotation: counter clockwise
(from flywheel end)

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Alternation	Date	Alternation	Date	Alternation	Date
A	2.10.2007				
B	5.11.2007				
C	2.6.2008				

Dimensions and volumes

engine outlines	length:	1 377 mm	54,21 in
	width:	872 mm	34,33 in
	height:	1 185 mm	46,65 in
engine dry weight:		940 kg	2 072,35 lb
Installation dimensions			
flywheel housing:	SAE 1 (with no rear brackets)		
	SAE 1 (with rear brackets)		
flywheel:	SAE 11½		
engine block:	4x M 16 (for front brackets)		
Volumes			
coolant:	engine:	22 dm ³	5,81 gal
lubricating oil:	engine:	56,0 dm ³	14,79 gal (total)
		51,0 dm ³	13,47 gal (oil sump – max mark)
		10,0 dm ³	2,64 gal (between max and min)

Technical parameters - SI

rated speed	1500	1800	rpm
rated power output (continuous)	158,7	211,6	kW
air/fuel ratio	1,55	1,71	-
ignition advance	20	35	°BTDC
idle speed	1000±25	1200±25	rpm
overrun speed max. - gas cut-off:		2000	rpm
- ignition switch-off:		2200	rpm
mean piston speed	7,5	9,0	ms ⁻¹
oil consumption	0,3-0,5	0,4-0,6	gkW ⁻¹ h ⁻¹
min. operating oil pressure (idle speed)		170	kPa
min. operating oil pressure (rated speed)		360	kPa
recommended operating coolant temperature range (measured at outlet from water collecting manifold)		80 till 95	°C
max. coolant temperature – (short time 1 hour)		100	°C
min. coolant temperature for 100% load		60	°C
load limitation for coolant temperatures below 60 °C		max. 25	%
coolant temperature for start		min. 10	°C
operation ambient temperature		max. 80	°C
intake air temperature for start		min. 10	°C
operation intake air temperature range		-50 till +50	°C
pressure drop in intake for rated parameters (measured before throttle valve)		max. 2	kPa
allowed pressure drop in intake (measured before throttle valve)		max. 5	kPa
exhaust back pressure for rated parameters (measured at "engine" manifold outlet)		max. 5	kPa
allowed exhaust back pressure (measured at "engine" manifold outlet)		max. 12	kPa
exhaust gas temperature (measured at "engine" manifold outlet) - for warning signal		670	°C
- for "STOP"		690	°C
allowed intercooler pressure drop		8	kPa
air temperature at intercooler outlet for rated parameters		45	°C
recommended intercooler capacity		20	kW
recommended coolant liquid cooler capacity	135	190	kW
required coolant flow	300	350	lmin ⁻¹
allowed crankcase pressure range		-2,0 till +1,0	kPa
allowed PTO from front end of crank shaft	35	40	kW
cold valve clearance - intake valve		0,30	mm
- exhaust valve		0,55	mm
spark plug electrode gap		0,38	mm

time limits for low load operation

Engine power	Runtime
0-30 %	30 min
31-50 %	2 hour
51-100 %	Continuous

After allowed running time under 51 % of nominal power must follow min. 2 hours recovery run above 70 % of nominal engine power.

fuel characteristic for rated values:	fuel value	34	MJNm ⁻³
	CH ₄ content	95	%
allowed fuel characteristic:	fuel value		MJNm ⁻³
	CH ₄ content	min. 80	%
	Methane No.	min. 80	-

Technical parameters - BU

rated speed	1500	1800	rpm
rated power output (continuous)	212,82	283,76	bhp
air/fuel ratio	1,55	1,71	-
ignition advance	20	35	°BTDC
idle speed	1000±25	1200±25	rpm
overrun speed max.	- gas cut-off:	2000	rpm
	- ignition switch-off:	2200	rpm
mean piston speed	24,61	29,53	ft/s
oil consumption	0,0007	0,0008	lb/hp-h
min. operating oil pressure (idle speed)		24,66	psi
min. operating oil pressure (rated speed)		52,21	psi
recommended operating coolant temperature range (measured at outlet from water collecting manifold)		176 till 203	°F
max. coolant temperature – (short time 1 hour)		212	°F
min. coolant temperature for 100% load		140	°F
load limitation for coolant temperatures below 60°C/140°F		max. 25	%
coolant temperature for start		min. 50	°F
operation ambient temperature		max. 176	°F
intake air temperature for start		min. 50	°F
operation intake air temperature range		-58 till +122	°F
pressure drop in intake for rated parameters (measured before throttle valve)		max. 0,29	psi
allowed pressure drop in intake (measured before throttle valve)		max. 0,73	psi
exhaust back pressure for rated parameters (measured at "engine" manifold outlet)		max. 0,73	psi
allowed exhaust back pressure (measured at "engine" manifold outlet)		max. 1,74	psi
exhaust gas temperature (measured at "engine" manifold outlet)			
- for warning signal		1238	°F
- for "STOP"		1274	°F
allowed intercooler pressure drop		1,16	psi
air temperature at intercooler outlet for rated parameters		113	°F
recommended intercooler capacity		1137,38	Btu/min
recommended coolant liquid cooler capacity	7677,32	10805,11	Btu/min
required coolant flow	79,26	92,47	gal/min
allowed crankcase pressure range		-0,29 till +0,15	psi
allowed PTO from front end of crank shaft	46,94	53,64	bhp
cold valve clearance - intake valve		0,01	in
- exhaust valve		0,02	in
spark plug electrode gap		0,01	in

time limits for low load operation

Engine power	Runtime
0-30 %	30 min
31-50 %	2 hour
51-100 %	Continuous

After allowed running time under 51 % of nominal power must follow min. 2 hours recovery run above 70 % of nominal engine power.

fuel characteristic for rated values:	fuel value	907,26	Btu/cft
	CH ₄ content	95	%
allowed fuel characteristic:	fuel value		Btu/cft
	CH ₄ content	min. 80	%
	Methane No.	min. 80	-

Power parameters at 1500 rpm

net rated power output	158,7 kW	212,82 hp
peak torque	1011 Nm	745,71 lb-ft
coolant heat output	106 kW	6028,11 Btu/min
exhaust gas heat output (at after-cooling on 120 °C / 248 °F)	93 kW	5288,82 Btu/min
intercooler heat output	15 kW	853,04 Btu/min
radiation heat power	26 kW	1478,59 Btu/min

elevation above sea-level correction table

Altitude	m a.s.l.	500	750	1000	1250	1500
Power factor		1	0,95	0,89	0,84	0,79

intake fuel mixture temperature (after intercooler) correction table

Fuel mixture	°C	45	55	65	75	80
Fuel mixture	°F	113	131	149	167	176
Power factor		1	0,92	0,84	0,77	0,71

fuel input power and fuel consumption - SI

Load		100 %	75 %	50 %	25 %
Fuel input power	kW	426	343	256	168
Efficiency	%	37,2	34,7	31,0	23,7
Fuel consumption	Nm ³ h ⁻¹	45,14	36,28	27,14	17,73

fuel input power and fuel consumption - BU

Load		100 %	75 %	50 %	25 %
Fuel input power	Btu/min	24226,19	19506,07	14558,46	9553,99
Efficiency	%	37,2	34,7	31,0	23,7
Fuel consumption	Btu/bhp-hr	199,87	160,64	120,17	78,51

combustion air flow		792 kg/h	365,61 cfm
exhaust gas flow		822 kg/h	1812,18 lb/h
exhaust gas temperature at turbocharger inlet		560 °C	1040,00 °F
exhaust gas temperature at turbocharger outlet		485 °C	905,00 °F
emissions of gaseous pollutants (TA-Luft 86)	CO	650 mg/Nm ³	1,597 g/bhp-hr
	NO _x	500 mg/Nm ³	1,228 g/bhp-hr
	PM ^b	- mg/Nm ³	- g/bhp-hr
	HC	- mg/Nm ³	- g/bhp-hr
noise level in 1 m distance		91	dB(A)
referential ambient characteristic:	barometric pressure	101,325 kPa	14,70 psi
	ambient temperature	25 °C	77 °F
	relative air humidity	30 %	30 %

Technical specification deviations are subject to manufacturer consultation.

Power parameters at 1800 rpm

net rated power output	211,6 kW	283,76 hp
peak torque	1123 Nm	828,32 lb-ft
coolant heat output	145 kW	8246,01 Btu/min
exhaust gas heat output (at after-cooling on 120 °C / 248 °F)	118 kW	6710,54 Btu/min
intercooler heat output	18 kW	1023,64 Btu/min
radiation heat power	31 kW	1762,94 Btu/min

elevation above sea-level correction table

Altitude	m a.s.l.	500	750	1000	1250	1500
Power factor		1	0,97	0,94	0,91	0,87

intake fuel mixture temperature (after intercooler) correction table

Fuel mixture	°C	45	55	65	75	80
Fuel mixture	°F	113	131	149	167	176
Power factor		1	0,91	0,83	0,75	0,69

fuel input power and fuel consumption - SI

Load		100 %	75 %	50 %	25 %
Fuel input power	kW	561	450	362	295
Efficiency	%	37,8	35,2	29,2	17,9
Fuel consumption	Nm ³ h ⁻¹	59,34	47,67	38,30	31,20

fuel input power and fuel consumption - BU

Load		100 %	75 %	50 %	25 %
Fuel input power	Btu/min	31903,51	25591,05	20586,58	16776,36
Efficiency	%	37,8	35,2	29,2	17,9
Fuel consumption	Btu/bhp-hr	197,06	158,31	127,19	103,61

combustion air flow		1148 kg/h	529,95 cfm
exhaust gas flow		1185 kg/h	2612,45 lb/h
exhaust gas temperature at turbocharger inlet		549 °C	1020,20 °F
exhaust gas temperature at turbocharger outlet		441 °C	825,80 °F
emissions of gaseous pollutants (TA-Luft 86)	CO	650 mg/Nm ³	1,563 g/bhp-hr
	NO _x	500 mg/Nm ³	1,202 g/bhp-hr
	PM ₁₀	- mg/Nm ³	- g/bhp-hr
	HC	- mg/Nm ³	- g/bhp-hr
noise level in 1 m distance		91	dB(A)
referential ambient characteristic:	barometric pressure	101,325 kPa	14,70 psi
	ambient temperature	25 °C	77 °F
	relative air humidity	30 %	30 %

Technical specification deviations are subject to manufacturer consultation.

Standard scope of supply

- Spark plugs CHAMPION RC 78 PYP 15 (M 14 x 1,25)
- Centrifugal oil cleaner in by-pass
- Replaceable oil filter with relief valve
- Oil cooler
- Closed crank case with oil separator and breather connected to intake manifold
- Flywheel housing SAE 1
- Flywheel SAE 11½
- Electric starter 24V, 6,6kW
- Turbocharger with cooled bearing housing
- Oil sump (51 dm³)
- Without thermostat and thermostat housing
- Standard run-up on test bench with natural gas
- Top coating BUCHNER AC 80, tint RAL 7035
- Type label
- Standard documentation (certificate of warranty, service book, operating and maintenance manual, spare part catalogue), 1 copy (CD)
- Final inspection protocol and test bench protocol

Options

- Analog speed governor Heinzmann E2F with electric throttle valve actuator
- TEDOM TMCI 1 ignition system with knock detection and ignition malfunction diagnostic, camshaft position sensor, knock sensor, ignition coils with cover, high-voltage cables mounted on engine
- TEDOM mixer
- TEDOM throttle valve
- JANKA PV-16 water - air intercooler
- Zero pressure regulator KROMSCHROEDER GIK 40
- Metal gas hose DN 32-750
- V-belt driven centrifugal coolant pump – pump power input 2 kW (1500 rpm) / 2,4 kW (1800 rpm)
- Electromotor driven centrifugal coolant pump
- Plastic fan
 - on crankshaft
 - puller type
 - puscher type
 - out of crankshaft (V-belts drive)
 - puller type
 - puscher type
- 28 V / 45 A charging alternator
- Thermostat housing including thermostats
- Front bracket, for engine flexible mounting
- Rear bracket, for engine flexible mounting
- Coolant temperature sensor
- Lubricating oil pressure sensor
- Lubricating oil temperature sensor
- Coolant temperature warning switch
- Oil pressure warning switch
- Inductive pulse sensor (for speed meter)
- Wooden transport skid
- Short period engine preservation
- Oil filling of engine
- Air filter
- Exhaust piping and silencer
- Catalyst for low emission limits
- Coolant expansion tank with overpressure and filling cap
- Radiator or Heat exchanger for coolant cooling