Description

Stationary, vertical, six cylinders in-line, water cooled, four-stroke, spark ignited, counter clockwise rotation (looking from flywheel end), OHV ad with two valves per cylinder. Gear driven cam-shaft and oil pump. Aluminium alloy pistons cooled by crank case oil spray. Lubrication is ensured by gear pump equipped with regulator and safety valve. Full-flow replaceable oil filter with relief valve and centrifugal filter in by-pass. Uncooled (dry) exhaust gas manifold.

engine type:	TP 90 G5V NX 86
drawing No.:	7000 848/XX
engine working cycle:	four-stroke, spark ignited, naturally aspirated, operating with lean mixture
fuel:	LPG (100 % propane) (according to ČSN 65 6481 regulation)

Rated parameters at reference conditions

rated speed	1500	rpm
rated power output (continuous)	89 (84,7)*	kW
peak torque	567 (539)*	Nm
coolant heat output	73,5 (85,5)*	kW
exhaust gas heat output (cooled to 120°C)	80 (92,5)*	kW
radiation heat power	11,5	kW

fuel input power and fuel consumption

Load		100 %	75 %	50 %	25 %
Fuel input power	kW	268,9 (289,1)*	217,4 (231,0)*	164,8 (172,9)*	111,8 (144,0)*
Efficiency	%	33,1 (29,3)*	30,7 (27,5)*	(24,5)*	19,9 (14,7)*
Fuel consumption	$m_N^3 h^{-1}$	10,4 (9,3)*	8,4 (7,5)*	6,4 (5,6)*	4,3 (4,7)*
	kg/h	20,9 (22,6)*	16,9 (18,2)*	12,9 (13,6)*	8,6 (11,4)*

Tolerances of parameters declared in this specification are stated in TEDOM No. 61-0-0284 regulation.

* Figures in brackets apply to LPG (propane 40%, 60% butane).

Date of issue:	5.1.2010				
Alternation	**Date**	**Alternation**	**Date**	**Alternation**	**Date**
A	17.8.2010	D	28.3.2019		
B	22.9.2010	E	28.4.2020		
C	28.8.2012				

Technical and build-up parameters

displacement			11,946	dm^3
bore			130	mm
stroke			150	mm
compression ratio			9,5:1	-
firing order			1-5-3-6-2-4	-
ignition advance			25	°BTDC
air/fuel ratio			1,51 (1,43)*	-
exhaust gas temperature at exit from exhaust manifold			623 (706)*	°C
combustion air flow			500 (508)*	kg/h
exhaust gas flow			521 (531)*	kg/h
idle speed			1000±25	rpm
overrun speed max.	- gas cut-off:		2000	rpm
	- ignition switch-off:		2200	rpm
lubricating oil	- total:		56,0	dm^3
	- oil sump - max. mark:		51,0	dm^3
	- between max. and min.:		10,0	dm^3
oil consumption			0,3-0,5	$gkW^{-1}h^{-1}$
min. operating oil pressure (idle speed)			170	kPag
min. operating oil pressure (rated speed)			360	kPag
volume of coolant (in engine)			22	dm^3
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
max. ambient temperature in engine compartment			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 exhaust collector outlet)			max. 5	kPa
allowed exhaust back pressure (measured at exhaust collector outlet)			max. 12	kPa
exhaust gas temperature (measured at exhaust collector outlet)				
	- for warning signal		645 (720)*	°C
	- for "STOP"		665 (740)*	°C
air temperature for rated parameters			25	°C
recommended coolant liquid cooler capacity			160	kW
required engine coolant flow			300	$lmin^{-1}$
allowed crankcase pressure range			-2,0 till +1,0	kPa
allowed PTO from front end of crank shaft			35	kW
cold valve clearance	- intake valve		0,30	mm
	- exhaust valve		0,55	mm
spark plug electrode gap			0,38	mm
emissions of gaseous pollutants		NO_x	< 500	mg/m^3
		CO	< 650 (1000)*	mg/m^3
		HC	-	mg/m^3
		PM^b	-	mg/m^3
noise level in 1 m distance			91	dB(A)

* Figures in brackets apply to LPG (propane 40%, 60% butane)

Reference conditions, correction factors and operational restrictions

reference ambient conditions:	barometric pressure	100	kPa
	ambient temperature	25	°C
	relative air humidity	30	%
fuel characteristic for rated parameters: (0 °C, 101,325 kPa)	LHV	93,1 (111,5)*	MJm_N^{-3}
	C_3H_8 concentration	100 (40)*	%
	C_4H_{10} concentration	0 (60)*	%
	temperature	0	°C
	pressure	101,325	kPa
	relative humidity	0	%
allowed fuel characteristic:	LHV	-	MJm_N^{-3}
	C_3H_8 concentration	min. 40	%
	C_4H_{10} concentration	max. 60	%
	MN (MON) det. resistance	20 (85)	-

altitude correction table

Altitude	m a.s.l.	500	750	1000	1250	1500
Power factor		1,00	0,97	0,93	0,90	0,86

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.

Other operating restrictions:
- Up to 4 Start per day are possible
- Minimum runtime 1 hour per Start
- Due to wear 1 start is equal 0,5 operating hours

Figures in brackets apply to LPG (propane 40%, 60% butane).

Layout and fitting dimensions

engine dimensions	length:	1 377 mm
	width:	872 mm
	height:	1 185 mm
engine dry weight:		940 +5 % kg
installation dimensions	flywheel housing:	SAE 1 (alternator) SAE 1 (with rear brackets)
	:	
	engine block	4x M 16 (for front brackets)
	flywheel:	SAE 11½

Standard scope of supply

- Spark plugs CHAMPION RC 78 PYP 15 (M 14 x 1,25)
- Without coolant pump (for external mounting of el. pump)
- Centrifugal oil cleaner in by-pass
- FULL cleaner with replaceable by-pass valve
- Oil cooler
- Closed crank case with oil separator and breather connected to intake manifold
- Flywheel housing SAE 1
- Flywheel SAE 11½
- Electric starter 24 V, 6,6 kW
- Oil pump driven directly from crankshaft (without transfer segment)
- Oil sump (51 dm^3)
- Without thermostat housing
- Uncooled (dry) exhaust manifold
- Oil pressure warning switch
- 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) - enclosed
- Standard conditioning and control parameters for natural gas
- Final inspection protocol and test bench protocol (enclosed)

Standard configuration (not included in the standard scope of supply)

Differences from the standard configuration must be consulted with a retailer or manufacturer.

- TEDOM TMCI 1+ ignition system with knock detection and ignition malfunction diagnostic (camshaft position sensor, knock sensor, ignition coils with cover, high-voltage cables)
- management system based on the richness of the mixture filling pressure (IS-AFR), filling pressure sensor, temperature mixture sensor
- Heinzmann 100 mixer + Woodward DN 30valve
- Mechanical power flap diameter 80 mm

Options

- Centrifugal pump coolant to the mechanical power from the crankshaft pump power input 2 kW
- Centrifugal coolant pump, V-belt driven by electric motor
- Analog speed regulator, type E2F, manufacturer Heinzmann, actuator controller mounted on the engine and connected with a flap (partially enclosed)
- TEDOM mixer
- Kromschroeder GIK 25 gas line with zero regulator
- Metal gas hose DN 32-750 (enclosed)
- 28 V / 45 A charging alternator
- Thermostat housing including thermostats (enclosed)
- 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
- Inductive pulse sensor (for speed meter)
- Short period engine preservation
- Long period engine preservation
- Oil filling of engine
- Oil sump (25 dm^3)
- Flywheel SAE 14