indop

INDOP 20TO

Modulation	75%	100%
Electrical Output	15	20 kWe
Thermal Output	33.9	41.9 kWth
Energy input	50.4	64.8 kW
Engine type - TOYOTA 4Y		
cylinders - 4		
Displacement 2237 ccm		
Electrical Eff	29.8	30.9 %
Thermal Eff	67.1	64.7 %
Total Efficiency	96.9	95.6 %
Seasonal Efficiency		189
Output flow Temp		85-90
Return Temp		35-70
CO		< 60
NOx	<	27 mg/Nm
-		65
SPL		50 dB(A)
weight 800 kgs		
1491mm x 800mm x 1266mm		
Fuel - natural gas / LPG		
service interval 8000 hrs		

A+++

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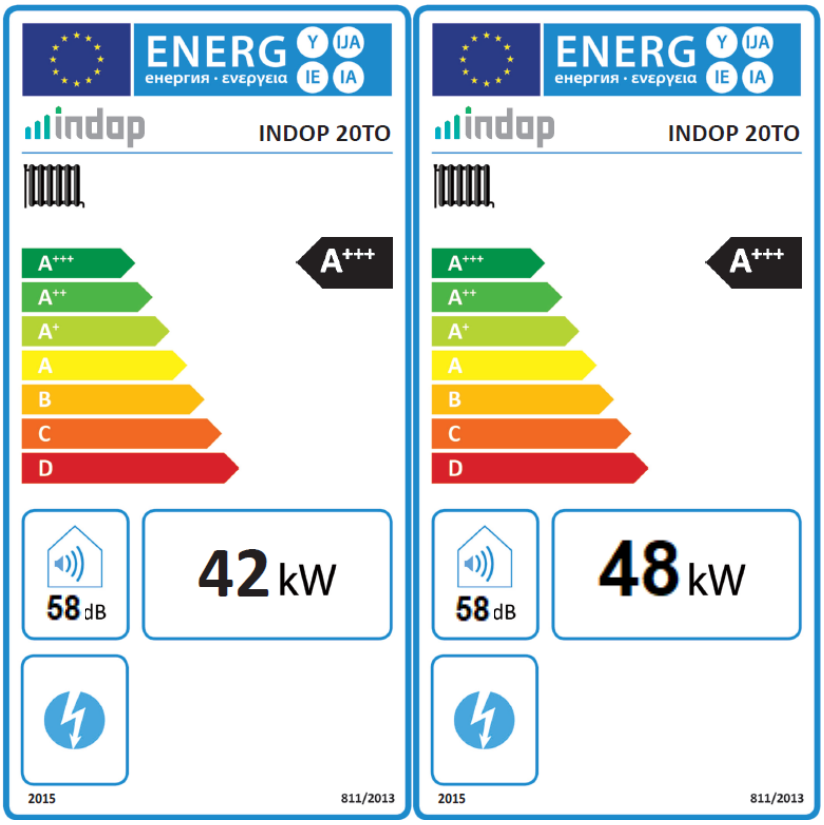
3 BEFORE INSTALLATION

Before installation of INDOP CHP unit you must consult your gas supply company, district master chimney sweep and obtain your electricity suppliers consent.

For successful approved and activated warranty, the system must be thoroughly inspected and for the first time started-up by an authorized INDOP person. It is not necessary to complete this operation. In this case, the warranty for system will not be approved!

3.1 ERP ACORDING TO REGULATIONS 811/2013 EU

The measurements were carried out in accordance with the standard EN 50465:2015.



- Seasonal efficiency without condensing system: 189%
- Seasonal efficiency with condensing system: 216%
- Heat power without condensing system: 42 kW
- Heat power with condensing system: 48 kW
- Sound power level: 58 dB

5.4 TECHNICAL SPECIFICATIONS FOR INDOP CHP UNIT

TECHNICAL DATA FOR UNIT	EM	20 kW		
		100%	75%	50%
Gas consumption	Nm^3/h	6,48	5,04	3,43
Electrical power	kW $_{el.}$	20	15	10
Power factor	λ	0,98-0,99		
Thermal power	kW	41,9	33,9	23
Operating current	A	30	22	14,7
max. Apparent power SAmax (cos φ 0.95):	kVA	21		
LHV				
Energy input	kW	64,8	50,4	34,3
Electrical efficiency	%	30,9	29,8	29,2
Thermal efficiency	%	64,7	67,1	67,1
Total efficiency	%	95,6	96,9	96,3
HHV				
Energy input	kW	71,9	55,9	38
Electrical efficiency	%	27,8	26,8	26,3
Thermal efficiency	%	58,3	60,6	60,5
Total efficiency	%	86,1	87,4	86,8
DATA WITH CONDENSING SYSTEM (return 30 °C)				
Electrical power	kW	20		
Thermal power	kW	48,2		
Energy input	kW	64,8		
Electrical efficiency	%	30,9		
Thermal efficiency	%	74,4		
Total efficiency	%	105,3		
Seasonal space heating energy efficiency (without condensing system)	%	189		
Seasonal space heating energy efficiency (with condensing system)	%	216		
Sound power level	dB	58		
Sound pressure level at distance 1m	dB(A)	50		
Thermal circuit				
Without condensing system:				
Flow temperature	°C	85–90		
Return temperature	°C	30–70		
Minimum flow rate of medium	l/min	33,3		
Minimum flow rate of medium	m^3/h	2,0		
Max pressure drop (secondary circuit - customer)	bar	0,45		
With condensing system:				
Flow temperature	°C	85–90		
Return temperature	°C	30		
Minimum flow rate of medium	l/min	33,3		
Minimum flow rate of medium	m^3/h	2,0		
Max pressure drop (secondary circuit - customer)	bar	0,35		

Electrical consumption of the unit:		
Stand by mode	W	50
Full power	W	248
Basic dimensions and mass of INDOP CHP unit (no handles, compensation or attachments)		
Length	mm	1491
Width	mm	800
Height	mm	1266
Weight	kg	800
Technical data - engine		
Manufacturer		TOYOTA 4Y
Engine type		L
Operating mode		4-Takt Otto
Configuration		R
Number of cylinders		4
Cylinder diameter	mm	91
Engine stroke	mm	86
Volume	cm^3	2237,0
Nominal speed	RPM	1540
Length	mm	610,5
Width	mm	590
Height	mm	764
Net weight	kg	122
Lubricating oil consumption	kg/h	0,003
Compression ratio	Ɛ	10,5
Oil volume in the engine max/min	l	11,2/1,5
Oil tank volume	l	38,8

Technical data - alternator		
Frequency	Hz	50
Voltage	V	400
Power	kVA	28,9
Current	A	42,5
Power factor	λ	0,75
Revolutions per minute	RPM	1535
Thermal energy balance		
Without condensing system:		
Energy input	kW	64,8
Cooling water	kW	24,3
Flue gases	kW	17,6
Power to heat ratio		0,48
With condensing system:		
Energy input	kW	64,8
Cooling water	kW	24,3
Flue gases	kW	23,9
Power to heat ratio		0,41

Flue gas		
Flue gases temperature with full load	°C	110 ± 5
Flue gases mass flow rate - wet	kg/h	85
Flue gases mass flow rate - dry	Nm3/h	69,6
Maximum pressure drop of flue gases	mbar	20
Emissions		
CO @ 5% O_2	mg/Nm^3	60
NO_x @ 5% O_2	mg/Nm^3	75
Without condensing system:		
CO (total energy produced)	mg/kWh	66
NO_x (total energy produced)	mg/kWh	82
CO (electricity produced)	mg/kWh	204
NO_x (electricity produced)	mg/kWh	255
CO (heat produced)	mg/kWh	97
NO_x (heat produced)	mg/kWh	122
With condensing system:		
CO (total energy produced)	mg/kWh	60
NO_x (total energy produced)	mg/kWh	75
CO (electricity produced)	mg/kWh	204
NO_x (electricity produced)	mg/kWh	255
CO (heat produced)	mg/kWh	85
NO_x (heat produced)	mg/kWh	106
Air combustion data		
Combustion air mass flow	kg/h	80,2
Ventilation air flow	m3/h	18

Table 6: Technical data for INDOP CHP unit

Consumption of natural gas with Hu_36 MJ/Nm3 in standard conditions: 15 °C; 101,325 kPa. The defined technical data are based on standard conditions according to EN 50465:2015. Any deviations from the standard conditions can cause changes in the value of thermal data, fuel consumption and electrical power output and should be taken into account when designing the heating circuit equipment. When defining dimensions of the heating circuit equipment, it is recommended to take into account the thermal power tolerance of ± 8%, and additional 10% reserve. Electric power ±5 %.

Note:

All data provided in the technical specification are based on full load of the engine, unless otherwise defined, with scheduled temperatures, and use of natural gas with calorific value of 10 kWh/Nm^3 and gas methane number > 80, taking into account technological development and changes.