

TERMOFARC

PELLETS & SOLID FUEL THERMAL POWER PLANT

FI-NSP



Pellets bin and feeder



Control panel



Draught thermostatic adjuster



Safety valve



Aerator



Safety heart valve (paid up)

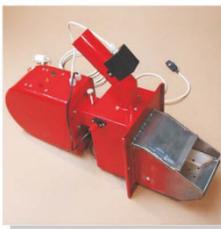
Fire point with pellets burner



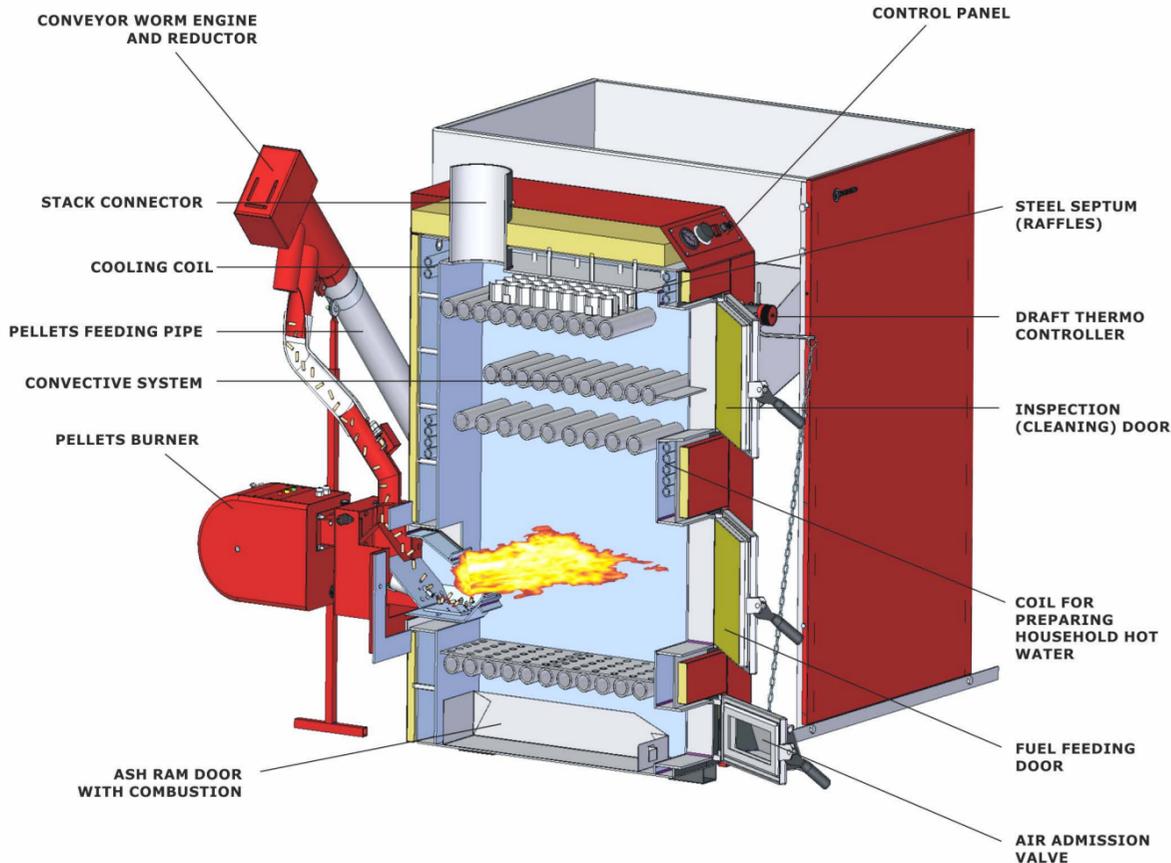
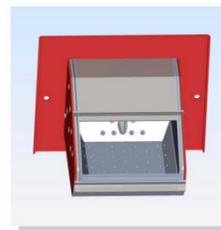
Combustion air adjusting valve driven by the thermostat



Pellets burner



Pellets burner built from reluctant stainless steel



GENERALITIES

- FI-NSP are automatic and ecological boilers, manufactured of high quality steel plate (the inner wall of 5 namely 6 mm and the outer wall of 4 mm), welded, executed in eleven manufacture sizes, equipped with automatic pellets burners;

- from the constructive point of view, they are water chamber boilers, with chamber type burning point and two convective circuits of burnt gases;

- their construction allows the use in two operation variants:

The automatic operation, being endowed with automatic burners of pellets

- a burner on pellets is assembled on the back side of the boiler that, in the automatic operating manner, is fed from the pellets tank trough a conveyer worm.
- the burner operates automatically, it starts when commanded by the control panel of the boiler, the pellet dose is fed for ignition, the electrical igniter and the fan start operating and when the photoelectrical sensor detects the light of the flame, the burning time of the first pellets dose starts elapsing, the electrical igniter stops and the device starts the normal operation, the pellets feed procedure and the pause for their combustion until the boiler-installation circuit is heated up. The burner is controlled to stop, the pellets feed stops and the burner fan shall operate within the time limit set for a complete combustion process of the pellets. Thus, the burner is ready for a new start up in case of receiving the command from the boiler's control panel and all the entire ignition-combustion repeats all over again.

The manual feed operation that uses solid fuels in the combustion process (wood, coal, coke, wood powder briquettes, wood waste)

- the fuel is loaded manually into the boiler's fire point and the combustion is made through natural draught;
- normally, the operation of the boiler is controlled by the draught thermostatic adjuster, adjusting the combustion air trough the opening and the closing of the valve on the door of the ash-box, according to the needs of the whole system and thus the combustion intensity;
- the boilers are equipped with two heat exchangers: coil for producing household hot water (range FI-NSP 15 – FI-NSP 50) and cooling coil, protection against overheating (all the powers classes);
- equipment certified according to the standard SR EN 303-5 CE labeled;
- the boiler belongs to class III (the best) related to efficiency and for air pollutant emissions;
- the boilers are meant for heating the buildings and producing household hot water;
- the standard pack includes the control panel, the draught thermostatic adjuster, the pellets burner, the pellets feeding system made up of a conveyer worm and a pellets tank (0.5-1m³ according to the boiler's power), safety valve, aerator, fire iron and wire brush, ash collection drawer and steel baffles.

ADVANTAGES

- high efficiency with values up to 90%;
- the same boiler (fire point) may be used with automatic operation on pallets and manual feed with any solid fuel;
- ecological and more economic operation than the gas or liquid based systems; during the pellets combustion, the exact quantity of CO₂ that the tree absorbed during its life is being released (it is important to keep in mind that the combustion of 1 m³ of gas leads to loading the environment with 2 kg of CO₂ and the combustion of a liter of liquid fuel releases 2.8 kg of CO₂);
- economies of up to 30 – 40 % compared to the gas fuel heating;
- wide autonomy in operating on pallets – according to the size of the boiler, the surveillance of the system is reduced to weakly fill in the tank and the elimination of the ash approximately twice a week;
- safe operating and comfort – joining the safety of the wood based boilers with the comfort offered by the gas or liquid fuel heating, as the desired and the ambient temperatures are adjustable by the serial connection to the panel control of an ambient thermostat;
- the automation elements included in the control panel of the boiler and of the pellets burner enable the activity of the boiler without the need to monitor it, by turning the burner on and off (by the control thermostat) when reaching the thermostatic temperature. The safety thermostat conditions the turning off of the boilers when reaching the temperature of 95°C, if the adjustment thermostat did not work;
- protection against overheating in case of manual feed on solid fuel, made up of a safety exchanger totally immersed into the primary thermal agent chamber and the thermal valve, that ensures the cooling of the boiler, using cold water from the supply network. This system sets off when reaching the temperature of 95 - 98 °C, by means of the thermostatic command thermal valve. It is essential to note that this system protects the boiler also in case of the accidental interruption of the electric power;
- household hot water preparation exchanger (coil) immersed into the primary thermal agent for the range of FI-NSP 15 – FI-NSP 50. Household hot water supply is achieved instantaneously and in a continuous flow, according to the capacity of the boiler (it covers the water needs of a kitchen and of a bathroom at the same time).



Electrical igniter for pellets



Programmable control block



Thermostat with radio control (wireless)



Ash collecting drawer



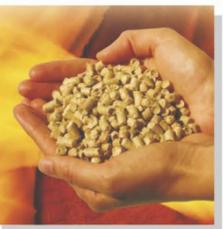
Ash cleaning fire iron and wire brush



Galvanised coils for: - preparing household hot water - boiler protection against overheating



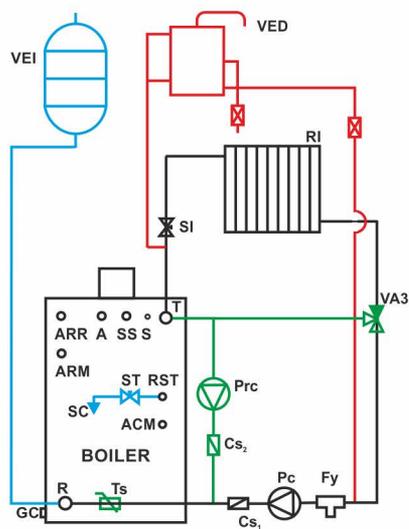
Open expansion tank (paid up)



Use in two operation variants: - automatic operation with pellets burner - operation with manual feed on solid fuels



POSSIBLE CONNECTIONS CHART



SS - safety valve
S - heat valve probe
VED - open expansion tank
VEI - closed expansion tank
RI - radiator
A - aerator
R - return inlet
T - turn inlet
SI - straight way valve
Pc - circulation pump
Cs₂ - direction valve
GCS - boiler discharge
Ts - thermostat

ARM - household cold water
ACM - household hot water
ARR - cold water network
RST - heat valve inlet
ST - safety heat valve
SC - discharge inlet connected to the sewerage system
Prc - re-circulation pump
Cs₁ - direction valve
Ts - Prc pump thermostat
Fy - impurities filter

In case the current water supply network is absent (even if a hydrophore is used), the assembly version will be mandatory with open expansion tank.

The open expansion tank is provided at the height of minimum 1.5 m above the last radiator.

The expansion tank is of open type according to ISCIR standards, the solid fuel boilers not having a prompt control over the combustion.

The open expansion tank version is recommended to be used in case the system operates on thermo siphon principle as well.

In the case of permanent water source and if the assembly of an open expansion tank is difficult /impossible to achieve, the choice is the membrane (closed) pressure expansion tank and cooling system (boiler overheating coil and safety heating valve) connected to the water network.

The safety valve on the boiler is mandatory for both assembling variants.

In order to extend the life service of the boiler by avoiding condensing and for a more efficient operation:

- it is recommended to assemble between turn and return a recirculation pump controlled by thermostat and of a three ways mixing thermostat valve.

In order to obtain household hot water an ACM boiler manufactured by Termofarc is connected.

TECHNICAL CHARACTERISTICS

BOILER	TYPE	FI-NSP 15	FI-NSP 22	FI-NSP 27	FI-NSP 33	FI-NSP 40	FI-NSP 50
Rated thermal power on wood	Kcal/h	15.000	22.000	27.000	33.000	40.000	50.000
	KW	17,4	25,6	31,4	38,4	46,5	58
Rated thermal power on pellets	Kcal/h	12.900	18.900	23.200	28.400	34.400	43.000
	KW	15	22	26,9	33	40	50
Capacity – wood operation	%	78-80	78-80	78-80	78-80	78-80	78-80
Capacity – pellets operation	%	85-90	85-90	85-90	85-90	85-90	85-90
Necessary flue draught	mbar	0,2-0,3	0,2-0,3	0,2-0,3	0,2-0,3	0,2-0,3	0,2-0,3
Water content in the boiler	liters	94	103	109	137	146	162
Maximum operating	bar	2	2	2	2	2	2
Test pressure	bar	4	4	4	4	4	4
Total height	mm	1350	1350	1350	1350	1350	1350
Boiler's width	mm	540	540	595	595	595	635
Equipment's total width	mm	1640	1640	1695	1695	1695	1835
Boiler's length	mm	595	650	705	760	815	870
Total length	mm	1240	1295	1350	1405	1460	1515
System Weight	Kq	387	405	449	475	492	575
Boiler Weight	Kq	267	285	329	355	372	410
Pellets boiler weight	Kq	26,6	26,6	26,6	26,6	26,6	33,1
Flue inlet	mm	Ø 146	Ø 146	Ø 146	Ø 166	Ø 166	Ø 166
Turn /return inlet	inch	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Safety valve inlet	inch	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
Boiler discharge inlet	inch	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
ACM coil inlet /cooling coil	inch	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
Household hot water flow	l/min	9	9	9	12	12	12
Burnt gases temperature	°C	180-250	180-250	180-250	180-250	180-250	180-250
Maximum operating temperature	°C	90	90	90	90	90	90
Electric power used at the ignition	W	720	720	720	720	720	720
Electrical power used for operating	W	120	120	120	120	120	120
Feeding voltage /frequency	V/Hz	220/50	220/50	220/50	220/50	220/50	220/50
Nominal consumption of wood H _i = 3500 kcal/kq	Kg/h	5,5	8,06	9,9	12,1	14,7	18,3
Nominal consumption of pellets H _i = 4150 kcal/kq	Kg/h	3,24	4,74	5,84	7,12	8,8	11

BOILER	TYPE	FI-NSP 60	FI-NSP 80	FI-NSP 100	FI-NSP 130	FI-NSP 150
Rated thermal power on wood	Kcal/h	60.000	80.000	100.000	130.000	150.000
	KW	69,6	93	116	150,8	174
Rated thermal power on pellets	Kcal/h	51.600	67.600	84.300	110.000	127.900
	KW	59,9	78,5	98	127,9	147,5
Capacity – wood operation	%	78-80	78-80	78-80	78-80	78-80
Capacity – pellets operation	%	85-90	85-90	85-90	85-90	85-90
Necessary flue draught	mbar	0,3-0,4	0,3-0,4	0,3-0,4	0,3-0,4	0,3-0,4
Water content in the boiler	liters	191	238	296	325	359
Maximum operating pressure	bar	2	2	2	2	2
Test pressure	bar	4	4	4	4	4
Total height	mm	1350	1350	1465	1465	1465
Boiler's width	mm	700	725	800	935	935
Equipment's total width	mm	1900	1925	2100	2235	2235
Boiler's length	mm	980	1230	1340	1380	1530
Total length	mm	1625	1875	2150	2190	2340
System Weight	Kq	636	773	911	1075	1154
Boiler Weight	Kq	471	607	732	896	975
Pellets burner Weight	Kq	33,1	33,1	46,9	46,9	46,9
Flue inlet	mm	Ø 196	Ø 196	Ø 216	Ø 246	Ø 246
Turn /return inlet	inch	1 1/2"	2"	2"	2 1/2"	2 1/2"
Safety valve inlet	inch	3/4"	1	1	1	1
Boiler discharge outlet	inch	1/2"	1/2"	1/2"	1/2"	1/2"
ACM coil inlet /cooling coil	inch	3/4"	3/4"	3/4"	3/4"	3/4"
Burnt gases temperature	°C	180-250	180-250	180-250	180-250	180-250
Maximum operating temperature	°C	90	90	90	90	90
Electric power used at ignition	W	935	985	985	1200	1200
Electrical power used for operating	W	335	385	385	600	600
Feed voltage / frequency	V/Hz	220/50	220/50	220/50	220/50	220/50
Nominal consumption of wood H _i = 3500 kcal/kq	Kg/h	22	29,3	36,6	47,6	55
Nominal consumption of pellets H _i = 4150 kcal/kq	Kg/h	13,2	17,5	21,9	28,4	32,8