1 Introduction

- Installing and use simplicity
- Simple and direct user's functions
- Reliable and flexible functioning software with well-established TiEmme elettronica technology
- Advanced functions available for the builder to adapt to different Burners and installations

Product composition:

- Control Board with 4 fixing points, solid and sure.
- Extractable connectors
- Photo resistance or Exhausting Temperature Probe
- Boiler Probe
- Connection cable Main Board-Control Panel
- Control Panel with antistatic cover
- Connector RS232 for the Modem/Computer connection

Safety rules

Before working on the system make follow:

- The accident prevention and Room prevention rules
- The National Institute rules against the work accidents
- The legal safety rules
- These instructions are only for technical personnel only

CE

Conformity declaration

Applied rules: EN 60730-1 50081-1 EN 60730-1 A1 50081-2

For compliance with the CEI EN 55014 you must install upstream a filter EMI properly sized.

This manual is done with care and attention, but the information could be incomplete, not comprehensive or could have mistakes. For this reason the design, the information could be modified without advance notice according to the model.

TiEmme elettronica is not responsible for the incomplete or not correct information

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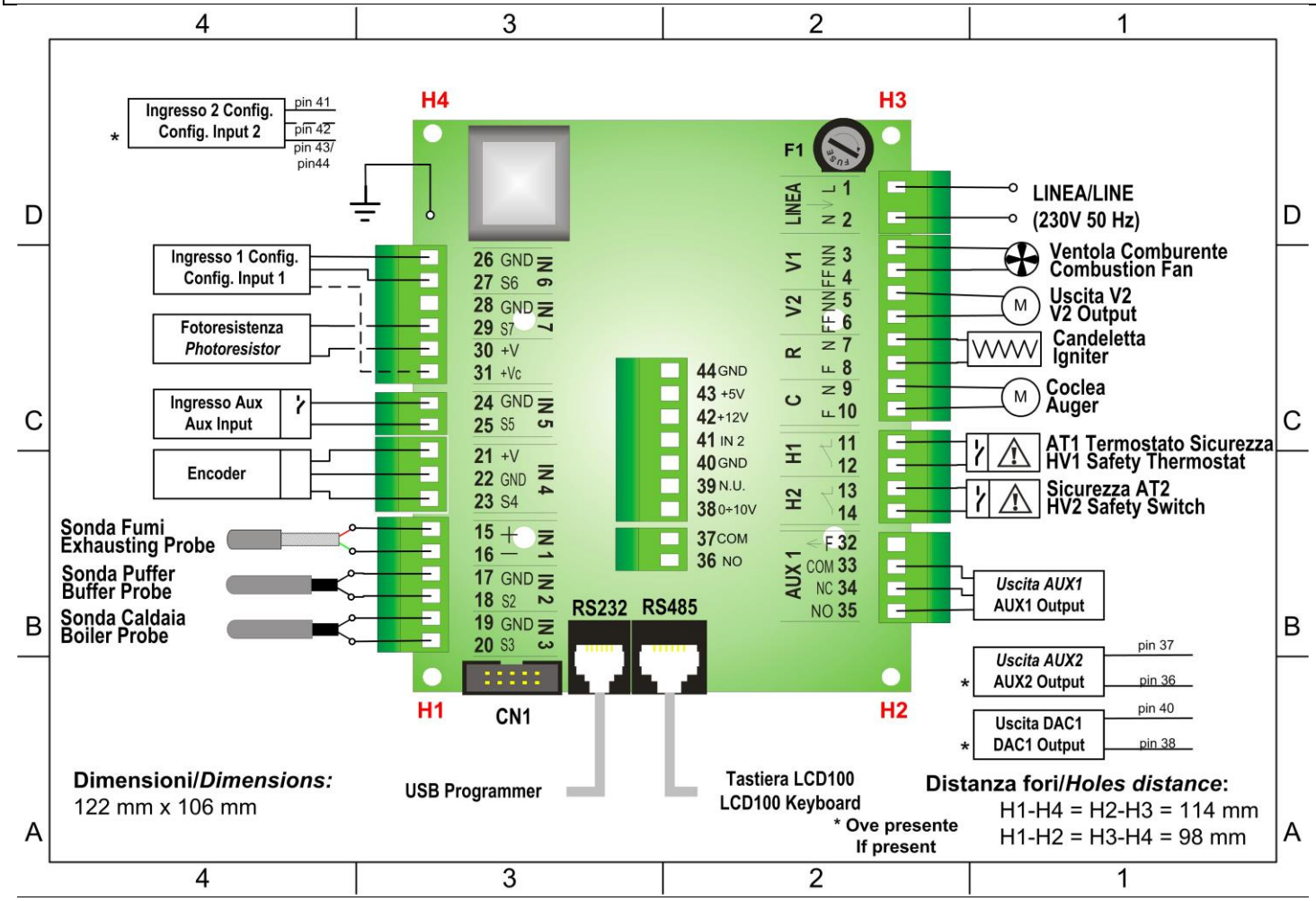
2 Electrical Connections

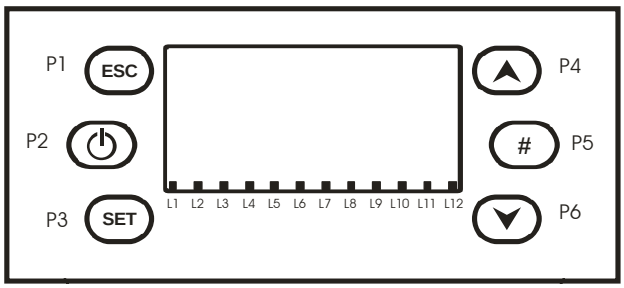


PIN		Function	Characteristics
1	L	Mains power line	230 Vac ± 10% 50/60 Hz **F1**= Fuse T5,0 A
2	N		
3	N	Combustion Fan	Triac Regulation max 1A
4	L		
5	N	Configurable V2 Output (see par.9.9)	Triac ON-OFF max 1A
6	L		
7	N	Igniter Resistance	Relais 3 A max
8	L		
9	N	Pellet Auger	Triac ON-OFF 1A max
10	L		
11		Safety Thermostat Input HV1	Contact ON/OFF Normally closed Bypass if not used
12			
13		Safety Thermostat Input HV2	Contact ON/OFF Normally closed Bypass if not used
14			
15	Red +	Exhausting Temperature Probe	Thermocouple K: 500 °C Max
16	Green –		
17		Water Buffer Tank Temperature Probe	NTC 10K @25 °C: 120 °C Max
18			
19		Boiler Temperature Probe	NTC 10K @25 °C: 120 °C Max
20			
21	+5V	Encoder Signal	Signal TTL 0 / 5 V
22	GND		
23	S4		
24		AUX Input: Chrono/Room Thermostat	Contact ON/OFF
25			
26	GND	Configurable Input 1 (see par.9.10)	Signal 0 / 5 V
27	S6		
28	GND		
29	S7	Photoresistor	Analog input
30	+5V		
31	+12V		
32	F	Live Phase	Max current 5 A
33	COM	Configurable AUX1 Output (see par.9.9)	Relais 3 A max
34	NC		
35	NO		
RS485		Keyboard	
RS232		Connector RS232	Connection to Modem/Computer

If Auxiliary module is present (**A32** = 1):

PIN		Function	Characteristics
36	COM	Configurable AUX2 Output (see par.9.9)	Relais 3 A max
37	NO		
38	0-10V	DAC1 Output	Output DC 0÷10V
39	N.U.	Not Used	
40	GND	Ground	
41	IN2	Configurable Input 2 (see par.9.10)	Signal 0 / 5 V
42	+12V		
43	+5V		
44	GND	Ground	

3 Control Panel: Use and Functions



3.1 Led

L1	Igniter output ON
L2	Auger output ON
L3	Configurable V2 output ON
L4	Configurable Aux1 output ON
L5	Configurable Aux2 output ON* (only if Auxiliary module is present)
L9	ON Limit Switch open ON
L10	Level Pellet sensor
L11	Aux Input Open

3.2 Buttons

Button	Click [P click]	Long pressing [P long] (about 3 seconds)
P1	Exit from Menu or Sub-Menu	-
P2	Enable/Disable Chrono mode in Chrono Menu	ON/OFF and Unblock function.
P3	Enter in menu or submenu, save data, activation chrono time slot	Enter in Keyboard Setting, Keyboard Menu or System Menu
P4	Visualisation / Increase parameter value	-
P5	-	Block keyboard
P6	Visualisation / Decrease parameter value	-

3.3 Alarms

Description	State System	Code
Safety Thermostat HV1: always signalled	Block	**Er01**
Safety Thermostat HV2: **only if Combustion Fan is ON (available for connection of a Pressostat switch or Pellet Thermostat)**	Block	**Er02**
Extinguishing for Lack of Flame	Block	**Er03**
Extinguishing for Boiler over Temperature	Block	**Er04**
Extinguishing for Exhaust gas over Temperature	Block	**Er05**
Encoder Error: No Encoder Signal (in case of **P25=1** or **2**)	Block	**Er07**
Encoder Error: Combustion Fan regulation failed (in case of **P25=1** or **2**)	Block	**Er08**
Real Time Clock (RTC) Error	Block	**Er11**
Failed Ignition	Block	**Er12**
Lack of Main Power Supply	Block	**Er15**
RS485 link error	Block	**Er16**
Lack of fuel	Block	**Er18**
Limit switch error	Block	**Er52**
Anomaly in probe control during Check Up phase		**Prob**
The reset of the BLOCK Condition is done by the Long pressing of the button P2		

3.1 Auto Learning menu

At the first power on of the board it is possible that the keyboard (after 10 seconds) starts to learn Menu. **Please, do not remove main power supply to control board during this phase.** It is possible to stop the procedure by pressing **P1** button. Please note that until keyboard doesn't complete the procedure, it is not possible to navigate into User or System menu. For this reason, if user stop the procedure, keyboard will start a new learning procedure after 10 seconds. This process will stop when keyboard has a valid menu structure.

3.2 Visualizations

Browse with click of **P3** and/or **P4** buttons.

Exhaust Temp:	103
Boiler Temp:	25
Buffer Temp:	25
Fan Speed :	1000
Flame Light	0
Recipe [nr]	1
Product Code: 488:	1234

Exhaust temperature [°C]
Boiler temperature [°C]
Buffer temperature [°C]
Fan speed [RPM]
Flame Light
Pellet Recipe number
Product code

4 User Menu(1)

All this items are accessible from main screen by **P3** button click

4.1 Combustion Power Setting

In this menu is possible to modify the heating power. It can be set in modality automatic or manual. In the first case the system chooses the combustion power, in the second case the user selects the desired power.
Pellet powers: 1-2-3-4-5-Auto
Wood powers: 0-1-2-3-4-5-Auto

4.2 Thermostats

Menu used to modify the value of the main thermostat.
Boiler thermostats
Buffer thermostats (only visible if **P26** = 1 and **P42** = 1)

4.3 Operation Mode

This item is visible only if **A31**=0 and the user can choose Wood or Pellet combustible.
This item can be changed only in **OFF** state.

4.4 Recipe

This item is visible only if **A31** = 0,1. The user can choose Pellet Recipe 1 or 2.

4.5 Chrono

Used to program and activate the ignitions/extinguishing of the system.

4.5.1 Modality

Used to activate or deactivate the programs set.
On this level press **P3** (to enter in edit mode) and then press **P2** to Enable/disable chrono; Press **P4** or **P6** to change Daily, Weekly or Week end program. To save all the setting press **P3** again.

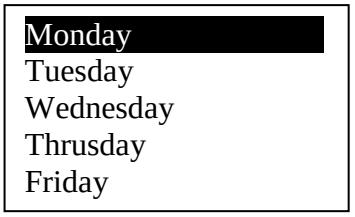
4.5.2 Chrono Program

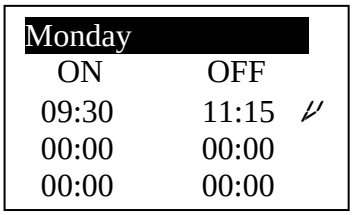
Select the day of the week to program and set the ignition and extinguishing times. The procedure to follow is this:

- Select the time to program with buttons **P3** or **P4**
- Enter the modality modify (the selected time blinks) with button **P2**
- Modify the times with button **P3** or **P4**
- Save with button **P2**
- Activate (appears "V") or deactivate the time band (there is no "V") pushing the button **P2**

Programs around midnight

Set the clock **On** of the previous day at the desired time: Ex. 20.30
Set the clock of **OFF** of the previous day at: **23:59**
Set the clock **On** of the following day at **00:00**
Set the clock of **OFF** of the following day at the desired time: Ex. 6:30
The system turns on at 20.30 on Tuesday and turns off at 6.30 on Wednesday





4.6 Load

This item activates Pellet manual loading turning on continuously Auger engine.
The loading is stopped automatically after 600 seconds. This function is available only if the system is in OFF state.

4.7 Calibration

It allows to modify the ON times set values of the Auger. The values are in the range – 7 ÷ 7.

5 User Menu(2)

All this items are accessible from main screen by **P3** button long press.

5.1 Keyboard Settings

5.1.1 Time and Date

Used to set the day, month, year and current time.

5.1.2 Language

Menu to modify the language of the LCD board. The highlighted is the language in use.

5.2 Keyboard Menu

5.2.1 Learn Menu

Menu to learn user and system menu from control board. This menu force the learn of the menu from control board. Anyway in case of firmware upgrade that involves a menu change, the keyboard ask periodically menu to the control board so generally is not necessary to learn menu manually. This item is protected by password that is the same as System Menu

5.2.2 Set Contrast

Menu to set contrast of display.

5.2.3 Set Min Light

Menu to set minimum backlight value when keyboard is in standby mode (no button pressed for at least 20 seconds).

5.2.4 Keyboard Address

Menu protected by password **1810** (not editable) to change keyboard address. The address must be set to **16**, otherwise control panel cannot communicate with control board.

5.2.5 Node List

Menu to visualize RS485 node information. The information available are:
Node Firmware code, Node type (master, keyboard,..), Node Address.

5.2.6 Acoustic Alarm

Menu to Enable/Disable acoustic beep in case of System Errors.

5.3 System Menu

The System menu is protected by Password (0000 is default) and will be discussed in the next chapter.

6 System Menu

This menu contains all the parameters that define control board the functioning and should be accessible only from heating system builder or installer. This menu is password protected and should be changed by means of System Evolution software.

6.1 Auger Menu

Setting of the **Auger TimeON** defined for each phase/power in the **Auger Period P05**

If a TimeON value is set = 0 the Auger is disabled for the corresponding Power/Phase; if a TimeON value is set ≥ **P05** the Auger works continuously for the corresponding Power/Phase. The TimeON regulation possible set as steps of 0.1 seconds. The set or calculated values are automatically limited in the threshold **P05** and **P27**.

The system uses these values only in Pellet Modality

Code	Description	Min	Max	U	Def.
C01	Auger TimeON Ignition	0	60	[s]	
C02	Auger TimeON Stabilization	0	60	[s]	
C03	Auger TimeON Power 1	**P27**	60	[s]	
C04	Auger TimeON Power 2	**P27**	60	[s]	
C05	Auger TimeON Power 3	**P27**	60	[s]	
C06	Auger TimeON Power 4	**P27**	60	[s]	
C07	Auger TimeON Power 5	**P27**	60	[s]	
C08	Auger TimeON during Periodic Cleaning	0	60	[s]	
C10	Auger TimeON Second Ignition	0	60	[s]	
C11	Auger TimeON Modulation	**P27**	60	[s]	
P05	Total Time Auger Period	4	60	[s]	
P15	Correction Step value of the value Auger TimeON	1	20	[%]	
P27	Minimum Auger TimeON	0	60	[s]	

6.2 Combustion Fan Menu

Setting of the Combustion fan speed for each power/phase of functioning; the value are referred to the current combustion recipe or combustible. The set or calculated values are automatically delimited between in the thresholds **P14** and **P30**. If **P25**=1,2: Encoder version (values are in RPM); if **P25**=0,3: No Encoder version (values are in VOLT).

Code	Pellet Modality	Wood Modality	Min	Max	U	Pellet	Wood
U01	Ignition Speed	- - -	0	230	Volt		- -
			300	2800	RPM		- -
U02	Stabilization Speed	- - -	0	230	Volt		- -
			300	2800	RPM		- -
U03	Power 1 Speed	Power 1 Speed	0	230	Volt		
			300	2800	RPM		
U04	Power 2 Speed	Power 2 Speed	0	230	Volt		
			300	2800	RPM		
U05	Power 3 Speed	Power 3 Speed	0	230	Volt		
			300	2800	RPM		
U06	Power 4 Speed	Power 4 Speed	0	230	Volt		
			300	2800	RPM		
U07	Power 5 Speed	Power 5 Speed	0	230	Volt		
			300	2800	RPM		
U08	Speed during the Periodic Cleaning	- - -	0	230	Volt		- -
			300	2800	RPM		- -
U09	Speed during the Extinguishing	- - -	0	230	Volt		
			300	2800	RPM		
U10	Second ignition Speed	- - -	0	230	Volt		- -
			300	2800	RPM		- -
U11	Modulation Speed	Modulation Speed	0	230	Volt		
			300	2800	RPM		
P14	Combustion Fan Minimum Speed	Combustion Fan Minimum Speed	0	230	Volt		
			300	2800	RPM		
P30	Combustion Fan Maximum Speed	Combustion Fan Maximum Speed	0	230	Volt		
			300	2800	RPM		

P25	**0**=Combustion Fan without Encoder; **1**= Combustion Fan with Encoder; **2**= Combustion Fan with Encoder with automatic change to **P25**=0 in case of no signal Encoder: alarm **Er07** **3=** Combustion Fan without Encoder and DAC Output management (if auxiliary module present)	0	3	[nr]	

6.3 Thermostats' Menu

Code	Description	Probe	Min	Max	U	Def.
L00	Burner OFF Light Value	Photo	0	100	[nr]	
L01	Light Value to Bypass Ignition	Photo	0	100	[nr]	
Th01	System OFF Thermostat	Exhausting	5	900	[°C]	
Th02	Deactivation Igniter Resistance Thermostat	Exhausting	5	900	[°C]	
Th03	Pre-Extinguishing Thermostat for no flame	Exhausting	5	900	[°C]	
Th06	Thermostat to go in Stabilization from Variable phase	Exhausting	5	900	[°C]	
Th07	Modulation Thermostat for Exhausting Over Temperature	Exhausting	5	900	[°C]	
Th08	Safety Thermostat for Exhausting Over Temperature	Exhausting	5	900	[°C]	
Th09	Ignition Bypass Thermostat	Exhausting	5	900	[°C]	
Th18	Antifreeze Thermostat	Boiler	5	10	[°C]	
Th19	Enable Pump Thermostat	Boiler	20	110	[°C]	
Ih19	**Th19** Thermostat Hysteresis	Boiler	1	20	[°C]	
Th21	Unblock Pump Thermostat (used if **A07** = 3)	Boiler	30	85	[°C]	
Ih24	**Th24** Thermostat Hysteresis	Boiler	1	20	[°C]	
Th25	Boiler Safety Thermostat	Boiler	20	110	[°C]	
Th26	Minimum Range of Boiler Thermostat	Boiler	20	110	[°C]	
Th27	Maximum Range of Boiler Thermostat	Boiler	20	110	[°C]	
Th28	System OFF Thermostat in Standby	Exhausting	5	900	[°C]	
Th29	Boiler Minimum Temperature, in case Wood Modality, goes in the OFF after **T21**	Boiler	30	85	[°C]	
Ih29	**T21** Thermostat Hysteresis	Boiler	1	20	[°C]	
Th47	Boiler Probe – Buffer Probe Differential Thermostat	Buffer	1	30	[°C]	
Ih47	**Th47** Thermostat Hysteresis	Buffer	1	5	[°C]	
Ih48	**Th48** Thermostat Hysteresis	Buffer	1	20	[°C]	
Th56	Output Enable Thermostat	Boiler	30	85	[°C]	
d01	Increasing Delta Temperature in Stabilization	Exhausting	0	100	[°C]	
d08	Delta Boiler Temperature in the boiler for combustion power in automatic regulation [**A**]	Boiler	1	30	[°C]	
d23	Delta Boiler Temperature over Boiler Thermostat to go from Modulation to Standby at the end of **T43** if **A13**=2	Boiler	0	50	[°C]	

6.4 Extinguishing Thermostats Menu

Settings for each Combustion Phase/Power of the Exhausting Temperature under which, after the Pre-Extinguishing time **T14**, the stove goes in Extinguishing for no flame. **These values occur with the Th03 Thermostat.**

Code	Description	Probe	Min	Max	U	Def.
Th35	Power 1	Exhausting	5	900	[°C]	
Th36	Power 2	Exhausting	5	900	[°C]	
Th37	Power 3	Exhausting	5	900	[°C]	
Th38	Power 4	Exhausting	5	900	[°C]	
Th39	Power 5	Exhausting	5	900	[°C]	
Th43	Modulation Power	Exhausting	5	900	[°C]	

6.5 Timer Menu

Code	Description	Min	Max	U	Def.
T01	Ignition: Cleaning Time	0	900	[s]	
T02	Ignition: Igniter Resistance Pre-heating Time	0	900	[s]	
T03	Ignition: Pre-Load Time	0	900	[s]	
T04	Ignition: Fixed Time	0	3600	[s]	
T05	Ignition: Variable Time	1	3600	[s]	
T06	Ignition: Stabilization Time	0	900	[s]	
T07	Interval Periodic Cleaning Repetition	15	600	[min]	
T08	Periodic Cleaning Time	0	900	[s]	
T09	Delay time HV1 Safety intervention	1	900	[s]	
T10	Delay time HV2 Safety intervention	1	900	[s]	
T11	Delay time for Standby Exit	0	900	[s]	
T13	Minimum Period Time of Extinguishing	0	900	[s]	
T14	Waiting time Pre-Extinguishing for no flame	0	900	[s]	
T15	Waiting time Pre-Extinguishing in Safety	0	900	[s]	
T16	Final Cleaning Time	0	900	[s]	
T17	Delay time Combustion Power Change	0	900	[s]	
T18	Delay time Combustion Power Change in exit from Ignition	0	900	[s]	
T21	Time after which the Burner in case of Wood Modality goes in OFF if the Boiler Temperature < **Th29**	0	600	[min]	
T22	Delay time for Standby Input	0	900	[s]	
T23	Timer tank filling	0	3600	[s]	
T24	Lack of Pellet signalling or control tank filling	0	3600	[s]	
T27	Delay to disable Auger 2	1	900	[s]	
T30	Work time of Cleaning Engine	0	9600	[s]	
T31	Wait time of Cleaning Engine	1	600	[min]	
T40	Delay to enable Auger	0	900	[s]	
T41	Work time of Pump in De-Block function	0	3600	[s]	
T42	Maximum time of inactivity of Pump in De-Block Function	1	900	[h]	
T43	Time, after which the Burner goes from Modulation to Standby if boiler Temperature>[Boiler Thermostat+**d23**] and **A13**=1	0	9600	[s]	
T85	Max waiting time for Cleaning Engine 2 limit switch	1	60	[s]	
T86	Cleaning Engine 2 ON time	0	9600	[s]	
T87	Cleaning Engine 2 Waiting time	1	900	[min]	

6.6 Enable's Menu

Code		Description	Min	Max	U	Def.
A06	**0**	In Modulation the system uses Power 1: **C03**, **U03**	0	1	[nr]	
	1	In Modulation the system uses Modulation Power: **C11**, **U11**				
A07	**0**	The input Aux is disable	0	4	[nr]	Only in Pellet
	1	The input Aux is used for Modulation/Normal functioning				
	2	The input Aux is used for Standby/Normal functioning				
	3	The input Aux is used to block the Pump until water temperature <**Th21** (**P26**=0)				
	4	The input Aux is used for ON/OFF functioning				
A13	**0**	Reached the Boiler Thermostat the Burner goes in Modulation	0	1	[nr]	
	1	Reached the Boiler Thermostat the Burner goes in Modulation, then if **d23** is satisfied and **T43** is finished it goes in Standby				
A26	**0**	The immediate Exit from Standby is allowed	0	1	[nr]	Only in Pellet
	1	Exit from Standby is allowed only in the phase Standby OFF				
A28	**0**	Auger brake not activated	0	1	[nr]	
	1	Auger brake activated				
A31	**0**	Pellet/Wood Management	0	2	[nr]	
	1	Only Pellet Management				
	2	Only Wood Management				
A32	**0**	Auxiliary Module Disable (not present)	0	1	[nr]	
	1	Auxiliary Module Enable (present)				
P02	Maximum number ignition attempts		1	5	[nr]	
P03	Work Combustion Powers' number		1	5	[nr]	
P09	Pellet Sensor configuration: 0=N.C., 1=N.O., 2=Not Available		0	2	[nr]	
P26	Plumbing system management (see section 9.9.6.1)		0	1	[nr]	

P37	Only Thermocouple (**P37**=0); Only Photoresistor (**P37**=1); Photo+Thermocouple (**P37**=2)	0	2	[nr]	
P42	Hydro/Air configuration Hydro (**P42** = 0) Air (**P42** = 1)	0	1	[nr]	
P44	Output V2 Configuration	0	16	[nr]	
P45	Output Aux1 Configuration	0	16	[nr]	
P48	Output Aux2 Configuration	0	16	[nr]	
P49	Cleaning Engine 2 max Cycle Number on Run Mode	0	100	[nr]	
P50	Cleaning Engine 2 max Cycle Number on Extinguishing	0	100	[nr]	
P60	Input 1 Configuration	0	2	[nr]	
P61	Input 2 Configuration	0	2	[nr]	

6.1 Menu Counters

Submenu	Description
Total time	Total time system feeding
Functioning time	Activity time system: time at least one Fan works
Run mode time	System real heating time: time in which heating is effectively produced (Run/Modulation)
Ignitions' Numbers	Number of done ignition attempts
Failed Ignitions' Numbers	Number of failed ignition attempts
Errors' Numbers	Number of errors occurred.
Counters Reset	Reset all counters: set to zero all counters

6.2 Outputs Menu Test

It allows the test of the single management outputs with the connected devices. The function is available in **OFF** state.

Code	Description	Min	Max	U	
Combustion Fan	Combustion Fan Test	0	230	[Volt]	
		300	2800	[RPM]	
During the Combustion Fan Test, the display shows the set value [Volt] o [RPM] and the RPM of the fan detected by the encoder if it is present: so it is possible to create a conversion table [RPM]/[Volt] to use for the passage from encoder Mode **P25**=1 to not encoder Mode **P25**=0 in case of encoder breakage					
Output V2	Output V2 Test	Off	On	-	
Auger	Auger Test	Off	On	-	
Igniter	Igniter Test	Off	On	-	
Output Aux1	Output Aux1 Test	Off	On	-	
Output Aux2	Output Aux2 Test (only if Auxiliary module is present)	Off	On	-	

7 Functioning States in Pellet Modality

7.1 Off

Timer	Controls			Combustion Fan	Auger	Igniter
		If Boiler Temperature> **Th25**	→ goes in **Block**	**OFF**	**OFF**	**OFF**
	Photoresistor **P37**=1 or 2	If Flame Light > **L00**	→ goes in **Extinguishing**			
	Thermocouple **P37**=0	If Exhaust Temperature>**Th01** Thermostat and the last functioning modality was pellet	→ goes in **Extinguishing**			

7.2 Check Up

Timer	Controls			Combustion Fan	Auger	Igniter
T01	**Photoresistor** **P37**=1 or 2	If Flame Light > **L01**	→ goes in **Normal**	**Max Speed**	**OFF**	**OFF**
	Thermocouple **P37**=0	If Exhaust Temperature>**Th01** Thermostat and the last functioning modality was wood	→ goes in **Recover Ignition**			
		If Exhaust Temperature>**Th09** Thermostat and the last functioning modality was pellet	→ goes in **Normal**			

7.3 Pre-Heating

Timer	Controls			Combustion Fan	Auger	Igniter
T02	**Photoresistor** **P37**=1 or 2	If Flame Light > **L01**	→ goes in **Normal**	**U01**	**OFF**	**ON**
	Thermocouple **P37**=0	If Exhaust Temperature>**Th09** Thermostat				

7.4 Pre-Loading

Timer	Controls			Combustion Fan	Auger	Igniter
T03	**Photoresistor** **P37**=1 or 2	If Flame Light > **L01**	→ goes in **Normal**	**U01**	**ON**	**ON**
	Thermocouple **P37**=0	If Exhaust Temperature>**Th09** Thermostat				

This phase doesn't start if P44=1 and T40 isn't finished

7.5 Fixed Phase

Timer	Controls			Combustion Fan	Auger	Igniter
T04	**Thermocouple** **P37**=0	If Exhaust Temperature>**Th09** Thermostat	→ goes in **Normal**	**U01**	**C01**	**ON**

This phase is present only if the system works with the Thermocouple.

7.6 Variable Phase

Timer	Controls			Combustion Fan	Auger	Igniter
T05	**Photoresistor** **P37**=1 or 2	If Flame Light > **L01**	→ goes in **Stabilization**	I Ignition: **U01** II Ignition: **U10**	I Ignition:**C01** II Ignition:**C10**	**ON**
		At the end of **T05** if Flame Light < **L01**	→ tries again Ignition from **Variable phase**			
			→ goes in **Extinguishing** with error **Er12** in case of finished number of attempts			
	Thermocouple **P37**=0	If Exhaust Temperature>**Th09** Thermostat	→ goes in **Normal**			**ON** if exhaust temp.<**Th02**
		If Exhaust Temperature>**Th06** Thermostat	→ goes in **Stabilization**			
		If Exhaust Temperature<**Th06** Thermostat at the end of **T05**	→ tries again Ignition from **Variable phase**			
			→ goes in **Extinguishing** with error **Er12** in case of finished number of attempts			

7.7 Stabilisation

Timer	Controls			Combustion Fan	Auger	Igniter
T06	**Photoresistor** **P37**=1 or 2	If Flame Light < **L01**	→ Tries again Ignition from **Variable phase**	**U02**	**C02**	**OFF**
			→ Goes in **Extinguishing** phase with error **Er12** in case of finished number of attempts			
		At the end of **T06** if Flame Light > **L01**	→ goes in **Normal**			
	Thermocouple **P37**=0	If Exhaust Temperature>**Th09** Thermostat	→ goes in **Normal**	**U02**	**C02**	**ON** if exhaust temp.<**Th02**
		If Exhaust Temperature <**Th06** Thermostat	→ tries again Ignition from **Variable phase**			
			→ goes in **Extinguishing** phase with error **Er12** in case of finished number of attempts			
		At the end of **T06** if Exhaust Temp. > **Th06**+**d01**	→ goes in **Normal**			

7.8 Recover Ignition

The system goes in **Recover Ignition**:
After a Power Failure < 1 minute while the Burner were in **ON** State as Ignition, Normal, Modulation the system wait 20 seconds and goes back to the previous state.
After a Power failure of 1-5 minutes while the Burner were in **ON** State as Ignition, Normal, Modulation the System extinguishing with error **Er15** than restart again from CheckUp state.
If the system is in Extinguishing and you want restart the Burner pushing the button ON/OFF.

Timer	Controls			Combustion Fan	Auger	Igniter
T16	**Photoresistor** **P37**=1 or 2	If Flame Light > **L01**	→ goes in **Ignition**		**OFF**	**OFF**
		If Flame Light > **L00**	→ waits	**U09**		
		If Flame Light < **L00**	→ starts Timer **T16**	**Max Speed**		
		At the end of **T16** if Flame Light < **L00**	→ goes in **Check Up**			

	Thermocouple **P37**=0	If Exhaust Temperature>**Th01**	→ waits	**U09**		
		If Exhaust Temperature<**Th01**	→ starts Timer **T16**	**Max Speed**		
		At the end of **T16** if Exhaust Temperature<**Th01**	→ goes in **Check Up**			

7.9 Normal

Param.	Controls			Combustion Fan	Auger	Igniter
		If Boiler Temperature > **Boiler Thermostat**	→ goes in **Modulation**	**User's Power**	**User's Power**	**OFF**
A07=1		If Input Aux open				
	P37=0 or 2	If Exhausting Temperature> **Th07** Thermostat				
		Buffer Temp.>**Buffer Thermostat** and **P26**=1 and **P44, P45, P48**=5	→ goes in **Standby**			
A07=2		If Input Aux open				
T15		If Boiler Temperature > **Th25** Thermostat	→ starts Timer **T15**			
		At the end of **T15** if Boiler Temperature>**Th25**	→ goes in **Extinguishing** with error **Er04**			
	P37=0 or 2	If Exhaust Temperature > **Th08** Thermostat	→ starts Timer **T15**			
		At the end of **T15** if Exhaust Temperature>**Th08**	→ goes in **Extinguishing** with error **Er05**			
T14	**Photoresistor** **P37**=1 or 2	If Flame Light < **L00**	→ starts Timer **T14**			
		At the end of **T14** if Flame Light < **L00**	→ goes in **Extinguishing** with error **Er03**			
	Thermocouple **P37**=0	If Exhaust Temp.<**Th03** Thermostat or If Exhaust Temp.<**Extinguishing Thermostat** for the used power	→ starts Timer **T14**			
		At the end of **T14** if exhaust temperature is low	→ goes in **Extinguishing** with error **Er03**			

7.10 Modulation

Param.	Controls			Combustion Fan	Auger	Igniter
A13=1		If for the time **T43** Boiler Temperature>**Boiler Thermostat+d23**	→ goes in **Standby**	If **A06**=1 → Power **U11** If **A06**=0 → Power **U03**	If **A06**=1 → Power **C11** If **A06**=0 → Power **C03**	**OFF**
		Buffer temp>**Buffer Thermostat** and **P26**=1 and **P44, P45, P48**=5				
A07=2		If Input Aux open				
T15		If Boiler Temperature > **Th25** Thermostat	→ starts Timer **T15**			
		At the end of **T15** if Boiler Temperature>**Th25**	→ goes in **Extinguishing** with error **Er04**			
	P37=0 or 2	If Exhaust Temperature > **Th08** Thermostat	→ starts Timer **T15**			
		At the end of **T15** if Exhaust Temperature>**Th08**	→ goes in **Extinguishing** with error **Er05**			

T14	**Photoresistor** **P37**=1 or 2	If Flame Light < **L00**	→ starts Timer **T14**			
		At the end of **T14** if Flame Light < **L00**	→ goes in **Extinguishing** with error **Er03**			
	Thermocouple **P37**=0	If Exhaust Temp.<**Th03** Thermostat or If Exhaust Temp.<**Extinguishing Thermostat** for the used power	→ starts Timer **T14**			
		At the end of **T14** if exhaust temperature is low	→ goes in **Extinguishing** with error **Er03**			

7.11 Standby

Param.	Controls			Combustion Fan	Auger	Igniter
T13 (Extinguishing phase)	**Photoresistor** **P37**=1 or 2	If Flame Light > **L00**	→ starts Timer **T13**	**U09**	**OFF**	**OFF**
		At the end of **T13** if Flame Light **>L00**	→ wait			
	Thermocouple **P37**=0	If exhaust temp.> **Th28** Thermostat	→ starts Timer **T13**			
		At the end of **T13** exhaust temp.>**Th28**	→ wait			
T16 (Final Cleaning phase)	**Photoresistor** **P37**=1 or 2	If Flame Light < **L00**	→ starts **T16**	**Max Speed**		
	Thermocouple **P37**=0	If Exhausting Temp. < **Th28** Thermostat				
(Standby OFF phase)		At the end of **T16**	→ goes in Standby OFF	**OFF**		

7.12 Extinguishing

Param.	Controls			Combustion Fan	Auger	Igniter
T13 (Extinguishing phase)	**Photoresistor** **P37**=1 or 2		→ starts Timer **T13**	**U09**	**OFF**	**OFF**
		At the end of **T13** if Flame Light **>L00**	→ wait			
	Thermocouple **P37**=0	If exhaust temp.> **Th01** Thermostat	→ starts Timer **T13**			
		At the end of **T13** exhaust temp.>**Th01**	→ wait			
T16 (Final Cleaning phase)	**Photoresistor** **P37**=1 or 2	If Flame Light < **L00**	→ starts **T16**	**Max Speed**		
	Thermocouple **P37**=0	If Exhausting Temp. < **Th01** Thermostat				
		At the end of **T16**	→ goes in **Block** if there are errors, otherwise goes in **Off**	**OFF**		
This phase doesn't stop if P44, P45, P48=6 and T27 isn't finished						

7.13 Block

Controls	Combustion Fan	Auger	Igniter
To exit: Push for 3 seconds button **P2**. With no more block conditions the system goes in **Off**	**OFF**	**OFF**	**OFF**

8 Functioning States in Wood Modality

The system has the Wood modality only if **A31**=0.

8.1 Off

Timer	Controls	Combustion Fan	Auger	Igniter
		OFF	**OFF**	**OFF**

8.2 Normal

Param.	Controls		Combustion Fan	Auger	Igniter
T21	If Boiler Temperature < **Th29**	→ starts Timer **T21**	**User's Power**	**OFF**	**OFF**
	At the end of **T21** if Boiler Temperature<**Th29**	→ goes in **Block** with error **Er03**			
	If Boiler Temperature > **Boiler Thermostat**	→ goes in **Modulation**			
	Buffer Temp.>**Buffer Thermostat** and **P26**=1 and **P44**=5	→ goes in **Standby**			
	If Water Temperature > **Th25** Thermostat	→ goes in **Security**			

8.3 Modulation

Param.	Controls		Combustion Fan	Auger	Igniter
	If Boiler Temperature > **Th25** Thermostat	→ goes in **Security**	If **A06**=1 → Power **U11** If **A06**=0 → Power **U03**	**OFF**	**OFF**
A13=1	If for time **T43** the Boiler temperature>**Boiler Thermostat**+**d23**	→ goes in **Standby**			

8.4 Standby/ Security

Param.	Controls	Combustion Fan	Auger	Igniter
		OFF	**OFF**	**OFF**

8.5 Block

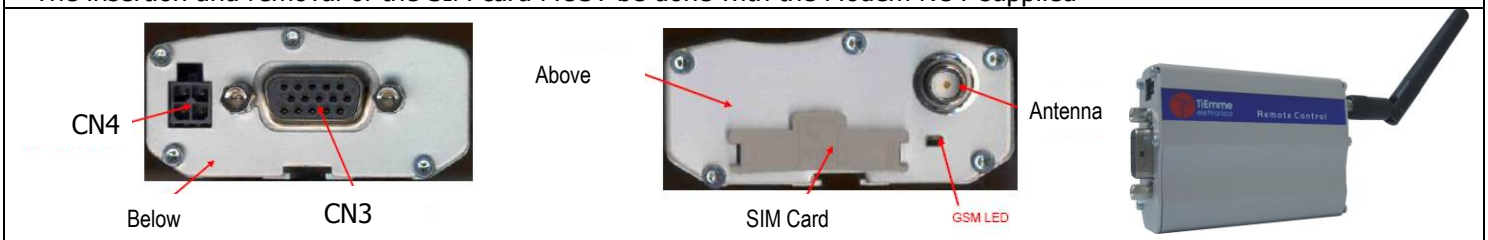
Param.	Controls	Combustion Fan	Auger	Igniter
To exit: Push for 3 seconds button **P2**. With no more block conditions the system goes in **Off**		**OFF**	**OFF**	**OFF**

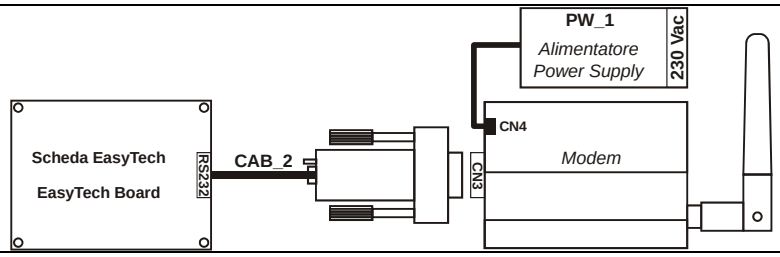
9 Functions

9.1 Modem Management

The system manages a modem module (given on demand) for the dialogue with the Burner through SMS to operate the Ignition, Extinguishing, State's request and have information about the Block/Alarms conditions. The Modem is connected to the Control Board's port RS232 with cables and connectors given; it is supplied with a AC/DC Power Supply unit.

- Use a SIM card in the Modem enabled to the traffic GSM data
- Disable the PIN request from the SIM
- The insertion and removal of the SIM card MUST be done with the Modem NOT supplied





The user can send an SMS to the Modem's SIM with a command word written both capital and small:

Start	To start Ignition from Burner OFF in case of Pellet Modality. The Modem sends back a message to the number from which it received the command with the status, Boiler Temperature and a possible alarm error code.
Stop	To start Extinguishing from Burner ON in case of Pellet Modality. The Modem sends back a message to the number from which it received the command with the status, Boiler Temperature and the alarm error code.
Status	To ask the Burner's State. The Modem sends back a message to the number from which it received the command with the status, Boiler Temperature and a possible alarm error code.
Learn	To Learn the number to send an SMS in case of Block. If there is a Block condition, the Modem automatically sends a message to the learnt number with the Boiler status, Boiler Temperature and the alarm error code.
Reset	To unblock the system in case of block state because of an error occurs. This function works only for those errors that no need a user interaction.

9.2 Supply Voltage Lack Management

In case of power failure, the system saves the most important functioning data.
When the control board is supplied again, the system evaluates the saved data and if the Burner were ON in the phases Ignition, Normal, Modulation, Standby, the system goes in Recover Ignition.
In case of functioning state of OFF or Block or Wood modality, the system goes back to the previous state.

9.3 Combustion Power Change Delay Management

When the system exits from the Ignition and goes in **Normal**, the Combustion Power, starting from the Combustion Power 1, reaches the target one increasing the value with the delay time as the timer **T18**.
The other manual or automatic power changes are managed and actuated with the delay time as timer **T17**.

9.4 Hydro/Air function

When **P42** = 0 the system manage a hydro product. If **P42** = 1 the system manga an air product.

9.5 Brazier Periodic Cleaning

When the Burner is activated in Pellet Modality, the system automatically starts the brazier's periodic cleaning.
With intervals as Timer **T07** (minutes) the Combustion is taken to Periodic Cleaning Power according to parameters **C08** and **U08** for the Timer **T08** (seconds).

9.6 Automatic Combustion Power Management

In the Combustion Power setting, the user can set the Automatic modality [**A**]. The work power is automatically selected according to the Boiler Temperature and the value of the selected Boiler Thermostat:

- Boiler Temperature ≤ **Boiler Thermostat–d08** → The system goes to the maximum available Combustion Power
- **Boiler Thermostat–d08**< Boiler Temperature<**Boiler Thermostat**→The Combustion Power decreases reaching the Boiler Thermostat
- Boiler Temperature≥**Boiler Thermostat**→The system goes to Combustion Power 1 if **A06=0** or to Modulation Power if **A06=1**

Example: **A06** = 1, Modality = [**A**], **Boiler Thermostat** =75 °C, **d08** = 5 °C, **P03** = 5						
Water Temperature °C	≤ 70	71	72	73	74	≥ 75
Work Combustion Power	Power 5	Power 4	Power 3	Power 2	Power 1	Power 1

9.7 Pellet Load Correction Management

The user could correct the Auger's times ON of Pellet Loading in Step **– 7 ÷ 7**
P15 is the percentage value of the single correction Step and is applied on the Work default values.

Example:	**P15**=10%	**C03**=2,0	**C04**=3,0	**C05**=4,0	**C06**=5,0	**C07**=6,0	**C11**=1,0
	Step=-1	**C03**=1,8	**C04**=2,7	**C05**=3,6	**C06**=4,5	**C07**=5,4	**C11**=0,9
The defined values are within the defined range P27 ÷ P05							

9.8 Speed Combustion Fan Management

The parameter **P25** sets the regulation modality of the Exhausting Fan Speed

P25=0	Exhausting Fan without Encoder: the speed is defined by the set voltage value [Volt].
P25=1	Exhausting Fan with Encoder: the speed is defined by the set number of turns [RPM]. In case of signal presence but regulation failed, the system goes in BLOCK with **Er08** alarm. In case of sensor break with absence of the signal, the system goes in BLOCK with **Er07** alarm.
P25=2	Exhausting Fan with Encoder: the speed is defined by the set number of turns [RPM]. In case of signal presence but regulation failed, the system goes in BLOCK with **Er08** alarm. In case of sensor break with absence of the signal, the system goes in BLOCK with **Er07** alarm. After the reset of the **BLOCK** done by the button **P2**, the system goes **Automatically** to **P25=0**
P25=3	Exhausting Fan without Encoder: the speed is defined by the set voltage value [Volt]. If auxiliary module is present at pin 38-40 will be present a 0÷10 V DC to manage a combustion fan with DC control. Please note that the 0÷10V DC value is related to the set value in the range 0÷230V. At pin 3-4 it is present 230 V AC when fan is On.

9.9 Configurable Output

It's possible to configure V2, Aux1 and Aux2 (if auxiliary module is present) outputs based on respectively **P44**, **P45**, **P48** parameters.

Value Parameter	*Output Type*	*Output*		
		V2 (**P44**)	AUX1* (**P45**)	AUX2** (**P48**)
0	Output not used	√	√	√
1	Pellet Safety Valve (see par.9.9.1)	√	√	√
2	Pellet Load Engine (see par. 9.9.2)	√	√	√
3	Output Under Thermostat (see par.9.9.3)	√	√	√
4	Cleaning Engine 1(see par.9.9.4)	√	√	√
13	Cleaning Engine 2(see par.9.9.5)	√	√	√
14	Exchanger Management (see par.9.9.6)	√	√	√
16	Auger 2 (see par.9.9.7)	√	√	√

√ = Function implemented
× = Function not implemented (Output deactivates)
— = Value not available for the parameter

NOTE:
V2 Output is a supplied output.
***AUX1 is a clean contacts output and need to be supplied. Connect pin 32-33 to supply.**
****** **if auxiliary module is present, AUX2 is a clean contacts output and need to be supplied. Connect pin 32-37 to supply.**

If parameter's value is different from the table above, the corresponding output will be always off.

9.9.1 Pellet Safety Valve

It works in Check Up, Ignition, Stabilisation, Run Mode, Modulation and Safety. When the output is activated, the Auger will be on only when the timer **T40** is finished.

9.9.2 Pellet Load Engine

When the Pellet Level Sensor signals a lack of fuel, the output is switched on. If after **T24** seconds is not reached the minimum level of pellets, the system goes in Extinguishing and the display shows the message **Er18**. If you fill the tank manually, you can reset the error and restart the system. However if the level is reached, the loading of the material continues for the time **T23**.

9.9.3 Output Under Thermostat

The output is managed by **Th56** Thermostat. If water temperature is greater than **Th56** the output is On, otherwise is Off.

9.9.4 Cleaning Engine

The output is On for the time **T30** when the system reaches the operation time **T31** in Run Mode and Modulation. In Wood modality it work only if exhaust gas temperature is greater than **Th29** Thermostat.

9.9.5 Cleaning Engine 2

The Cleaning Engine 2 is enabled to work only if the system is in Pellet modality and it's on in:

- Off, Recover Ignition, Standby-Extinguishing before the Final Cleaning. Fans and augers are off; the cleaning is repeated **P50** times. To disable the cleaning in these phases, set **P50**=0.
- periodically when the operating time in Run Mode, Modulation is greater than parameter **T87**. The combustion parameters don't change; the cleaning is repeated **P49** times. To disable the cleaning, when the system has reached the final power, set **P49**=0.

The Brazier Cleaning Engine management can be done using a limit switch or no:

- management with limit switch (set **P60**, **P61** (only if Auxiliary module is present), equal to 2)

Phase	*Description*
Phase 1	The system activates the Engine and checks the state of the limit switch: when it opens it goes to Phase 2. If, when the **T85** timer expires, the limit switch is still close the system goes in Block with error **Er25.**
Phase 2	The maximum duration of this phase is **T86** seconds: in this time the Engine has to be done his cycle and be repositioned in the start position (the limit switch has to be close). At the end the system goes to Phase 3. If, at the end of **T86** the limit switch is open the system goes to Block state with error **Er25.**
Phase 3	If the number set as cleaning cycles is greater than 1, it starts a new cleaning cycles otherwise the engine is disabled.

If during the normal operation the thermo-regulator reads the limit switch as open, the Brazier Engine is activated to try to close the contact; if it doesn't do it within the **T86** time, the system goes in Block state with the error message **Er25.**
In Off and Block state, for safety concerns, the Engine is always still.

- management without limit switch

Phase	*Description*
Phase 1	The system switches on the engine for a time equal to **T86** seconds, in this time, the engine have to completed its cycle and have to place itself in the starting position. At the end system goes to Phase 2.
Phase 2	If the number of cleaning cycles set is greater than one starts another cycle of cleaning, otherwise the motor is switched off.

In Off and Block state, for safety concerns, the Engine is always still.

9.9.6 Exchanger Management

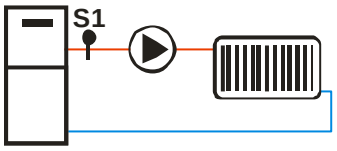
If **P42** = 0 system manage a Pump (see par 9.9.6.1);if **P42** = 1 system manage an Air fan (see par. 9.9.6.2).

9.9.6.1. Pump

It is possible to choose 2 plumbing plants:

P26=0

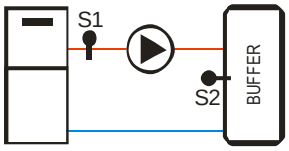
Ex. Th18= 5 °C
Th19= 50°C
Th21= 80°C



System pump is used to supply heating plant.
Pump is enabled if S1 temperature is greater than **Th19** Thermostat.
Pump is always ON if S1 temperature is greater than **Th21** Thermostat and lower than **Th18** Thermostat.

P26=1

Ex. Th18= 5 °C
Th19= 40 °C
Th48= 80 °C
Th47= 8 °C



Pump is used as Buffer charge.
It is ON if differential temperature S1-S2 is greater than **Th47** and S1 temperature is greater than **Th19**.
If Buffer Thermostat **Th48** is satisfied, system goes in Standby. Pump is always ON if S1 temperature is lower than **Th18** Thermostat.

Unblock Pump
If Pump is OFF for a time greater than **T42**, it is activated for **T41** seconds, to avoid Pump block for inactivity.

9.9.6.2. Air Fan

Air fan output will be On when Boiler temperature is over **Th19**.
If **A07** = 3 (block exchanger) and Aux input is open, output will be Off unless Boiler temperature is greater than **Th25**.

9.9.7 Auger 2

The Auger 2 carries the fuel into the brazier; if the Auger is enabled, the Auger 2 is always on; when the Auger is turned off, the Auger 2 remains on until the timer **T27** expire.

9.10 Configurable Input

It's possible to configure Input1 and Input2 (if auxiliary module is present) input based on respectively **P60**, **P61** parameters.

Value Parameter	*Input Type*	*Input*	
		Input1 (**P60**)	Input2* (**P61**)
0	Input not used	√	√
1	Level Pellet Sensor (see par.9.10.19.9.1)	√	√
2	Limit switch (see par.9.10.2)	√	√

√ = Function implemented
× = Function not implemented (Output deactivates)
— = Value not available for the parameter

NOTE:
**** if auxiliary module is present, Input2 is available.**

9.10.1 Pellet Sensor management

If the no configurable outputs isn't set as Pellet Engine the Pellet Level Sensor has the following functioning: when pellet is under the fixed level, after a signalling for a time **T24**, the system goes in Extinguishing with error **Er18**. If the pellet is put in the tank, the system stops every signal and it is possible to restart it. If don't use the sensor set **P09**=2.
Pellet sensor electrical connection:
Input 1 (**P60** = 1): Pin 26-27-31
26 Gnd
27 Signal
31 +12V
Input 2 (**P61** = 1): Pin 40-41-42 (only if Auxiliary Module is present)
40 Gnd
41 Signal
42 +12V

9.10.2 Limit Switch management

Limit switch is used in combination with Cleaning Engine 2 (see par.9.9.5).
Control board read this input as closed when if limit switch is closed connect the input to +5V.
Limit switch electrical connection:
When Input 1 is configured as limit switch (**P60** = 2) connect limit switch to pin 27-30
When Input 2 is configured as limit switch (**P61** = 2) connect limit switch to pin 41-43