

Electronics



Pulse Firing controller
for Esa Estro and Esa Reflam
ESA PLEX-PULSE (E7108 rev. 01 - 16/12/2016)

GENERAL WARNINGS:



■ All installation, maintenance, ignition and setting must be performed by qualified staff, respecting the norms present at the time and place of the installation.

■ To avoid damage to people and things, it is essential to observe all the points indicated in this handbook. The reported indications do not exonerate the Client/User from observing general or specific laws concerning accidents and environmental safeguarding.

■ The operator must wear proper DPI clothing (shoes, helmets...) and respect the general safety, prevention and precaution norms.

■ To avoid the risks of burns or high voltage electrocution, the operator must avoid all contact with the burner and its control devices during the ignition phase and while it is running at high temperatures.

■ All ordinary and extraordinary maintenance must be performed when the system is stopped.

■ To assure correct and safe use of the combustion plant, it is of extreme importance that the contents of this document be brought to the attention of and be meticulously observed by all personnel in charge of controlling and working the devices.

■ The functioning of a combustion plant can be dangerous and cause injuries to persons or damage to equipment. Every burner must be provided with certified combustion safety and supervision devices.

■ The burner must be installed correctly to prevent any type of accidental/undesired heat transmission from the flame to the operator or the equipment.

■ The performances indicated in this technical document regarding the range of products are a result of experimental tests carried out at ESA-PYRONICS. The tests have been performed using ignition systems, flame detectors and supervisors developed by ESA-PYRONICS. The respect of the above mentioned functioning conditions cannot be guaranteed if equipment, which is not present in the ESA-PYRONICS catalogue, is used.

DISPOSAL:



To dispose of the product, abide by the local legislations regarding it.

GENERAL NOTES:



■ In accordance to the internal policy of constant quality improvement, ESA-PYRONICS reserves the right to modify the technical characteristics of the present document at any time and without warning.

■ It is possible to download technical sheets which have been updated to the latest revision from the **www.esapyronics.com** website.

■ The products manufactured by ESA-PYRONICS have been created in conformity to the **UNI EN 746-2:2010** Norms: Equipment for industrial thermal process - Part 2: Safety requirements for combustion and the movement and treatment of combustible elements. This norm is in harmony with the Machine Directive **2006/42/CE**. It is certified that the products in question respect all the requirements prescribed by the above mentioned Norms and Directives.

■ Certified in conformity with the **UNI EN ISO 9001** Norm by DNV GL.

CERTIFICATIONS:



ESA PLEX-PULSE is in compliance with European Union directives and standards: **2014/30/UE** (electromagnetic compatibility) **2014/35/UE** (low voltage), **EN 61000-4-2**, **EN 61000-4-4**, **EN 61000-4-5** and **EN 61000-4-11** (electromagnetic compatibility: conducted and radiated emissions, ESD, burst, surges and Power fails immunity).

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ESA PLEX-PULSE is a device dedicated to managing the burner pulses controlled by ESA ESTRO and ESA REFLAM according to a percentage of the power required for maintaining the temperature.

The device has the purpose to improve performance in terms of flexibility and performance in order to allow the customer to manage the heat treatment of their own plant in an innovative way. Special care was given to the aspect of product line that has reduced the area used inside the electrical panel making the most of its height. The card allows any control or supervising device (PLC, PC, DCS ecc...) to command and receive information regarding the burner conditions using digital I/O and analogical inputs in a fast and versatile manner.

APPLICATIONS

- Double step impulse control for the burners, modulating them from minimum to maximum power or from off to on.
- Triple step impulse control for the burners, modulating them from off, to minimum power and maximum power according to the power percentage requested for heating.
- Impulse control only of the air valves to carry out controller cooling according to the power percentage requested for cooling.
- ECS control of up to a maximum of 4 control areas and 16 burners per zone, via the ECS bus.

CHARACTERISTICS

GENERAL:

- Supply voltage: 90÷240Vac
- Supply frequency: 40÷70 Hz
- Maximum absorption: 40 VA
- Operating temperature: 0÷50 °C
- Storage temperature: -10÷70 °C
- Fixing: on DIN 35mm rail (EN50022)
- Mounting position: any
- Protection degree: IP10
- Working environment: Not suitable for explosive or corrosive environments
- ESA PLEX-PULSE-HWR dimensions 187.5X114 H119mm
- ESA PLEX-PULSE-HWR Weight 1000g
- Type of analog input signal: 0-10V,0-20mA, 4-20mA
- Impedance of analog inputs: >30Kohm x Volt
250 ohm x mA
- Digital input tension: 24Vdc
- Digital input absorption: 7mA
- Digital input length line: max 5 mt
- Maximum flow rate digital outputs:
2A @ 230V cosj=1
1A @ 230V cosj=0.5
- Number of controllable burners: max 64
- Number of zones controlled: max 4
- Number of burners per zone: max 16
- ECS field bus tension: max 25Vdc
- Data transmission rate of ECS bus: 9600 baud
- Length of ECS line max 200mt with ECS cable or with busway
- Instruments that can be connected to the ECS active output max 64 9600 baud

DESCRIPTION

ESA PLEX-PULSE allows the user to manage the heat treatment of the plant, in an innovative, fast and versatile way.

The pulse adjustment system presents numerous benefits because the flows are distributed in a more homogeneous way inside the control area. The main advantages are the reduction of the temperature difference for various points of the same area, especially when the required power is minimum; and a turn-down of better regulation, proportional to the number of burners of the area. The fundamental characteristic of the pulse-firing is the sequential management of the burners on the basis of time, by modulating the duration of the phase of full power compared to that of a minimum power or off, depending on the adjustment percentage required by temperature controller. The burners therefore do not take on intermediate powers but pass continuously from minimum to maximum generating convective motions inside the combustion chamber. The definition of the operating timing and alternating of the burners is defined by an algorithm, present in ESA PLEX-PULSE, which processes in real time the process data. The algorithm according to the required regulation power calculates the scanning time and the operation of the burners, all resulting in serial commands on the ECS bus output towards the ESA ESTRO and ESA REFLAM burner control devices.

The PLEX-PULSE ESA device allows you to control up to a maximum of 64 burners divided into 4 zones with 16 devices.

ESA PLEX-PULSE interfaces with the control system via

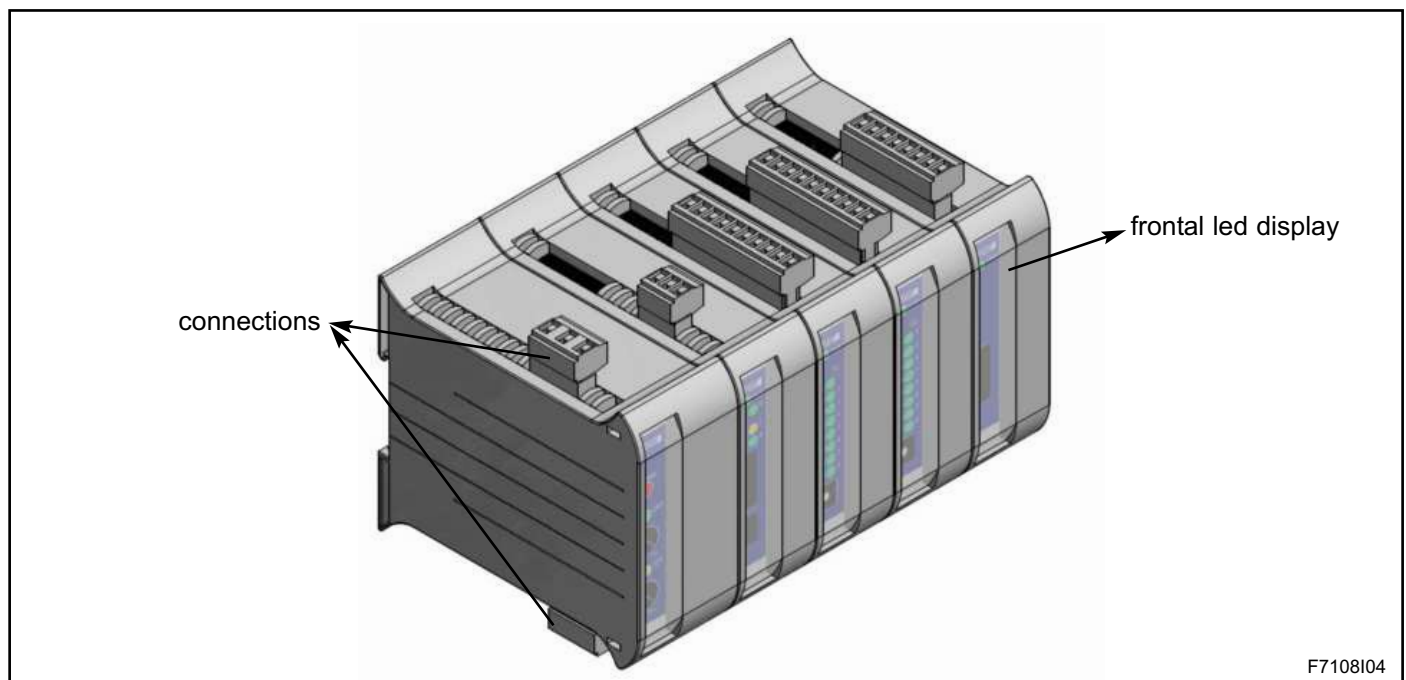
analog and digital signals. In particular via analog inputs it receives the power adjustment values for each zone; while through digital inputs it receives the consents to activate the burners or other functions (forcing, reset etc). Finally, the device has digital outputs that send back to the supervisor the status of the controlled burners. ESA PLEX-PULSE is supplied in separate modules suitable for mounting at the back of the panel, each dedicated to a specific function. The modules are the following:

- Power supply module ESA ALIM-2
- Controller module ESA CPU PLEX PULSE
- Digital input-output module ESA D8IO n°1
- Digital input-output module ESA D8IO n°2
- Analogical input module ESA A4I

The modules are interconnected via a quick connect multi-cable supplied with the device, and each has LEDs that indicate the operating status.

The power section, consisting of a universal power ESA ALIM2 (switching) that accepts a wide supply voltage range thus ensuring the functionality of the device in hostile environments. Connections are made using the quick release connectors, which facilitate the wiring operations or maintenance.

ESA PLEX-PULSE is equipped with a configuration software that allows you to customize various functions including power thresholds and number of burners per zone, to adapt it to any type of burner and installation.



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ESA PLEX-PULSE has connections on the top and bot-

tom, while the signs are present only on the front side.

DISPLAY SECTION




ESA PLEX-PULSE is made up of more than one module and each one has a LED to indicate its operation status. Here below are all the indications available and their mea-

ning grouped according to the ESA PLEX-PULSE modules.

ESA ALIM-2 power module

The module ESA ALIM-2 has three LEDs on the front of the






display to be able to quickly recognize any anomalies.

LED	STATE	DESCRIPTION
 Power (Red)	STEADY	Power adapter present
	OFF	Power adapter not present
 24V (Green)	STEADY	24Vdc output present
	OFF	24Vdc output present, check the fuse on the front
 12V (Yellow)	STEADY	12Vdc output present
	OFF	12Vdc output present, check the fuse on the front



ESA CPU PLEX-PULSE controller module

The module ESA CPU PLEX-PULSE has seven indication LEDs on the front, one of which is related to the power, two for the data flow on the ECS bus towards the burner con-

trols and the others used for the indication of the state of the device or of the communication bus.


LED	STATE	DESCRIPTION
 PWR (Green)	STEADY	Power adapter present
	OFF	Power adapter not present
 TX (Green)	FLASHING	ECS transmission towards the burner controls is on
	OFF	ECS transmission towards the burner controls is off
 TX (Green)	FLASHING	ECS reception from the burner controls is on
	OFF	ECS reception from the burner controls is off
 1 (Red)	STEADY	Anomaly: shortcircuit on ECS bus
	FLASHING	Dip-switch configuration error
	OFF	No anomaly
 2 (Yellow)	STEADY	Card in configuration
	FLASHING	Timeout of PLEX-PULSE / Burner control communication
	OFF	No anomaly







DISPLAY SECTION

LED	STATE	DESCRIPTION
 3 (Green)	STEADY	"Remote Enable" button unlock command on
	FLASHING	ECS function on
	OFF	Special functions not on
 4 (Green)	STEADY	Device for regular operation
	FLASHING	Configuration device low level
	OFF	Device is not running regularly



Digital input-output module ESA D8IO n°1









The digital module ESA D8IO with address 1 has eight LEDs on the front which are related to the digital input statuses and eight LEDs related to the digital output statuses as well as one LED related to the power.

LED	STATE	DESCRIPTION
 PWR (Green)	STEADY	Power adapter present
	OFF	Power adapter not present

LED	STATE	DESCRIPTION
 DI 1 (Green)	ON	Generic prepurge command present
	OFF	Generic prepurge command not present
 DI 2 (Green)	ON	Reset command present
	OFF	Reset command not present
 DI 3 (Green)	ON	Forcing to minimum present
	OFF	Forcing to minimum not present
 DI 4 (Green)	ON	HEATING command present
	OFF	COOLING command present
 DI 5 (Green)	ON	Enable zone 1 command present
	OFF	Enable zone 1 command not present
 DI 6 (Green)	ON	Manual zone 1 command present
	OFF	Manual zone 1 command not present

DISPLAY SECTION


LED	STATE	DESCRIPTION
 DI 7 (Green)	/	NOT USED
	/	NOT USED
 DI 8 (Green)	ON	Enable zone 2 command present
	OFF	Enable zone 2 command not present









LED	STATE	DESCRIPTION
 DO 1 (Green)	ON	System working
	OFF	System fault
 DO 2 (Green)	ON	Fault on ECS bus present
	OFF	ECS bus ok
 DO 3 (Green)	/	NOT USED
	/	NOT USED
 DO 4 (Green)	/	NOT USED
	/	NOT USED
 DO 5 (Green)	ON	Zone 1 - at least one burner running
	OFF	Zone 1 - no burner running
 DO 6 (Green)	ON	Zone 1 - at least one burner in lockout
	OFF	Zone 1 - no burner in lockout
 DO 7 (Green)	/	Zone 1 - Spare
	/	Zone 1 - Spare
 DO 8 (Green)	ON	Zone 2 - at least one burner running
	OFF	Zone 2 - no burner running

DISPLAY SECTION









Digital input-output module ESA D8IO n°2

The digital module ESA D8IO with address 2 has eight LEDs on the front which are related to the digital input statuses and eight LEDs related to the digital output statuses as well as one LED related to the power.

LED	STATE	DESCRIPTION
 PWR (Green)	STEADY	Power adapter present
	OFF	Power adapter not present


LED	STATE	DESCRIPTION
 DI 1 (Green)	ON	Zone 2 manual command present
	OFF	Zone 2 manual command not present
 DI 2 (Green)	/	NOT USED
	/	NOT USED
 DI 3 (Green)	ON	Zone 3 enable command present
	OFF	Zone 3 enable command not present
 DI 4 (Green)	ON	Zone 3 manual command present
	OFF	Zone 3 manual command not present
 DI 5 (Green)	/	NOT USED
	/	NOT USED
 DI 6 (Green)	ON	Zone 4 enable command present
	OFF	Zone 4 enable command not present
 DI 7 (Green)	ON	Zone 4 manual command present
	OFF	Zone 4 manual command not present
 DI 8 (Green)	/	NOT USED
	/	NOT USED

DISPLAY SECTION

LED	STATE	DESCRIPTION
 DO 1 (Green)	ON	Zone 2 - at least one burner in lockout
	OFF	Zone 2 - no burner in lockout
 DO 2 (Green)	/	Zone 2 - spare
	/	Zone 2 - spare
 DO 3 (Green)	ON	Zone 3 - at least one burner running
	OFF	Zone 3 - no burner running
 DO 4 (Green)	ON	Zone 3 - at least one burner in lockout
	OFF	Zone 3 - no burner in lockout
 DO 5 (Green)	/	Zona 3 - spare
	/	Zona 3 - spare
 DO 6 (Green)	ON	Zone 4 - at least one burner running
	OFF	Zone 4 - no burner running
 DO 7 (Green)	ON	Zone 4 - at least one burner in lockout
	OFF	Zone 4 - no burner in lockout
 DO 8 (Green)	/	Zone 4 - spare
	/	Zone 4 - spare

Analogue input Module ESA A4I












The analogue module ESA A4I with 6 addresses has only one led related to power.

LED	STATE	DESCRIPTION
 PWR (Green)	STEADY	Power adapter present
	OFF	Power adapter not present


DISPLAY SECTION

INDICATIONS FOR ANOMALIES AND ERRORS

Thanks to indication leds the ESA PLEX-PULSE allows functioning. easy identification of the regular status or possible mal-

LED AND DEVICE STATUS					
1	2	3	4	Description	Solution
 (red)	 (yellow)	 (green)	 (green)		
off	off	off		The device works correctly and there is no anomaly	/
	off	off		problem on ECS bus	
		off		ESA ESTRO burner control is connected but with ECS bus polarity reversed.	Check all the ECS bus connections
off		off		One or more ESA ESTRO burner control devices not connected.	Reset the installation bits on the flame control not present in the configuration.
				ESA ESTRO burner control connected but with incorrect serial address.	Check via PROG-1 ESA the serial address of the flame controls installed. (See "Operation-ECS-BUS")
				Dip-switch configuration problem	
	off	off	off	Device with dip-switch selector set incorrectly	Check the dip-switch selector according to the configuration you wish to use.

 flashing indication.

 Steady indication.

During steady-state operation ESA PLEX-PULSE continuously transmits the commands to the flame controls and receives from them the state, so each time a Tx LED flashes, there must be a corresponding Rx LED flashing. In case the device sends cumulative commands to the burners or in the presence of anomalies, ESA PLEX-PULSE does not receive any reply, and displays only the flashing of the Tx LED. This indication is carried out under the following conditions:

This indication is carried out under the following conditions:

- activation of the general stop command for all burners;
- interruption of the connection on the ECS bus;
- address configuration and baud rate does not match between the device and the flame controls;
- Flame controls required but not installed.

FUNCTIONING

PULSE FIRING FUNCTIONING

ESA PLEX-PULSE translates the power of acquired adjustment via analog input in a pulse control of burners with different functions depending on the value acquired by adapting its behavior to suit its operation. The device allows three modes of the burner pulse control in addition to other two forcing modes. The activation of the various functions is done during configuration and control depends on what the user wants to have as well as on the devices installed that constrain certain choices: for OFF-MIN-MAX control, a three stage air valve is needed (e.g. ESA SERIO -TPF).

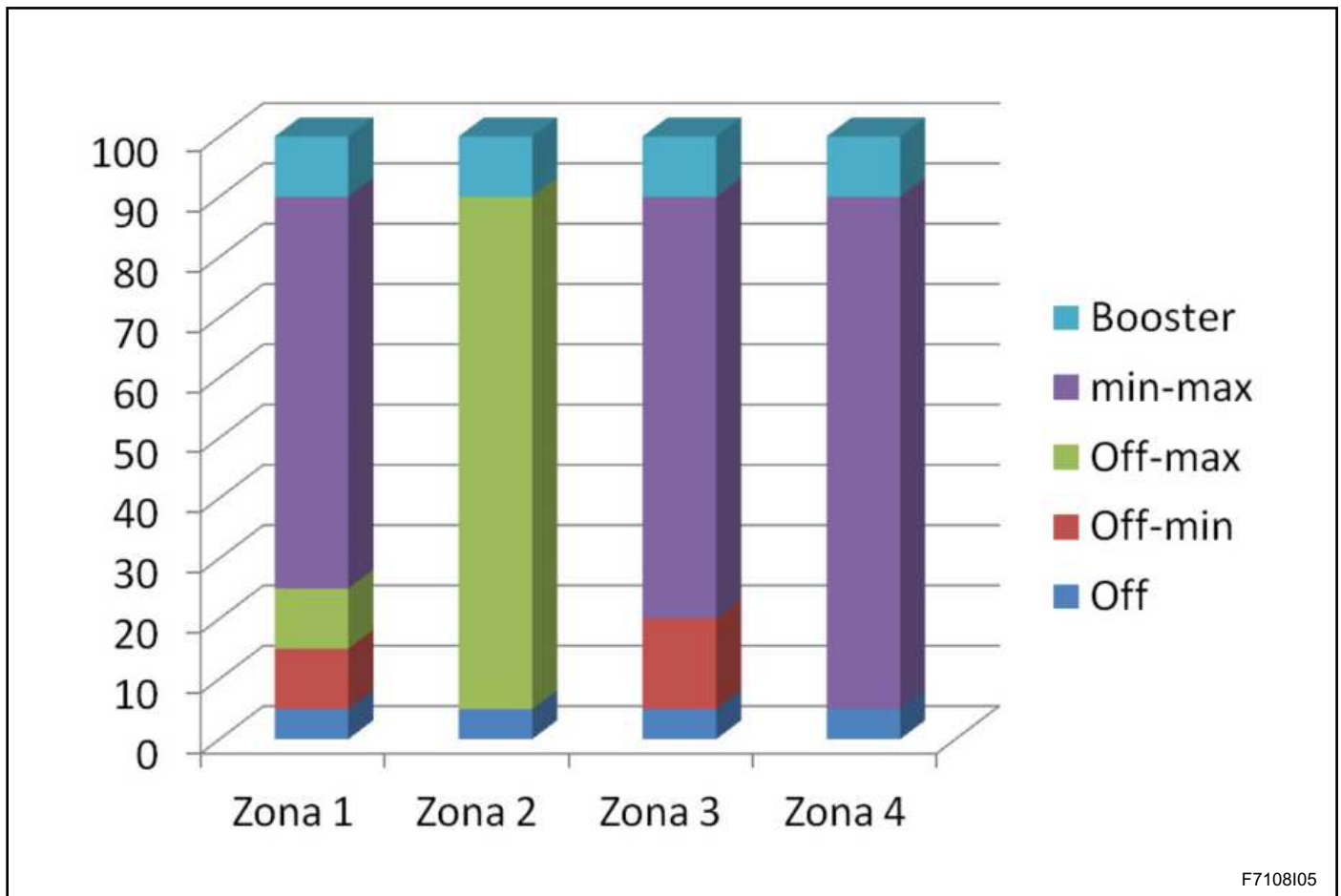
The modes are:

- OFF-MIN pulse control;

- OFF-MAX pulse control;
- MIN-MAX pulse control;
- OFF forcing;
- BOOSTER forcing.

During the configuration phase the user must decide which mode to use and the power percentage that determines the passing from one control to the other. In this way, when the adjustment power calculated by the temperature regulator changes, ESA PLEX-PULSE adapts the burner operation optimizing their performance and limiting the stress of the components.

In the following graph four types of regulation zone controls are indicated in which the burners, with the same power and regulation, are controlled in different ways.



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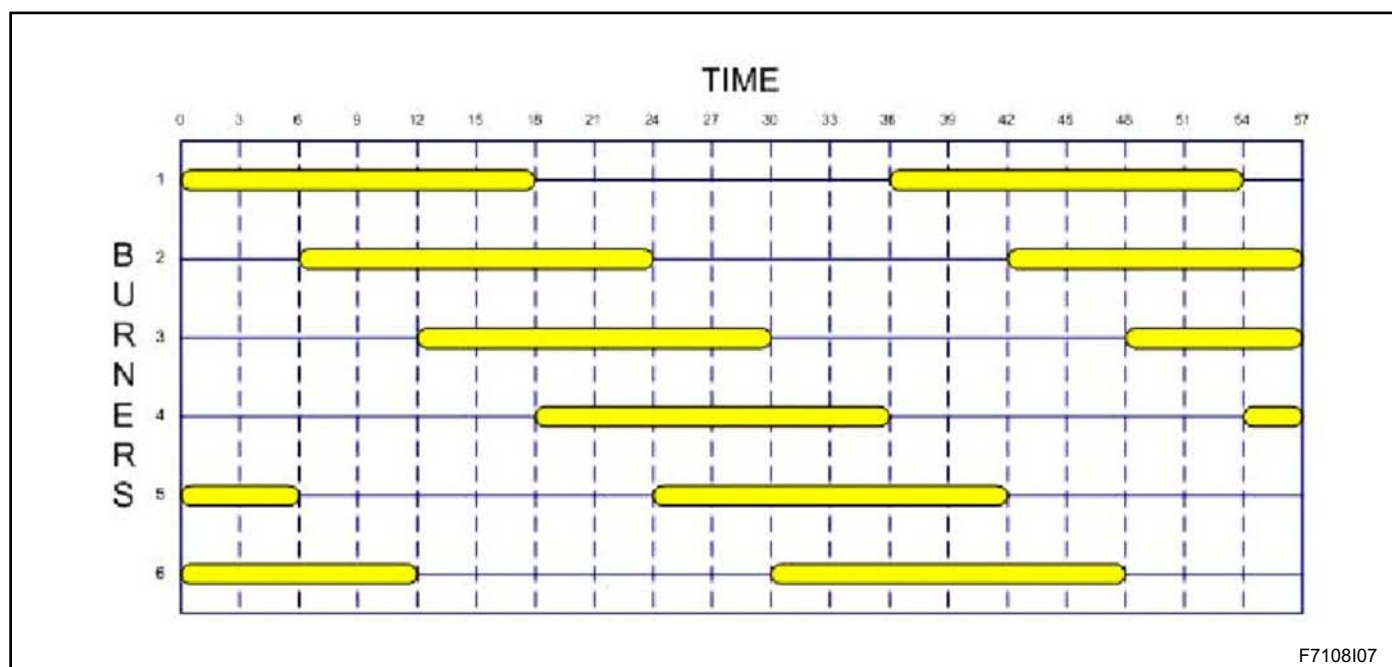
FUNCTIONING

Using Zone 1 as reference, we can see all 5 control modes enabled, therefore ESA PLEX-PULSE will control the burners in this zone in the following way:

OUTPUT VALUE ADJUSTMENT	MODE	DESCRIPTION
PWR <5%	OFF forcing	All the burners in the zone are forced to minimum.
5% < PWR <15%	OFF-MIN pulse	The burners are alternately commanded to switch off or switch on at minimum power for varying periods of time.
15% < PWR < 25%	OFF-MAX Pulse	The burners are alternately commanded to switch off or switch on at maximum power for varying periods of time.
25% < PWR < 90%	MIN MAX Pulse	The burners are alternately commanded to minimum or maximum power for varying periods of time.
90% < PWR	BOOSTER Forcing	All the burners in the zone are forced to switch on to the maximum power.

ESA PLEX-PULSE in the pulse mode in a differentiated manner controls the individual burners, commanding them in sequential rotation to the power defined for the predetermined time, according to the adjustment percentage.

In the following diagram pulse control is represented with a regulation percentage that is stable at 50% where in every moment 50% of the burners is commanded to the pre-established power.



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Referring to the two graphs, speculating a regulation power stable at 50%, in Zone 2 (OFF-MAX mode) the lines that are highlighted indicate the time in which the burners are running at maximum power, whilst the others indicate when the burners are off. In the case of Zones 1/3/4 (MIN-MAX mode), the lines

that are highlighted indicate the time in which the burners are running at maximum power, whilst the others indicate when the burners are running at minimum power. The rotation sequence of the burner is defined during the configuration phase, allowing the user to change it according to the shape of the furnace.

FUNCTIONING

OFF-MIN pulse control

The burners are commanded to switch off or switch on at minimum power for a variable period of time, proportional to the regulation percentage.

During configuration this control is enabled in addition to choosing the activation threshold, referring to the adjustment percentage. This type of control requires the instal-

OFF-MAX pulse control

The burners are commanded to switch off or to switch on at maximum power for a variable period of time that is proportional to the regulation percentage.

During configuration this control is enabled in addition to choosing the activation threshold referring to the adju-

MIN-MAX pulse control

The burners are commanded to the minimum or maximum power for a variable time period that is proportional to the regulation percentage.

During configuration this control is enabled in addition to choosing the activation threshold referring to the adjustment percentage. This type of control requires the

OFF forcing

All the burners in the zone are forced to switch off until the regulation percentage is lower than the threshold set for one of the pulse controls.

This control is enabled during configuration so if it is not activated the device controls the burners with pulsing even at very low power.

BOOSTER forcing

All the burners in the zone are forced into ignition at maximum power until the percentage of adjustment is higher than the configured threshold, and the rotation between the burners is not active.

During configuration this type of control is enabled in addition to choosing the activation threshold, referring to

lation of a two stage gas burner or a three stage air regulation valve (eg ESA SERIO-TPF).

ESA PLEX-PULSE controls the burners in OFF-MIN mode as soon as the regulation percentage exceeds the defined threshold, until reaching the upper threshold regarding another mode.

stment percentage.

ESA PLEX-PULSE controls the burners in OFF-MAX mode as soon the regulation percentage exceeds the defined threshold, until reaching the upper threshold regarding another mode.

installation of a two stage gas burner or a three stage air regulation valve (eg ESA SERIO-TPF).

ESA PLEX-PULSE controls the burners in MIN-MAX mode as soon as the adjustment percentage exceeds the defined threshold until reaching the upper threshold regarding another mode.

Its function is to limit unnecessary ignition of the burners which determines only the stress of the components without benefits for the application

As soon as the percentage of control exceeds the first pulse control threshold, the burners are started again in sequence.

the adjustment percentage. Its function is to limit unnecessary shutdowns and subsequent start-ups of the burners which determine only the stress of the components without benefits for the application, considering the high-power heating demand.

FUNCTIONING

ESA PLEX-PULSE GENERIC FUNCTIONS

ESA PLEX-PULSE controls the burners according to the pulse logic and the digital inputs that are used to enable zones or for specific functions. The outputs instead are used to report the statuses.

	IN	INPUT COMMAND		OUT	OUTPUT REPORTING
Digital input - output module D8IO n°1	1	Forcing pre-purge for all zones		1	System working
	2	Burner reset command in lockout		2	Error on ECS bus
	3	Minimum forcing for all the zones		3	Not used
	4	Enabling Heating and disabling Cooling for all the zones		4	Not used
	5	Zone 1 burner control enabling		5	Zone 1 with at least 1 burner running
	6	Zone 1 manual burner control enabling		6	At least 1 burner in lockout in zone 1
	7	Not used		7	Not used
	8	Zone 2 burner control enabling		8	Zone 2 with at least 1 burner running
Module D8IO n°2	1	Zone 2 manual burner control enabling		1	At least 1 burner in lockout in zone 2
	2	Not used		2	Not used
	3	Zone 3 burner control enabling		3	Zone 3 with at least 1 burner running
	4	Zone 3 manual burner control enabling		4	At least 1 burner in lockout in zone 3
	5	Not used		5	Not used
	6	Zone 4 burner control enabling		6	Zone 4 with at least 1 burner running
	7	Zone 4 manual burner control enabling		7	At least 1 burner in lockout in zone 4
	8	Not used		8	Not used
Module A4I	1	Zone 1 adjustment percentage			
	2	Zone 2 adjustment percentage			
	3	Zone 3 adjustment percentage			
	4	Zone 4 adjustment percentage			

FUNCTIONING

BURNER MANAGEMENT SYSTEM

When ESA PLEX-PULSE is powered it is ready in regime operation mode indicated by the fixed activation of led 4 of the CPU module and by activating serial communication towards the burner control devices. During communication all the addresses of the burner controls defined as present, are sequentially interrogated, therefore during the configuration phase the number of zones, the number of burners per zone and the correct address of the burners installed on the plant must be entered.

During regime operation if the zone is not enabled by the specific digital input, the burners are forced to switch off

regardless of the adjustment percentage requested.

As soon as the burner controls of the specific zone is enabled, they are controlled in ignition or activation of the single air valve, depending on if the furnace is in the heating phase or the cooling phase defined by specific digital input. Also, if you activate the pre-purge of the burners are turned off and all the air valves are turned on. ESA PLEX-PULSE sends commands to each burner control while checking their status, and then activates the digital outputs of burners that are running or in the cumulative block for each zone.

PREPURGE COMMAND

ESA PLEX-PULSE has a specific digital input that forces the burners of all the zones in the prepurge step. In the purge phase the pulse management is disabled and all

the burner air valves are controlled to full opening ensuring the passage of the maximum air flow.

RESET COMMAND

ESA PLEX-PULSE has a specific digital input which controls the reset to the flame controls, valid for all the controlled areas. The reset command must be maintained active for at least 5 seconds to allow the device to terminate the control of all the connected devices and the release of any blocked burners.

By activating the reset command the device unblocks the

burners in lockout and stops them from remote. Afterwards the pulse firing control commands the burner into the correct state according to the adjustment percentage. This type of control avoids the simultaneous lockout of many burners and allows to command the burner in the correct state following sequential logic.

FORCING TO MINIMUM

ESA PLEX-PULSE has a specific digital input which limits the burners at minimum power, while maintaining the pulse control active. Depending on the active phase, according to the percentage adjustment, following cases are determined:

■ OFF-MIN pulse phase: Forcing to minimum keeps the control logic in OFF-MIN pulses.

■ OFF-MAX pulse phase : Forcing to minimum changes the control logic to OFF-MIN pulses.

■ MIN- MAX pulse phase: Forcing to maximum changes the control logic to OFF-MIN pulses..

■ Forcing phase OFF: forcing to minimum keeps all the burners off.

■ BOOSTER forcing phase: The minimum forcing keeps all the burners running at minimum.

HEATING/COOLING

ESA PLEX-PULSE allows the pulse control for both the HEATING phase as well as the COOLING phase to allow controlled heating and cooling. In particular during the heating phase the burners are commanded to switch on while during the cooling phase the burner control devices

activate only the air valves (ESA SERIO-TPF).

For all the zones the device has only one digital input for the selection between two phases: when it is activated you have the HEATING phase, whilst when it is deactivated you have the COOLING phase.

FUNCTIONING

ENABLING OF THE ZONE CONTROL

ESA PLEX-PULSE has four digital inputs. Each one is dedicated to controlling the related zone. When this command is missing, all the burner control devices are forced from remote, to halt, whilst the ones in lockout remain in lockout.

When the zone control is enabled, the device sequential-

ly commands the burner controls to their correct state according to the

As soon as the control is enabled, the device sequentially controls the burner control devices in the expected status depending on whether the heating or cooling phase is on and on the regulation percentage.

LOCAL OR MANUAL CONTROL OF THE BURNER

ESA PLEX-PULSE allows each zone to operate manually, which allows to switch the burner on or off locally on the burner control device, facilitating any type of maintenance operation or burner regulation. Activating this function the device does not send any command to the burner control device but simply checks the current state indicating it to the supervisor.

ESA PLEX-PULSE can determine a possible shut down of the burner put into manual after a limited amount of

configurable time, avoiding having burners running not directly managed by the control system. Burner shut down occurs when the manual function is activated and when the selected time expires, regardless of the burner state.

To be able to turn the burner on again it is sufficient to act on the local button of the flame control device and automatically the related timer is reset.

NO RESPONSE FROM THE FLAME CONTROL

ESA PLEX-PULSE waits for a response (indicating the state of the burner) to each command sent to the burner controls connected to the ECS bus. If a burner control fails to respond immediately to the command, the device waits for a set period of time, after which it then checks the next burner control. The burner failing to respond to the enquiry may be temporary or persistent: in the first case there may be some form of interference affecting the communication bus and thus cancelling certain signals, while in the second case the flame control simply stops responding to the commands. To avoid the risk that the temporary non response of a burner could generate a false alarm signal for the supervisor, ESA PLEX-PULSE

works independently in this case, without showing the missing signals, by sending the supervisor the previous status of the burner. In case the problem persists, the device informs the supervisor which burners are non-communicating until communication is restored.

During configuration the maximum number of acceptable consecutive missing replies is established, before indicating that the flame control is not communicative. During operation scheme ESA PLEX-PULSE stores but doesn't show the consecutive missing responses of each flame control. It checks that they do not exceed the defined limit.

SAFETY AND CONTROLS

ESA PLEX-PULSE continuously checks the state of the ECS bus and stops all the burners and activates digital output if it detects an anomaly. Possible anomalies include inverted polarity of the ECS bus on one or more con-

nected controls flame or a line short circuit that, if prolonged, could compromise the transmission stage of the ESA PLEX-PULSE device.

INTERFACE COMMUNICATION FUNCTION

ESA PLEX-PULSE also allows functioning as only communication interface between a PC and the ESA ESTRO flame controls, when they must be controlled by dedicated software (e.g. for configuration). In this mode the device becomes transparent between the RS232 input in front and the ECS bus and all its control functions are disabled.

To activate this function it is necessary to activate le DIP8 of CPU keeping all the others inactive. Furthermore it is necessary to disconnect the upper RS232 and RS485 connectors and only connect to the connector in front.

FUNCTIONING

BUS ECS

The communication to the burner controls takes place with bus and ECS protocol. The ECS bus allows you to connect multiple burner control devices to the same network.

The communication to the flame controls is cyclical and continues: in every communication the last command received from the supervisor is sent and prompted the state of the flame control is requested.

ECS address definition

To allow the ESA PLEX-PULSE device to communicate with the connected burner controls, you must configure the serial address in each flame control using the ESA PROG-1 device. The serial addresses of the burner con-

trols corresponding to the number of burners installed must have a different address for each burner, the address is composed of segment and node as specified in the following table:

BURNER NUMBER	ZONE 1		ZONE 2		ZONE 3		ZONE 4	
	Address allowed for flame control		Address allowed for flame control		Address allowed for flame control		Address allowed for flame control	
	Segment	Node	Segment	Node	Segment	Node	Segment	Node
1	1	1	2	1	3	1	4	1
2	1	2	2	2	3	2	4	2
3	1	3	2	3	3	3	4	3
4	1	4	2	4	3	4	4	4
5	1	5	2	5	3	5	4	5
6	1	6	2	6	3	6	4	6
7	1	7	2	7	3	7	4	7
8	1	8	2	8	3	8	4	8
9	1	9	2	9	3	9	4	9
10	1	A	2	A	3	A	4	A
11	1	B	2	B	3	B	4	B
12	1	C	2	C	3	C	4	C
13	1	D	2	D	3	D	4	D
14	1	E	2	E	3	E	4	E
15	1	F	2	F	3	F	4	F
16	1	G	2	G	3	G	4	G

During configuration ESA PLEX-PULSE allows you to define the sequence of burner ignition directly setting the

ignition position inside the sequence.

ECS Baudrate definition

The ECS BUS communication speed is set during configuration, and must match the baud rate selected on the burner controls. The first baud rate is set by the manufacturer and can be changed by each customer using the dedicated software. The definition of the communication speed depends on several factors: the type of the applica-

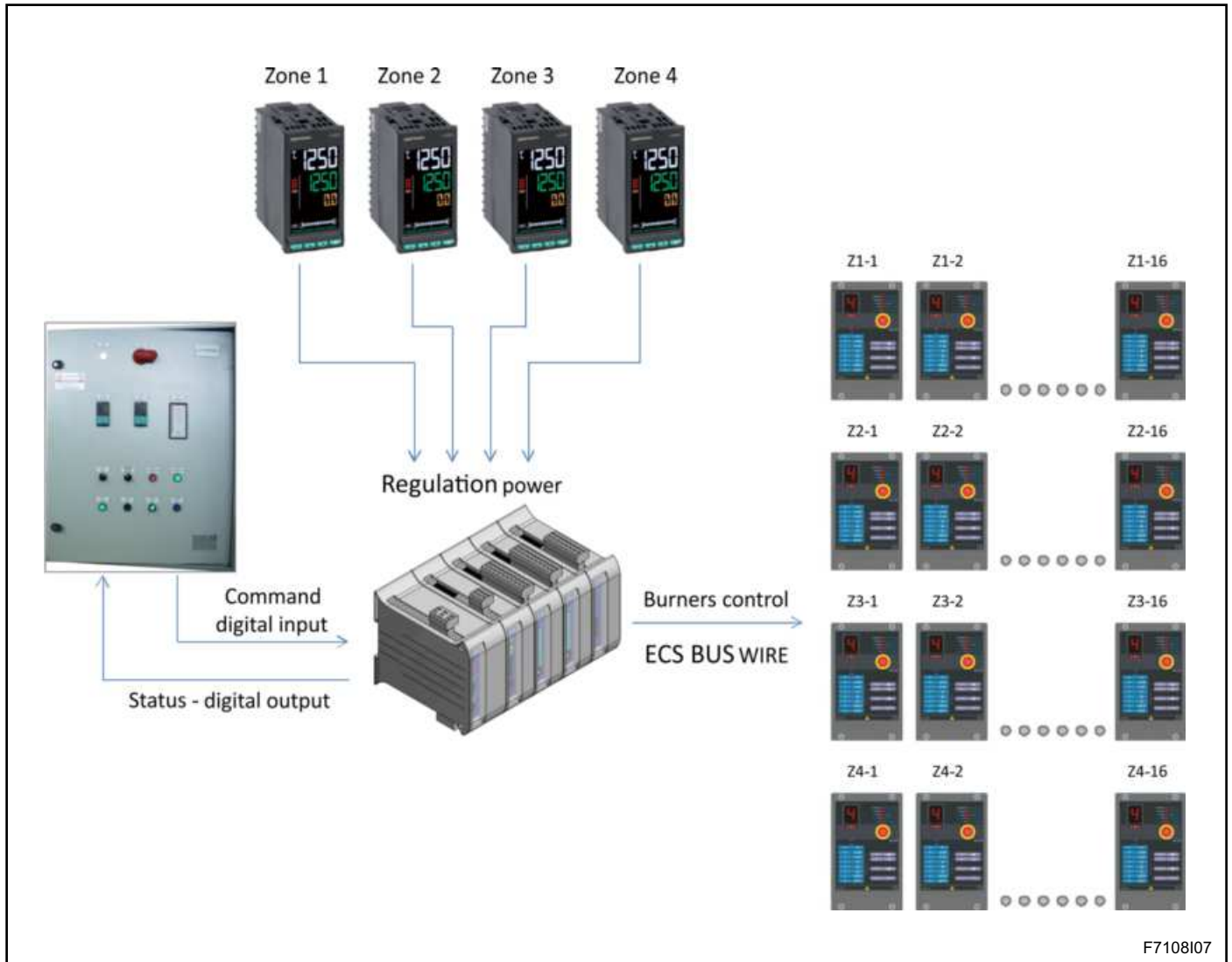
tion, the expected wiring and environmental factors that can disrupt the data flow with more evident effects at high speeds, so if one wants to reduce it is necessary to change the baud rate both on ESA PLEX-PULSE as well as on the flame controls.

APPLICATION EXAMPLE 1 - ESA PLEX-PULSE

ESA PLEX-PULSE receives the control power via analog signal from the zone temperature controllers, and then defines how long the burner control pulses must last. The enable signals and the states of the burners are exchanged with the control system via digital inputs and

outputs.

In systems controlled by PLC that controls the inside temperature adjustments, all analog and digital signals will be connected only to the PLC.



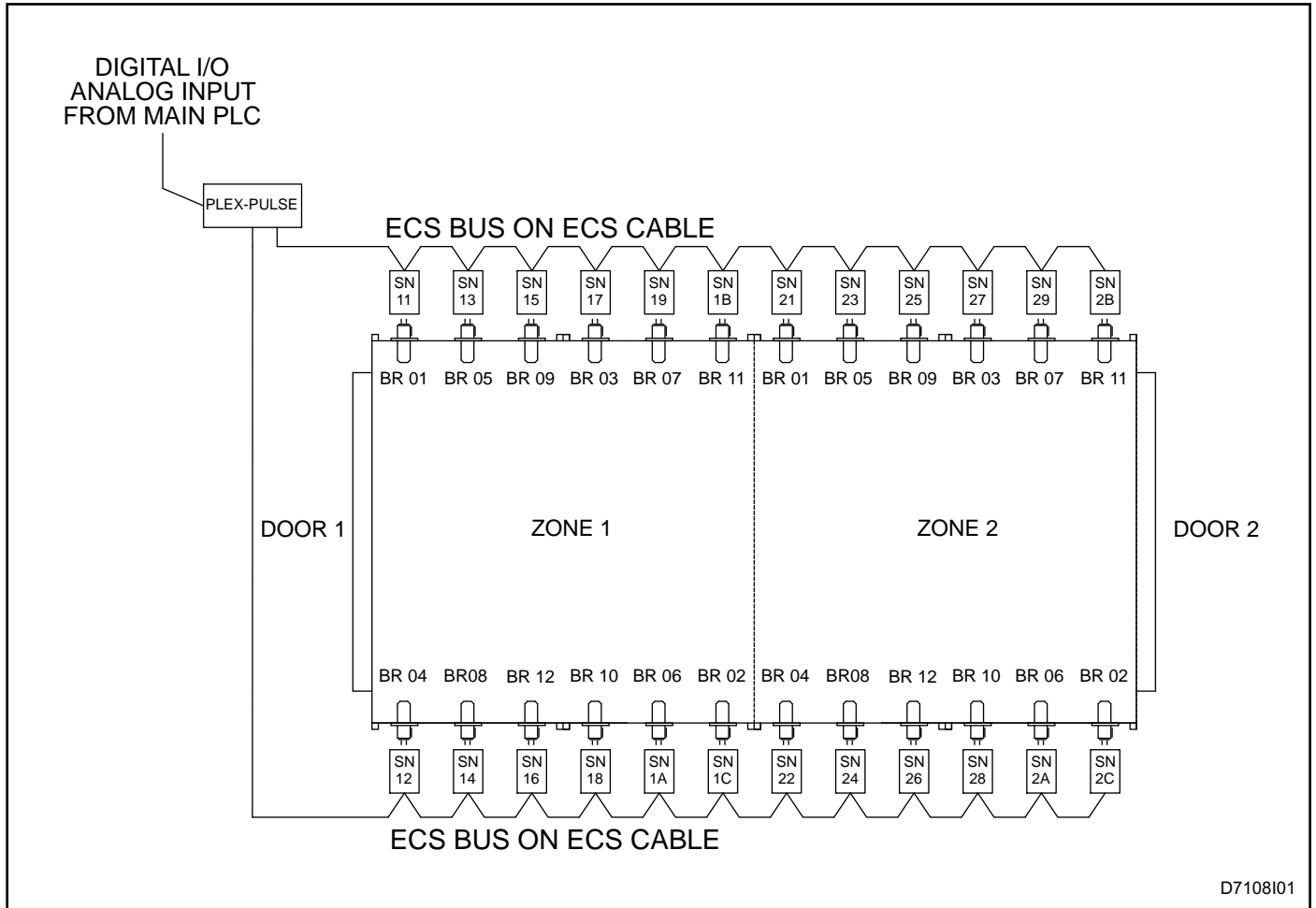
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APPLICATION EXAMPLE 2 - ESA PLEX-PULSE

The combustion system is a horizontal furnace and provides for the presence of 24 burners divided into 2 control zones.

The burner controls are arranged in the furnace with the ECS addresses in sequence (BR01, BR02...BR12) with

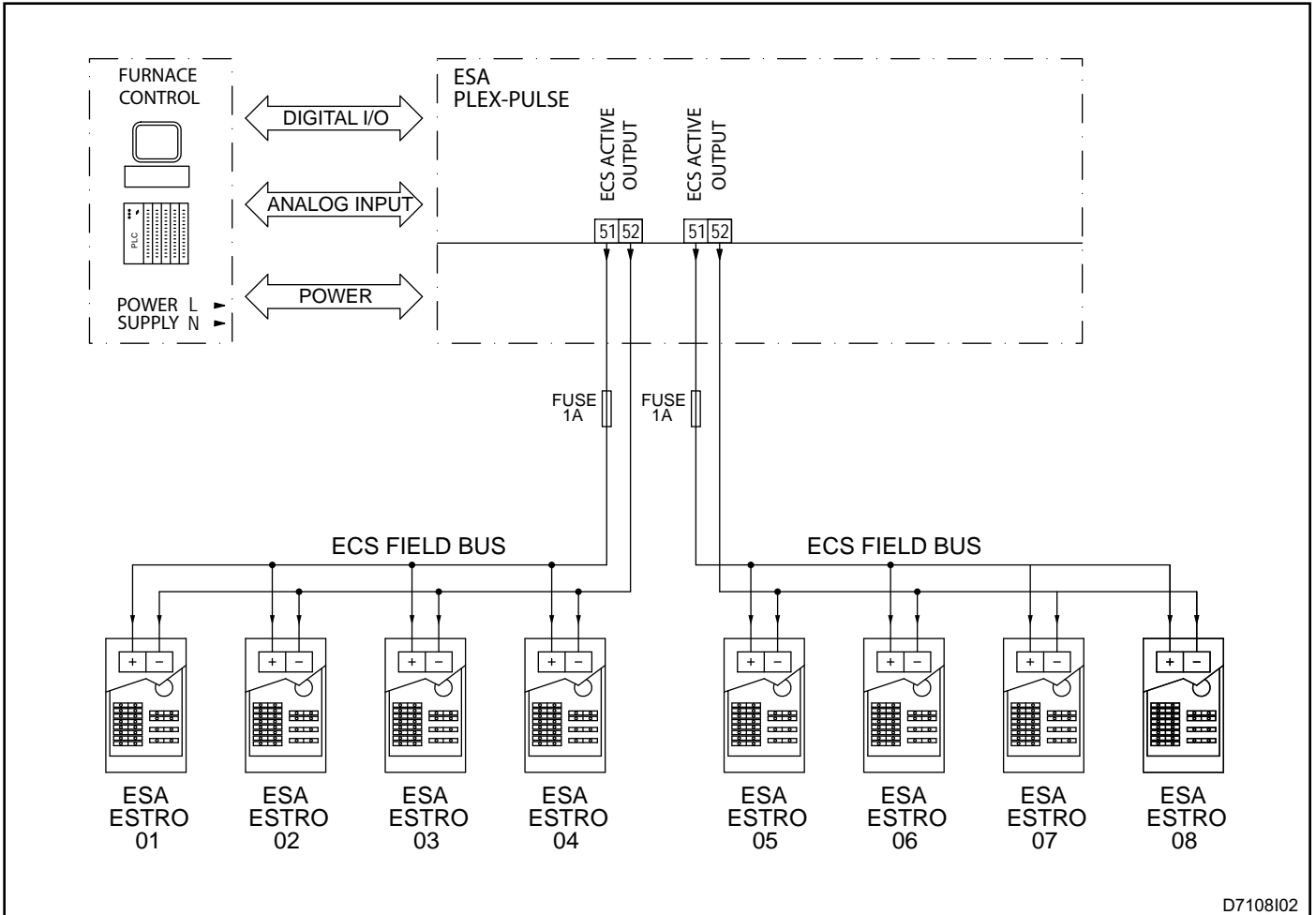
the even ones on one side and odd on the other. The activation sequence in the pulse-firing burner mode is specified in the configuration of the ESA PLEX-PULSE device.



APPLICATION EXAMPLE 3 - ESA PLEX-PULSE

ESA PLEX-PULSE is installed inside an electrical panel and receives from the supervisor both the power supply as well as the digital and analogic inputs. The burners are located on both sides of the furnace and

the ESA PLEX-PULSE reaches the two ends of the ECS bus that are connected separately to the two ECS output connectors.



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CONFIGURATION PARAMETERS

Configuration defines the operation of the ESA PLEX-PULSE card adapting it to the plant's needs. The device


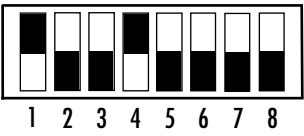
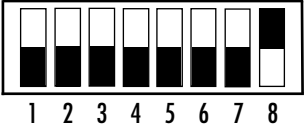
has two configurations, a hardware and a software.

HARDWARE

The ESA PLEX-PULSE hardware configuration consists in setting the Dip-Switches on each module and must be carried out with the device off.

The Dip-Switch group of the ESA CPU controller module allows the activation of the software configuration and operation as communication interface.

ESA CPU controller Dip switch module for ESA PLEX-PULSE

SELECTION	DESCRIPTION
 <p>1 2 3 4 5 6 7 8</p>	<p>Enabling the low-level software configuration. In this mode the device allows the operator to change some parameters of the pulse control, without interrupting communication with the burner controls. To allow the software to access the parameters, only communication with the supervisor is disabled.</p>
 <p>1 2 3 4 5 6 7 8</p>	<p>Enabling high-level software configuration. In this mode the device allows the operator to change all of the adjustment and configuration parameters, including the number of zones and the installed burners.</p>
 <p>1 2 3 4 5 6 7 8</p>	<p>Communication interface enabling function to communicate directly with the burner controls from external PC (see Operation chapter).</p>

Other combinations are not accepted by ESA PLEX-PULSE and involve the stop of any function indicated by the flashing of the red LED 1.

The Dip-Switch group for each of the remaining modules is meant to define the module address for internal control. From left to right the modules must be set with the following addresses:

- Digital input-output module ESA D8IO No. 1 - 1



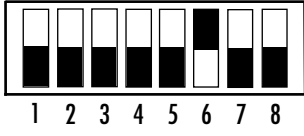
address

- Digital input-output module ESA D8IO No. 2 - 2 address

- Analog Input Module ESA A4I - address 6

For modules with digital inputs and outputs, the dip-switch is rotatable and the desired number is selected, and for the module with analog inputs the Dip-Switch is a group of eight Dips of which only the requested one is activated.

Dip-Switch Modules INPUTS outputs for ESA PLEX PULSE

	ESA D8IO n°1	ESA D8IO n°2	ESA A4I
Address			 <p>1 2 3 4 5 6 7 8</p>

CONFIGURATION PARAMETERS

SOFTWARE CONFIGURATION

The ESA PLEX-PULSE software configuration consists in setting all the parameters related to the regulation and operation of the device.

The modification of the parameters takes place using the ESA ELBP122 dedicated software communicating via the front RJ connector through a dedicated wire and disconnecting all the communication wires from their control devices.

The configuration mode is divided into two levels; a high level and a low one that can be activated by Dip-Switches. In the low level there is the possibility of setting only certain parameters without changing the functionality of the

plant. In this mode the device waits for the configuration by the user and at the same time continues sending the last command received by the master to the burner controls. The burners can therefore remain on.

In the high configuration level instead, all the parameters are changed but the device does not control any communication on the ECS bus. Because of this, before activating high level configuration, make sure that the missing control of the burners on behalf of ESA PLEX-PULSE does not cause problems or damage to the application.

The software allows to change the following parameters:

PARAMETER	DESCRIPTION
Baud-rate ECS bus	ECS bus transmission speed, which must be equal to that set for the burner controls (baud rate 4800, 9600 or 19200).
Number of automatic unlocks	Number of automatic unlock attempts (accepted range: 0 - 5) made by the device for each burner in lockout state. Set this parameter as 0 to disable the automatic unlock function and so allow the supervisor to unlock the burner directly. This parameter must be set in accordance with the relative application norms.
Time limit for manual control	The Time limit (accepted range: 0-120 minutes) after which ESA PLEX-PULSE forces the manually controlled burner to switch off. Set this parameter as 0 to disable the automatic switching off at the time-out.
Number of filtered missing responses	The max. number of consecutive filtered missing responses from the flame control compensated for by ESA PLEX-PULSE (accepted range: 1-5).
MODBUS-RTU address	Modbus-RTU address for the device (accepted range: 1-254).
MODBUS-RTU port	Identifies the communication range for MODBUS-RTU on board ESA PLEX-PULSE, the choice is between the RS232 port or the RS485.
MODBUS-RTU bus communication speed	Data rate of MODBUS-RTU bus between the ESA card PLEX-PULSE and the supervisor.
MODBUS-RTU communication timeout	Time limit for the missing MODBUS-RTU communication with the supervisor (see Operation chapter).
Format of transmitted data	Selection of the format for transmissions to supervisor for reading the status of burner: default word (type 5).
Type of burner controls installed	Defines the type of managed flame controls with different versions as there may be different types of management.
Type of regulation analog input	Selection of the analog signal type generated by the controller to send the percentage of adjustment to PLEX-PULSE. The choice is made between the signals 0-20mA, 4-20mA or 0-10V.

CONFIGURATION PARAMETERS

PARAMETER	DESCRIPTION
Number of zones controlled	Indicates the number of zones that ESA PLEX-PULSE must control up to a maximum of 4 control zones.
Number of burners controlled Zone 1 (2,3,4)	For each regulation zone it defines the number of burners controlled up to a maximum of 16.
Minimum time for burner running Zone 1 (2,3,4)	For each regulation zone it defines the minimum interval for the ignition of the burner. This value depends on the burner control configuration which defines the ignition timing (pre-purge, ignition and flame stabilization) plus the time for which you want to have the burner running steady.
Enabling and pulse control threshold OFF-MIN Zone 1 (2,3,4)	For each regulation zone it defines the enabling of the OFF-MIN pulse control and the activation threshold referring to the adjustment percentage (see OPERATION).
Enabling and pulse control threshold OFF-MAX Zone 1 (2,3,4)	For each regulation zone it defines the enabling of the OFF-MAX pulse control and the activation threshold referring to the adjustment percentage (see OPERATION).
Enabling and pulse control threshold MIN-MAX Zone 1 (2,3,4)	For each regulation zone it defines the enabling of the MIN-MAX pulse control and the activation threshold referring to the adjustment percentage (see OPERATION).
Enabling and forcing threshold OFF Zone 1 (2,3,4)	For each regulation zone it defines the enabling of the forcing OFF and the activation threshold referring to the adjustment percentage (see OPERATION).
Enabling and forcing threshold BOOSTER Zone 1 (2,3,4)	For each regulation zone it defines the enabling of the forcing BOOSTER and the activation threshold referring to the adjustment percentage (see OPERATION).
Flame control serial address Zona 1 (2,3,4)	Serial addresses of the installed burners, corresponding to those configured for the relevant flame controls on the system. All alphanumeric characters may be used (0-9 and capitals A-Z). Take into account that all the connected flame controls must have different addresses and that burners with a 00 address are not controlled.

The ELBP122 software allows to insert intuitively the ignition sequence by assigning to each burner, defined with its serial address, the scanning position within the com-

mand sequence used by ESA PLEX-PULSE during the input management.

WARNINGS

For correct use of the device respect the following warnings:

■ In the selection of configuration parameters analyze any risks associated with certain operating modes, choose values that do not compromise the safety of the application. Before installing the instrument, verify that the configuration parameters are set as defined.

■ ESA PLEX-PULSE is meant to be electrically connected in a permanent and fixed manner. Inverting phase/neutral may compromise the safety of the system. Do not use different phases between the different voltage inputs and do not apply voltages on the output terminals.

■ Check correct connections after installation. Before powering the instrument ensure that the voltage, frequency and type of fieldbus are correct. Ensure that loads do not have an absorption greater than the maximum capacity of the output contacts.

■ The device must be located inside electrical panels and must not be exposed to direct heat sources nor come into contact with combustion products such as liquids, solvents or corrosive gases.

■ The use of the ESA PLEX-PULSE device must take place in an environment with temperature variations within the allowed limits.

■ If the polarities on one or more flame control devices are reversed, the entire ECS bus will fail to function. This will be signalled by the RX-LED lighting up and the activation of the red LED. The same situation occurs with a short circuit on the communication line. If it persists, the malfunctioning will cause the device to break.

■ Connecting equipment to the ECS bus when in operation could cause a brief interruption in communication.

■ In case of malfunctioning ESA PLEX-PULSE must be sent to the manufacturer for repair. Any modification or repair carried out by third parties causes the warranty conditions to automatically expire and may compromise the application safety.

■ ESA PLEX-PULSE is a device used for the control and regulation on combustion plants. It therefore is not intended as a safety device for which there are special dedicated instruments.

INSTALLATION

For correct installation follow the instructions below:

MOUNTING

- 1 - Installation must be done by qualified staff respecting the Norms in force at the time and place of installation.
- 2 - Check that the device is compatible with the control system, for both the supply voltage as well as the type of fieldbus.
- 3 - Avoid placing ESA PLEX-PULSE near strong magnetic fields or electrical conditions and make sure it is not exposed to direct radiation from heat sources or in contact with combustion products, liquids, solvents or corrosive gases.
- 4 - The device must be placed inside electric panels and mounted on a DIN rail. Do not limit in any way the area around the instrument but ensure adequate space and ventilation to avoid overheating of the device.

ELECTRICAL CONNECTION

- 1 - If the system has a phase-phase type power it is necessary to install an insulation transformer with connection of a secondary winding end to ground.
- 2 - In carrying out the electrical connection refer to the technical documentation, according to the polarity between phase and neutral. The terminals for the electrical connections are screw type and can accept section conductors from 0.5 to 2.5mm² and the choice of conductors and their location must be suitable for the application.
- 3 - Adequately tighten the wires into the terminals to prevent malfunctioning or overheating which can lead to dangerous conditions. Numbering and the use of appropriate terminals on conductors is highly recommended.

4 - Always make sure the protective ground is connected to the appropriate terminals and to all metallic frames using appropriate conductors. Failure to connect the device to the protective ground, causes a dangerous condition for the operator.

5 - The digital inputs when controlled by dry contacts (relay), can be powered with 24Vdc voltage generated by the ESA PLEX-PULSE, otherwise they can be driven by the 24Vdc PLC outputs (transistor). The length of the lines of the digital inputs must not exceed the specified limit.

6 - The laying out of the communication lines must be separated from power lines, motor control (inverters) and network voltage; moreover MULTIPOLAR or SHIELDED cables must not be used.

7 - For the communication lines use the ECS CABLE. As an alternative we recommend the use of busbar systems taking into account a maximum length of 1mt of the connecting cable between the busway and device for both communication and for power.

8 - The length of the communication lines must not exceed the specified limit. If the controller is far from the plant, we recommend placing ESA PLEX-PULSE near the furnace and avoid using an ECS signal repeater.

9 - It is recommended to have a fuse on the active ECS line to avoid prolonged short-circuits from damaging the card; If necessary use a rapid blow fuse 1 A.

10 - On each of the ECS bus parts it is possible to connect the active output of a single ESA PLEX-PULSE device. If the number of burners exceeds the amount controlled by a single ESA PLEX-PULSE device it is necessary to use more ESA PLEX-PULSE devices; each one connected to its ECS part.

START-UP

The operations indicated in the following chapter must be carried out by expert technician staff. Failure to follow the indications may cause dangerous conditions.

1 - Check that ESA PLEX-PULSE is installed and connected properly. Check that the wires are fully engaged in the terminals and that there are no exposed conductor parts.

2 - Before powering the device and relative inputs, check that the voltage and frequency are correct and make sure that the protection ground is connected to the specific terminal. Also verify that the analog signals are compatible with the device inputs.

3 - Set the address in the ESA PLEX-PULSE device according to the value defined in the supervisor, when required.

4 - Set with the ESA device PROG-1 addresses of all the burner controls connected according to the addresses set in the ESA PLEX-PULSE.

5 - Power up the device by checking through the LEDs, the absence of anomalies and that communication with the burner controls is activated.

6 - Turn on the digital commands on the ESA PLEX-PULSE input and regulating the adjustment percentage, check that the burners on field perform the correct commands. At the same time compare the state of the burner controls with the outputs of the device.

7 - When required the supervisor must verify that the state of the burners is as specified by the controller.

GENERAL MAINTENANCE PLAN

Check	Type	Frequency	Operation
Case closing	O	periodic	Verify that the instrument is always closed to prevent dirt, dust and moisture from entering and damaging the device.
Integrity of connecting cable	O	every six months	Check the exterior insulation integrity and the absence of abrasion or conductor overheating.
Device response	O/S	annual	Verify that the commands from the supervisor are run correctly by the flame controls and that their state is signaled correctly.
Tightening of conductors	O/S	annual	Reduce to every six months in applications with vibrations.
Replacement of the device	S	/	Replacement is necessary if the device is no longer functioning.

NOTES: Key O = ordinary / E = extraordinary

ORDINARY MAINTENANCE

For proper maintenance of ESA PLEX PULSE, strictly follow the instructions. Before carrying out maneuvers with the system on, make sure that the safety of the process and the operator is not compromised, if necessary check the parts with the system off.

CHECK OF THE CASE CLOSURE

The closure of the electrical panel case enclosing the device is essential for its proper functioning as it prevents the entry of agents that might damage the control board. If inside there is dirt, first disconnect the power supply to the device and then remove dirt by blowing with compressed air. Do not use any mechanical means for this operation.

CHECK OF CABLE INTEGRITY

The integrity of the electrical cables can be checked visually. In case it is necessary to operate on the conductors for verification, as they are not totally visible, discon-

nect the power to the device before performing any operation.

DEVICE RESPONSE

Via the supervisor send different commands to the burners making sure that they are properly carried out by the connected flame controls. At the same time compare the state of the flame control with what was received by the supervisor.

FASTENING OF CONDUCTORS

The verification of the tightening of the wires into the terminals, required to prevent malfunction or overheating, applies both to the conductors connected to the device terminal as well as for those connected on users and for connecting the fieldbus. During this operation, also check that the insulation of the wire reaches the inside of the terminal or terminal block.

EXTRAORDINARY MAINTENANCE

For a correct replacement of ESA PLEX-PULSE, strictly follow the instructions to be carried out with the system off. It is recommended to have spare devices to intervene in quickly.

INSTRUMENT REPLACEMENT

1 - Make sure that the device is the cause of failure or malfunction, and to have a spare part the same as the one being replaced, verifying the data located on the identification label.

2 - Disconnect the electric power, unfasten the plug-in ter-

minals of the card leaving the conductors connected to the female terminal, so you do not disconnect the wires.

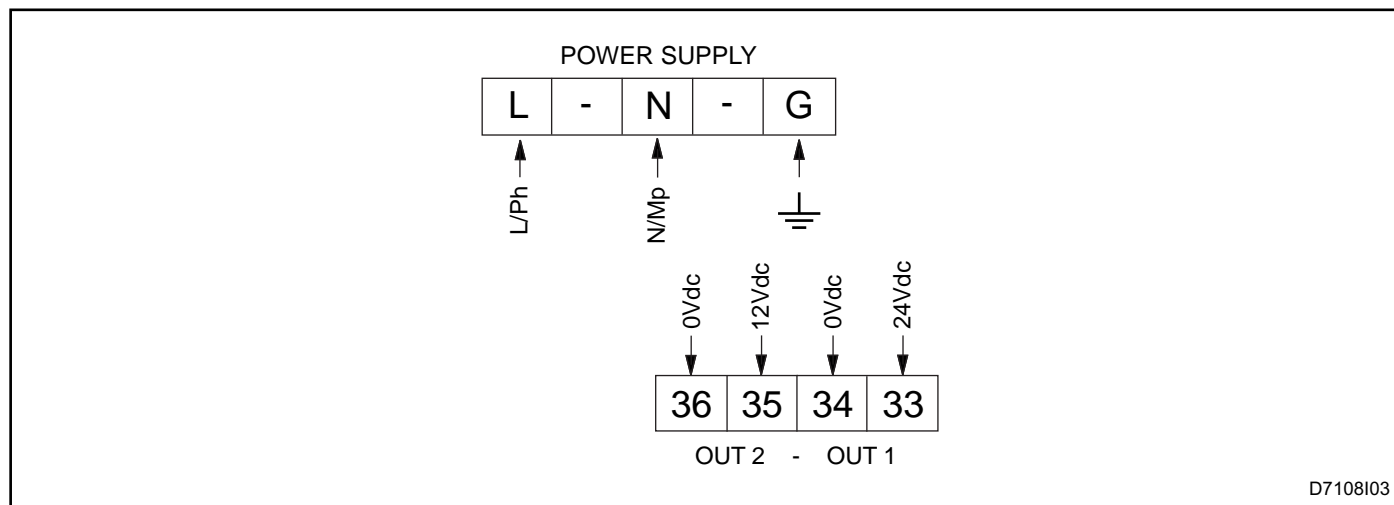
3 - Remove the device from the DIN rail, then mount the spare device.

4 - Connect the connectors in their respective locations, making sure that they are seated properly and not overturned or shifted.

5 - Turn on power and check that the new device is functioning properly by repeating the "Star-up" steps.

ESA PLEX-PULSE CONNECTIONS - MODULE ALIM-2

Power supply module ESA ALIM-2



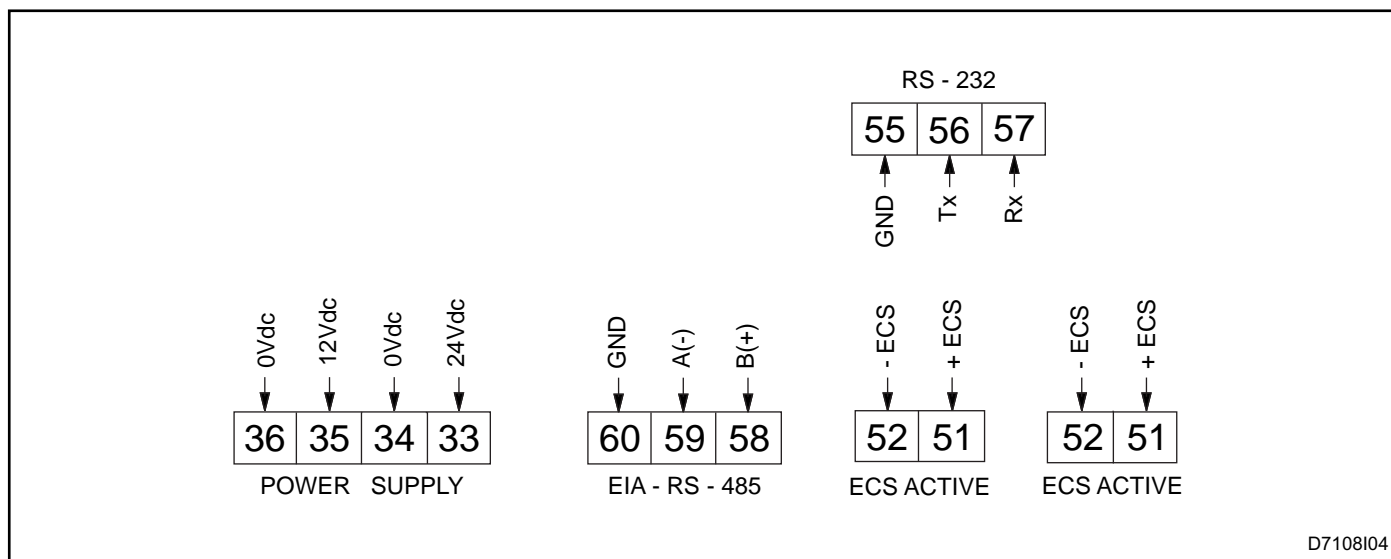
TERMINAL CONNECTORS

Pos.	Description	Pos.	Description
L	Power supply phase	33	Power output 1 +24Vdc
N	Power supply neutral	34	Power output 1 0Vdc
G	PE protection earth	35	Power output 2 +12Vdc
		36	Power output 2 0Vdc

Outputs 1 and 2 are dedicated to powering the ESA PLEX-PULSE modules.

ESA PLEX-PULSE CONNECTIONS - MODULE CPU

Controller module ESA CPU PLEX PULSE



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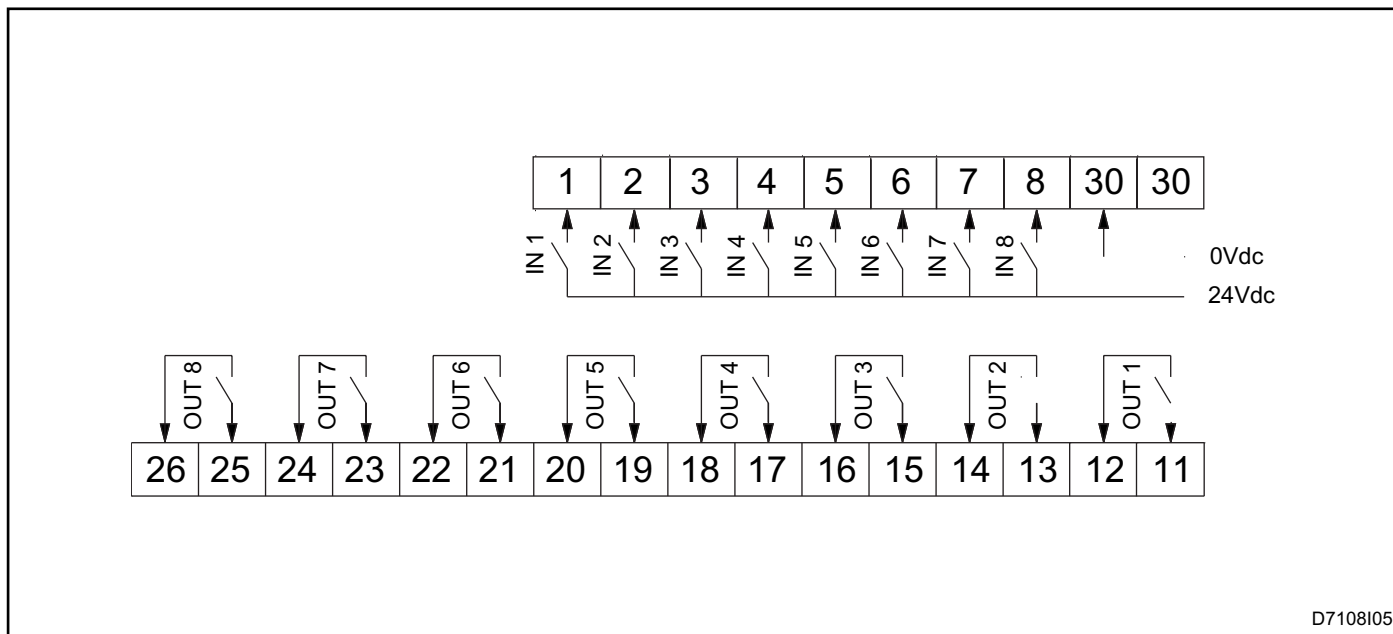
TERMINALS CONNECTORS

Pos.	Description	Pos.	Description
33	Power supply input 1 +24Vdc	52	Negative output to ECS bus communication
34	Power supply input 1 0Vdc	55	Ground communication input RS232
35	Power supply input 2 +12Vdc	56	Transmitting communication input RS-232
36	Power supply input 2 0Vdc	57	Receiving communication input RS-232
51	Positive output to ECS bus communication	58	Positive (B) communication input RS-485
52	Negative output to ECS bus communication	59	Negative (A) communication input RS-485
51	Positive output to ECS bus communication	60	Ground communication input RS-485

The two output connectors of the ECS bus are in parallel.

ESA PLEX-PULSE CONNECTIONS - MODULE D8IO

Digital 8 input-output module ESA D8IO

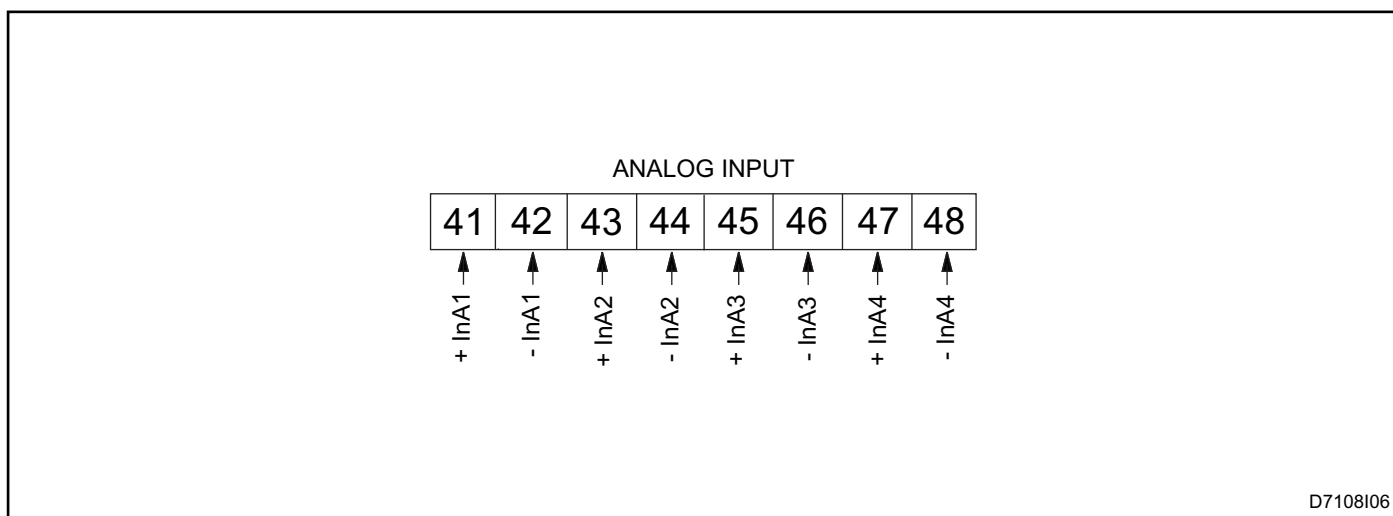


TERMINALS CONNECTORS

Pos.	Description	Pos.	Description
1	Positive digital input 1	15	Digital output 3 (COM)
2	Positive digital input 2	16	Digital output 3 (NO)
3	Positive digital input 3	17	Digital output 4 (COM)
4	Positive digital input 4	18	Digital output 4 (NO)
5	Positive digital input 5	19	Digital output 5 (COM)
6	Positive digital input 6	20	Digital output 5 (NO)
7	Positive digital input 7	21	Digital output 6 (COM)
8	Positive digital input 8	22	Digital output 6 (NO)
30	Negative digital inputs	23	Digital output 7 (COM)
11	Digital output 1 (COM)	24	Digital output 7 (NO)
12	Digital output 1 (NO)	25	Digital output 8 (COM)
13	Digital output 2 (COM)	26	Digital output 8 (NO)
14	Digital output 2 (NO)		

ESA PLEX-PULSE CONNECTIONS - MODULE A4I

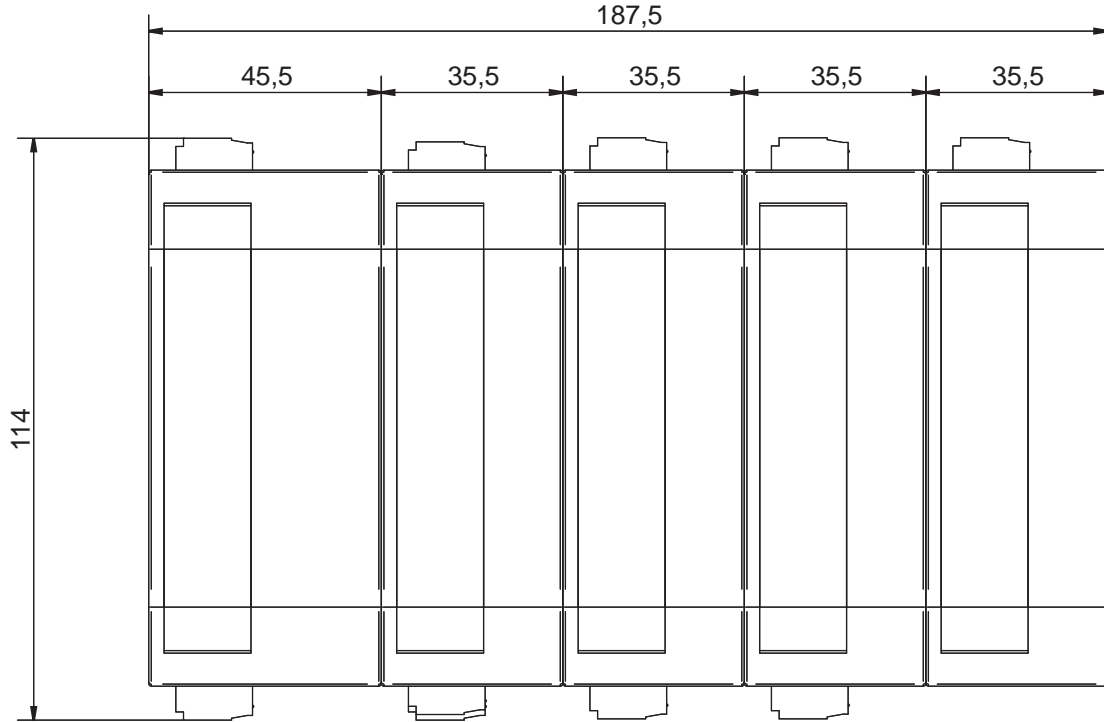
Analogical 4 input module ESA A4I



TERMINALS CONNECTORS

Pos.	Description	Pos.	Description
41	Positive analogic input 1	45	Positive analogic input 3
42	Negative analogic input 1	46	Negative analogic input 3
43	Positive analogic input 2	47	Positive analogic input 4
44	Negative analogic input 2	48	Negative analogic input 4

OVERALL DIMENSIONS



D7108I07

ORDERING CODE

ESA PLEX-PULSE																
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16

DEVICE VERSION		01
Control by digital and analogic I/O	HWR	

BURNER NUMBER ZONE 1		02
Burner number from 1 to 16	xx	

BURNER NUMBER ZONE 2 (*)		03
Burner number from 0 to 16	xx	

BURNER NUMBER ZONE 3 (*)		04
Burner number from 0 to 16	xx	

BURNER NUMBER ZONE 4 (*)		05
Burner number from 0 to 16	xx	

BAUD-RATE ON ECS BUS		06
4800 baud	4	
9600 baud	9	
19200 baud	1	

AUTOMATIC UNLOCK ATTEMPT		07
From 0 to 5	0	

MANUAL CONTROL TIME-OUT		08
From 0 to 120 minutes	xxx	

NUMBER OF FILTERED NO-RESPONSE		09
From 1 to 5	x	

10 DEVICE MODBUS-RTU ADDRESS	
From 001 to 254	xxx

11 MODBUS-RTU PORT	
RS-232 Port	2
RS-485 Port	4

12 BAUDRATE MODBUS-RTU BUS	
4800 baud	4
9600 baud	9
19200 baud	1

13 MODBUS-RTU COMUNICAZIONE TIMEOUT	
Timeout function disable	0
2 seconds	1
5 seconds	2
10 seconds	3
20 seconds	4

14 DATA FORMAT	
Type data 4	4
Type data 5	5
Type data 6	6

15 DEVICE TYPE CONTROLLED	
ESA ESTRO vers. 2.0 e 2.1	1
ESA ESTRO vers. 2.2	2

16 ANALOGIC INPUTS TYPE Only for version HWR	
0-20mA	0
4-20mA	4
0-10V	1

(*) the value 0 means that the zone is not controlled or doesn't exist.

ACCESSORIES

PULSE FIRING BURNER INDICATOR ESA DISPLAY UNIT

ESA DISPLAY UNIT is a display that allows you to view the status of burners operated pulse logic with ESA PLEX-PULSE HWR version.

ESA DISPLAY UNIT indicates in detail the on or off state for each burner and possibly the type of lockout. In this way, the operator can easily analyze the operation of the furnace.

APPLICATIONS

- Optional display for ESA PLEX-PULSE version HWR device
- Display of detailed burner status for each regulation zone.

CHARACTERISTICS

GENERAL:

- Supply voltage: 24Vdc
- Display dimensions: 3.5"
- Maximum absorption: 5 VA
- Operation temperature: 0÷60 °C
- Storage temperature: -10÷70 °C
- Weight: 500g
- PLEX-PULSE communication: RS-485
- Fixing: in front of the panel
- Mounting position: any
- Protection degree: IP6x
- Working environment: Non suitable for explosive or corrosive environments

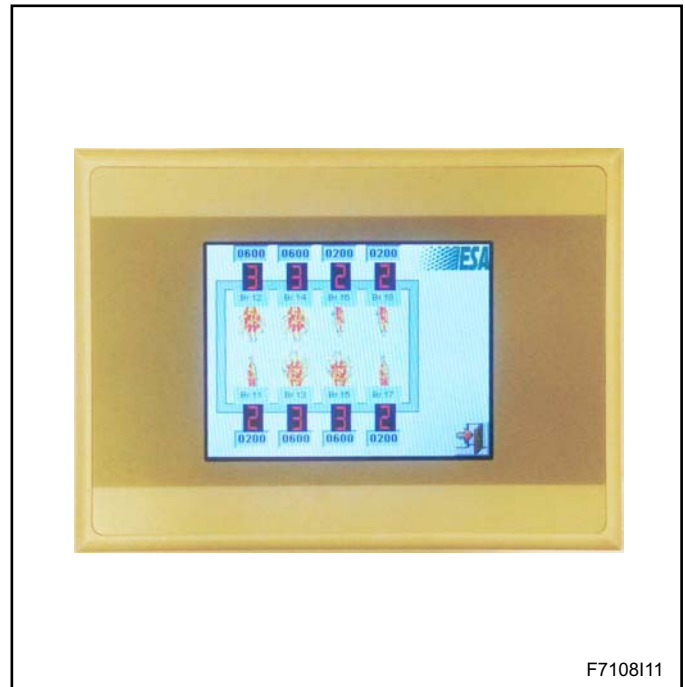
DESCRIPTION

ESA DISPLAY UNIT completes ESA PLEX-PULSE HWR version allowing the user to have the supervision of the combustion plant under control.

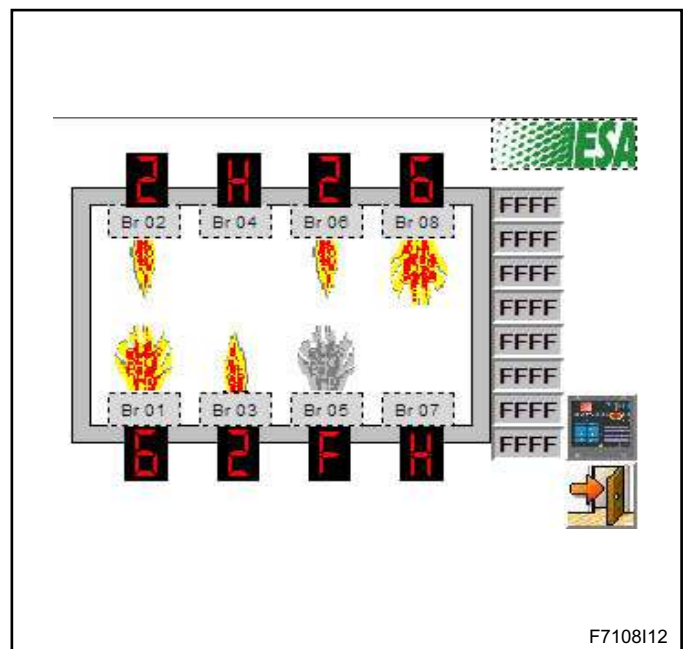
ESA PLEX-PULSE-HWR controls the burner functioning according to the analogic inputs. For each zone it has cumulative outputs for the signaling of burner on and burner in lockout inside the zone without giving details regarding how many and which are the burners that are signaled by these outputs.

ESA DISPLAY UNIT allows to display in real time everything that is happening in the single zone, displaying the burner state among: off, on at minimum power, on at maximum power or possibly, in lockout.

The graphic set-up of the burners on the page allows the operator to understand the pulse command of the burners and assess whether the rotation is correct.



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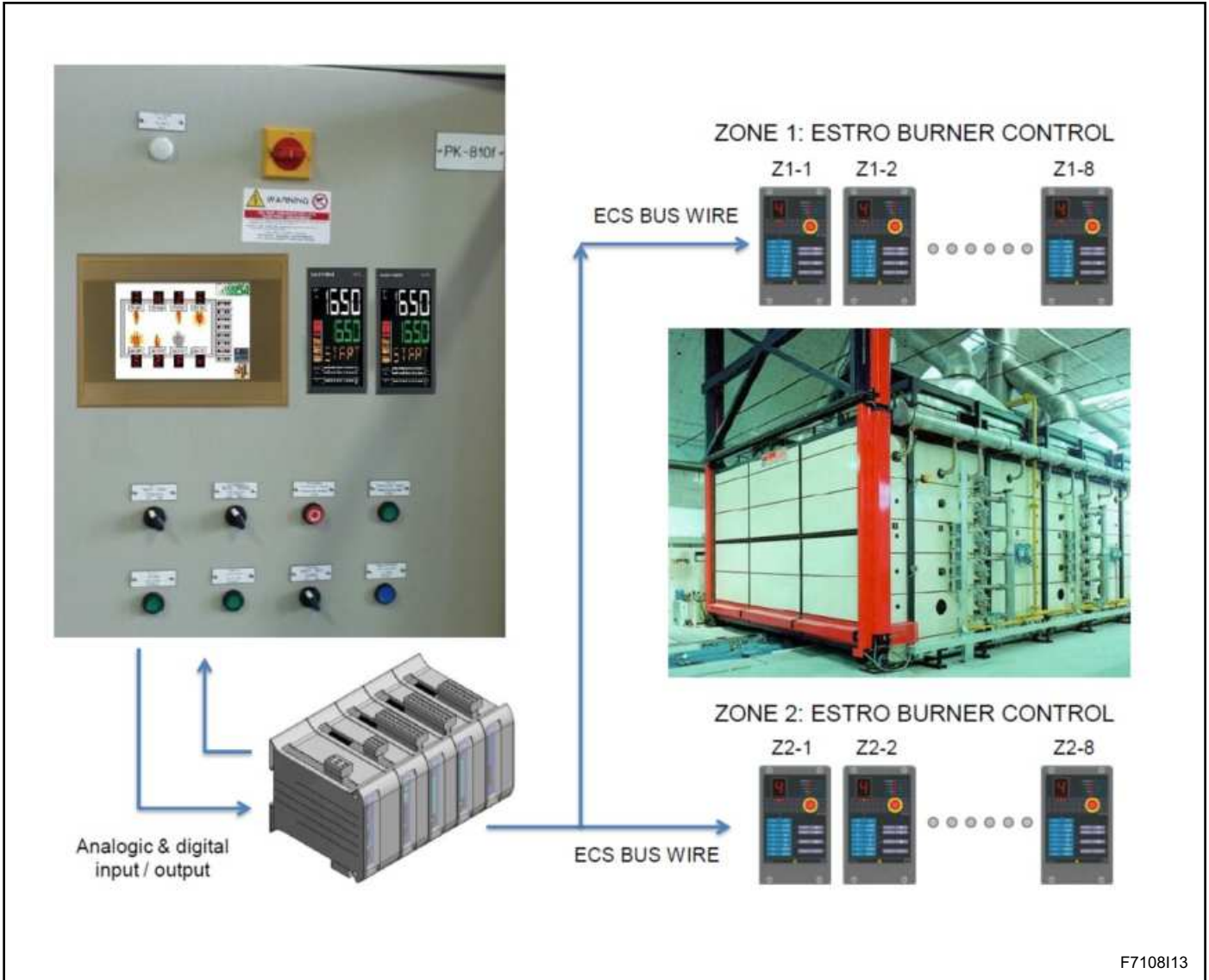
ESA DISPLAY UNIT is a display unit and does not allow any change to the operation of ESA PLEX-PULSE therefore there is a specific configuration software.

The device communicates with ESA PLEX-PULSE via RS485 serial communication to instantaneously read the state of each burner.

EXAMPLE OF APPLICATION - ESA DISPLAY UNIT

ESA DISPLAY UNIT displays the state of the burners controller by ESA PLEX-PULSE version HWR. The furnace

has two regulation zones so the ESA DISPLAY UNIT dedicates a page per regulation zone.



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