

E7030E- rev. 0.1 - 19/11/2025



Permanent operation automatic burner control

ALBEN BC

- One or more gas or oil stage burners without limitation of capacity
- Single or double flame sensor for pilot and main supervision
- Flame detection by rod or UV scanner with permanent or not permanent operation
- Integrated Valve Proving System
- High Temperature Operation and Flameless management
- Package burner control
- Available in 2 boxes sizes

1. GENERALITY

1.1 GENERAL WARNINGS



Each manual constitutes an integral part of the ESA catalogue.

- This manual and each of its parts (logos, texts, photos, tables, graphs, etc...) cannot be reproduced or modified in whole or in part without the written consent of ESA.
- The technical information related to the design, installation, regulation and operation of the combustion system with ESA products must be shared in advance with ESA. ESA declines all responsibility in relation to damage to property and people resulting from im-proper use of the products.
- The design, installation, regulation and operation of a combustion system require compliance with all current safety standards and regulations. ESA declines any responsibility in relation to its products, if used in systems or in circumstances in which the regulations in force in the place of use are not respected.
- ESA reserves the right to modify the technical characteristics of the products by updating the relevant manual, at any time and without notice. By consulting the website **www.esapyronics.com** it is possible to download the manuals updated to the latest revision in Italian and English.
- The performance of the products indicated in each manual is established at the ESA Research and Development center under certain operating conditions and using ESA equipment. These performances cannot be guaranteed using other equipment or outside of the afore-mentioned conditions.
- It is forbidden to use the combustion system supplied by ESA for drying the furnace refractories. In case of use, ESA declines all responsibility.

1.2 LOGISTICS AND DISPOSAL



- **Transport:** protect the equipment from shocks, vibrations, atmospheric agents, etc... Upon receipt of the product, check the labeling in accordance with the order and promptly report any discrepancies and/or damages for transport.
- **Storage:** store the product in a suitable place, according to the product specifications.
- **Packaging:** the material used must be disposed of according to local regulations.
- **Disposal:** comply with local legislation on the matter.

1.3 CERTIFICATIONS



The ESA Quality System has obtained certification of conformity to **UNI EN ISO 9001:2015** standard from the DNV certification body.



The ESA Management System has obtained certification of conformity to **UNI EN ISO 14001:2015** Standard from the DNV certification body.



ESA ALBEN BC conforms to the European Directives: Gas Regulation **2016/426/EC**, Low voltage directive **2014/35/EC**, Electromagnetic immunity **2014/30/EC**, Radio Equipment **2014/53/EC** in conjunction with the **EN298** and **EN1643**.

ESA adopts the Code of Ethics and Conduct pursuant to **Legislative Decree. 231/01**.

ESA products are designed, manufactured and controlled in compliance with European Directives/Regulations. In particular, the general safety requirements for combustion systems are specified in **EN ISO 13577-2** and **EN ISO 13577-4** Standards.

2. DESIGN

2.1 DESCRIPTION

The ALBEN BC series identifies automatic burner control units for gas or oil burners.

ALBEN BC is a modular device that allows the management of multiple burner sensors and actuators. Available with two different housings, it can detect flames from two separate flame sensors.

The device safely manages single- or multi-stage burners, monitors combustion air presence, and can detect flame signals from ionization sensors (electrodes) or UV radiation sensors (photocells), continuously checking the flame sensor periodically.

ESA ALBEN is equipped with serial communication for remote burner management, as well as wireless connectivity for effective burner diagnostics and parameterization via a smartphone app.

The robust thermoset or aluminium device housings allow the ESA ALBEN BC installation in the immediate vicinity of the burner. The device can contain the ignition transformer.

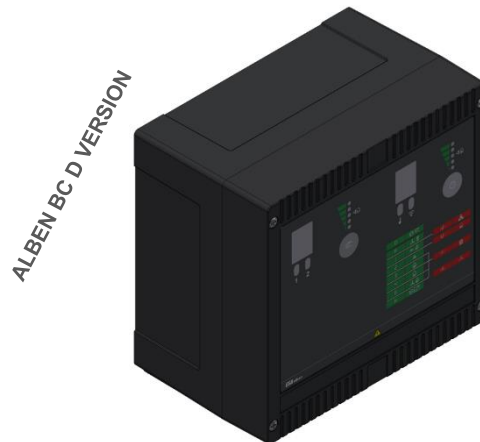
ALBEN BC S IN THERMOSET CASE

- Control of a burner up a two-gas stage
- Single flame input
- Air valve control
- Ignition transformer housing



ALBEN BC D IN ALUMINIUM CASE

- Multistage burner control
- High temperature and flameless self-management
- Integrate valve proving and package burner control
- Ignition transformer housing



The modularity of ALBEN BC is achieved by combining the ALBEN Safe Unit and AEM01 expansions, resulting in up to five hardware configurations, two of which can be mounted in two types of enclosures.

The ALBEN Safe Unit is the device's main board, providing safety inputs and outputs for controlling the fuel valves, as well as all the devices for remote and local control.

The AEM01 expansion has additional digital inputs and outputs, in addition to two analog inputs and one analog output. Specifically, the analog inputs can receive thermocouple signals, allowing ALBEN BC to autonomously manage high-temperature operation.

The device allows to configure parameters and operating modes according to application needs. When ordering, it can be defined the behaviour of the inputs and outputs according to pre-established functions, enable/disable process phases, and change their timing. It can also define operating sequences based on the type of burner and applicable installation regulations.

ESA ALBEN BC can integrate the fuel valve proving system function (tightness control) or work as an Independent Flame detector instead of burner control.

2.1.1 ALBEN BC HARDWARE VERSION

The choice of ALBEN BC model depends on the number and type of inputs and outputs required by the application. The following table summarizes the resources available for each board:

Resources	ALBEN SAFE UNIT	ALBEN AEM01
Safe digital inputs	3	4
Analog inputs in mA, Volt, pulse or thermocouple	0	Up to 2
Flame signal inputs	1	0
Safe digital outputs (voltage output)	Up to 2	0
Safe digital outputs (SPDT)	0	2
Not safe digital output	2	2
Analog outputs in mA, Volt or PWM	0	Up to 1

Regarding the safety digital outputs, ALBEN Safe Unit offers the option of having a single safety output and a dry contact digital output, as an alternative to the two safety outputs. This can be used for signalling or to control the air valve.

The ALBEN BC safety outputs are protected by a replaceable protection fuse and a non-replaceable limit fuse. These outputs are powered by a separate terminal from the instrument power supply, allowing the fuel valves to be activated only under certain system conditions.

The AEM01 board's safety outputs must be powered by an Alben Safe Unit safety output, a prerequisite for their use in controlling fuel valves. Otherwise, they become non-safety outputs that are added to the other two on the AEM01.

The following table illustrates the combinations of Safe Unit and AEM01 and the resulting available hardware resources.

Resources	SINGLE SAFE UNIT WITHOUT AEM01	SINGLE SAFE UNIT WITH AEM01	DOUBLE SAFE UNIT WITHOUT AEM01	DOUBLE SAFE UNIT WITH SINGLE AEM01	DOUBLE SAFE UNIT WITH DOUBLE AEM01
ALBEN BC S			Not possible	Not possible	Not possible
ALBEN BC D					
Safe digital inputs	3	7	6	10	14
Analog inputs	0	Up to 2	0	Up to 2	Up to 4
Flame signal input	1	1	2	2	2
Fuel valve safety outputs	Up to 2	Up to 2+1 ⁽¹⁾	Up to 4	Up to 4+1 ⁽¹⁾	Up to 4+2 ⁽¹⁾
Digital outputs (1 for ignition transformer)	2	Up to 4	Up to 4	Up to 6	Up to 6
Analog outputs	0	Up to 1	0	Up to 1	Up to 2

- (1) The safety output of AEM01 can be used to control fuel (e.g. flame/flameless, VPS fill/vent), but they must be derived from a voltage safety output of Safe Unit, capable to control fuel valves.

All the ALBEN BC digital inputs, connected at 115 or 230Vac, are safety inputs that can manage safety interlocks from the machine or burner devices. Depending on the function assigned, some of them can be used as redundant for a higher safety level.

2.1.2 BURNER OPERATION MODE AND HIGH TEMPERATURE OPERATION

Depending on the working time and on the type of burner flame detection, it is possible to define the sensor's check method by selecting from the internal check of the ionization probe every hour, external check of the UV-2 sensor via the dimming shutter every hour or shut down every 24 hours for non-permanent operation with UV-2.

ALBEN BC can work in High Temperature Operation mode (HTO) where, instead of checking the flame presence, it checks the furnace temperature is above the fuel self-ignition temperature (> 750 °C). If the temperature falls below the defined temperature limit for HTO, ALBEN BC returns to flame supervision mode.

In HTO mode ALBEN BC can also activate the flameless burner working mode by activating specific fuel valves.

For both High Temperature Operation mode and Flameless mode, the activation can be driven by digital inputs or self-activate by ALBEN BC that reads the furnace temperature by two thermocouples or by a combination of both conditions.

2.1.3 REMOTE AND LOCAL CONTROL

ALBEN BC is equipped with two serial interfaces: ESA ECS and RS485 that allows to completely control the burner from remote, communicating via the ECS or Modbus-RTU protocols, both implemented as standard in the instrument. Via serial communication a complete check of the burner is possible: ignition and shut down, pilot and main burner control, air valve control, information on the status and value of the flame signal.

Using specific converters, it is possible to control the device through the most common fieldbus used by the PLCs.

On the front panel, ALBEN BC has a configurable local button, a phase indication display and a bargraph flame signal indicator.

ALBEN BC is equipped with WiFi/BLE connectivity which allows, through the "ESA Alben APP" for smartphones or tablets, the device diagnostics, instrument configuration, and manual operating mode for burner commissioning.

ALBEN BC runs the burner ignition cycle count, storing the number of activations of the fuel valves and the hour counter. Via the "ESA Alben APP" is possible to read the numbers of the cycles performed and following maintenance of the valves reset the counters.

2.2 APPLICATIONS

ALBEN BC are burner control units suitable for all kinds of burners without limitation of power. They represent the ideal choice for industrial applications thanks to the remote control and supervision through the communication.

Sectors: steel, aluminium, copper, glass, food, paper, ceramic, cremation
Applications: melting, heating, cooking, galvanizing, heater

2.3 CHARACTERISTICS

General

Voltage supply	115 Vac o 230 Vac +10÷-15%
Frequency supply	50÷60 Hz
Type of supply	phase-neutral, not appropriate for phase-phase systems
Neutral	suitable for ground and non-ground neutral systems
Device consumption without loads	25VA max
Working temperature	-20÷60 °C -4÷140 °F
Storage temperature	-20÷80 °C -4÷176 °F
Protection degree	IP65 (for wiring use specific glands)
Mounting position	any
Working environment	not suitable for explosive or corrosive environments
Enclosure ALBEN BC S	Thermosetting glass fiber
Enclosure ALBEN BC D	Aluminium

Inputs & Outputs

Voltage to the flame detection probe	max 320 Vac
Minimum ionization current	1,8 µA ± 0,3 µA
Current limits to the probe	1 mA
Flame signal display	0 ÷ 90 µA
Detection probe type in Non-permanent operation	scanner ESA UV-2 or ionization rod
Detection probe type in Permanent operation	scanner ESA UV-2 with shutter or ionization rod
UV-2 scanner temperature range	-20÷60°C
Detection probe line length to electrode or scanner UV-2	< 30 m
Insulation between the probe conductors	> 50 Mohm (cables with double insulation or double protection)

HV cable length from ignition transformer	maximum 2 m
Distance between ignition electrode and burner mass	3 mm $\pm$ 0,5
Safe Unit digitals input voltage	Same as the supply voltage
Safe Unit digital inputs absorption	max 5mA
Safe Unit digital inputs line length	Any length (suitable also for length > 10 m)
Safe Unit output voltage	Same as the supply voltage
Safe Unit outputs line length	Any length (suitable also for length > 10 m)
Maximum current per single safety voltage output DO1, DO2, DO9, DO10 on Safe Unit	1,5 A $\cos\Phi$ 0,8
Maximum current per voltage outputs DO3 & DO11	1,5 A $\cos\Phi$ 0,8 (2 A for ignition transformer)
Total maximum current for voltage outputs of each Safe Unit	3,15 A ⁽¹⁾ per 10 second / minute
Safe Unit dry contact output maximum current	2A (not protected by internal fuse)
Output protection fuse for voltage outputs of each Safe Unit	3,15 A fast ⁽¹⁾ replaceable
Safe Unit Internal relay protection fuse	4 A not replaceable
Minimum voltage supply to maintain output	70Vac (version 115Vac) and 140Vac (version 230Vac)
AEM01 expansion digital input voltage	24 Vac/Vdc (not safety related), 115 Vac, 230 Vac
AEM01 expansion digital input absorption	max 5mA
AEM01 expansion 115/230V digital inputs line length	Any length (suitable also for length > 10 m)
AEM01 expansion not safety related 24V digital inputs line length	< 3 m
AEM01 expansion two analog inputs	thermocouple K/N/S (Safety related) or mA/V/Pulse (not safety related)
AEM01 expansion analog output	0...20mA/0...10V/PWM (not safety related)
AEM01 expansion digital output voltage	Same as the supply voltage
AEM01 expansion digital outputs line length	Any length (suitable also for length > 10 m)
AEM01 expansion output maximum current	2A (not protected by internal fuse)

⁽¹⁾ It is possible to increase at 4 A max.

Parameters

Purging or waiting time before ignition 0 sec ÷ 18 hours

1st gas stage safety time ⁽²⁾ 1 ÷ 25 sec

Regulation delay time or 2nd gas stage safety time ⁽²⁾ 0 ÷ 25 sec

Reaction time ⁽²⁾ 1 ÷ 20 sec (<1 sec for EN298)

Accepted remote reset number max 5 in 15 minutes

Shut off purging or waiting time 0 ÷ 99 sec o 2 ÷ 4 min

Flame sensor check in permanent operation in 1 hour

Auto shut down for test with non-permanent operation in 24 hours

Behaviour at flame loss configurable

1st gas stage burner functioning configurable

Air valve functioning: configurable

HTO temperature low limit ⁽³⁾ 750°C

HTO detector response time < 1 sec

VPS check @startup, @stop, @bothStart & Stop

VPS fuel valve open time ⁽²⁾ 1 ÷ 255 sec (<3sec for EN1643)

VPS fuel valve attempts ⁽²⁾ 1 ÷ 255 (1 attempt for EN1643)

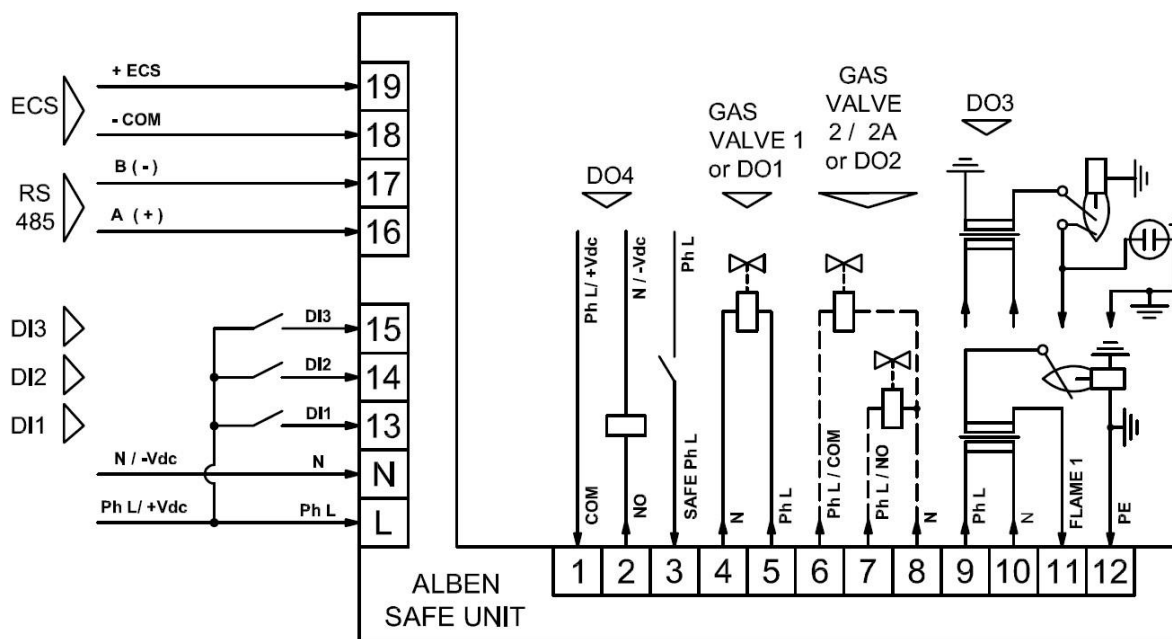
VPS measure pressure time 1 ÷ 65535 sec

(2) These parameters must be set according to the standard that is applicable at the time of installation.

(3) This parameter may be setup from 650-1200°C. If selected below 750°C, the HTO functionality is not compliant with EN298:2022 or EN ISO 13577-2 standard.

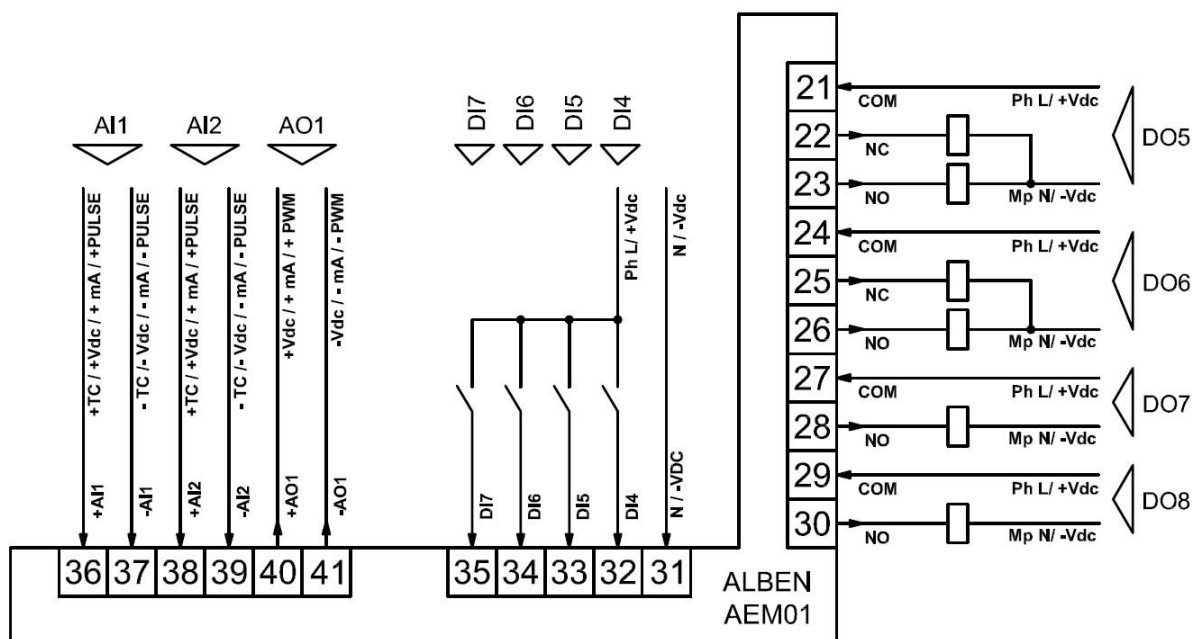
2.4 ELECTRIC CONNECTIONS

2.4.1 ELECTRICAL CONNECTIONS FIRST SAFE UNIT



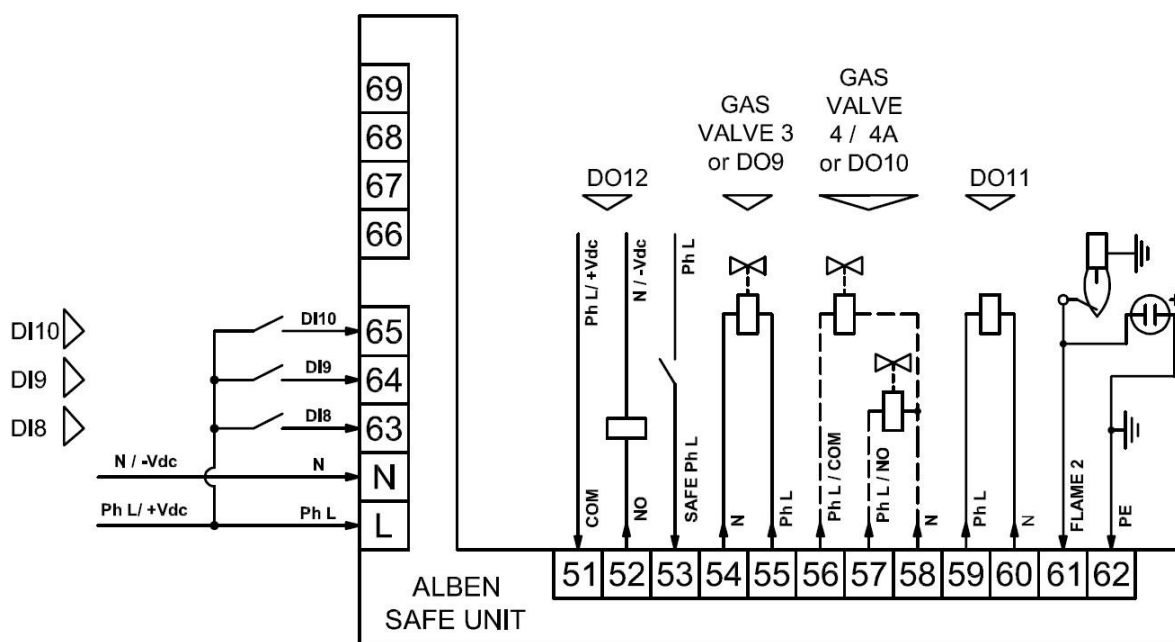
Pos.	Description	Pos.	Description
L	Device power supply phase	N	Device power supply neutral
1	Digital output dry contact DO4 (COM)	2	Digital output dry contact DO4 (NO)
3	Power supply phase for voltage output (DO1, DO2, DO3)	4	Fuel valve 1 or digital output DO1 neutral
5	Safety digital output in tension DO1 for fuel valve 1 phase	6	Safety digital output in tension DO2 for fuel valve 2 phase or Digital output dry contact DO2 (COM)
7	Safety digital output in tension DO2 for fuel valve 2A phase or Digital output dry contact DO2 (NO)	8	Fuel valve 2 or digital output DO2 neutral
9	Digital output in tension DO3 for ignition transformer phase	10	Digital output DO3 for ignition transformer neutral
11	Detection electrode, signal from transformer (unirod) or UV probe negative	12	PE ground protection, burner body and UV probe positive
13	Digital input phase DI1	14	Digital input phase DI2
15	Digital input phase DI3	16	RS485 communication positive input A
17	RS485 communication negative input B	18	RS485 communication ground or ECS communication negative input
19	ECS communication positive input		

2.4.2 ELECTRICAL CONNECTIONS FIRST AEM01



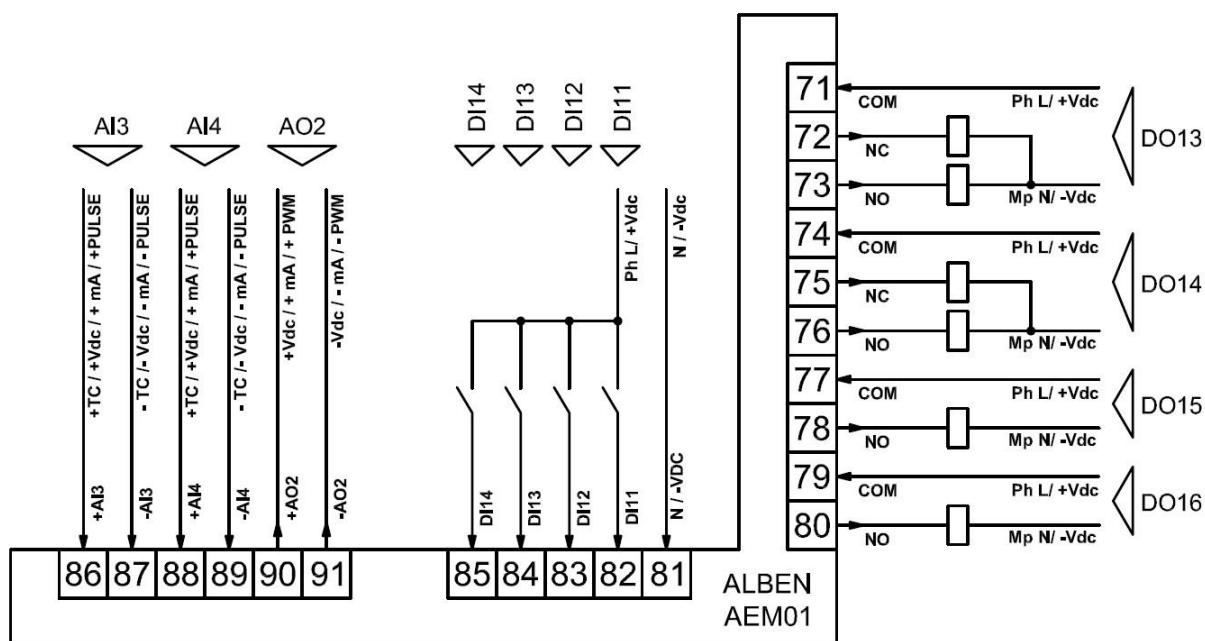
Pos.	Description	Pos.	Description
21	Digital output change over contact DO5 (COM)	22	Digital output change over contact DO5 (NC)
23	Digital output change over contact DO5 (NO)	24	Digital output change over contact DO6 (COM)
25	Digital output change over contact DO6 (NC)	26	Digital output change over contact DO6 (NO)
27	Digital output dry contact DO7 (COM)	28	Digital output dry contact DO4 (NO)
29	Digital output dry contact DO8 (COM)	30	Digital output dry contact DO8 (NO)
31	Digital inputs neutral or common	32	Digital input phase or positive DI4
33	Digital input phase or positive DI5	34	Digital input phase or positive DI6
35	Digital input phase or positive DI7	36	Positive analog input 1 thermocouple / mA / V / pulse
37	Negative analog input 1 thermocouple / mA / V / pulse	38	Positive analog input 2 thermocouple / mA / V / pulse
39	Negative analog input 2 thermocouple / mA / V / pulse	40	Positive analog output 1 mA / V / PWM
41	Negative analog output 1 mA / V / PWM		

2.4.3 ELECTRICAL CONNECTIONS SECOND SAFE UNIT



Pos.	Description	Pos.	Description
L	Device power supply phase	N	Device power supply neutral
51	Digital output dry contact DO12 (COM)	52	Digital output dry contact DO12 (NO)
53	Power supply phase for voltage output (DO9, DO10, DO11)	54	Fuel valve 3 or digital output DO9 neutral
55	Safety digital output in tension DO9 for fuel valve 3 phase	56	Safety digital output in tension DO10 for fuel valve 4 phase or Digital output dry contact DO10 (COM)
57	Safety digital output in tension DO10 for fuel valve 4A phase or Digital output dry contact DO10 (NO)	58	Fuel valve 4 or digital output DO10 neutral
59	Digital output in tension DO11 phase	60	Digital output in tension DO11 neutral
61	Detection electrode or UV probe negative	62	PE ground protection, burner body and UV probe positive
63	Digital input phase DI8	64	Digital input phase DI9
65	Digital input phase DI10	66	Not connected
67	Not connected	68	Not connected
69	Not connected		

2.4.4 ELECTRICAL CONNECTIONS SECOND AEM01



Pos.	Description	Pos.	Description
71	Digital output change over contact DO13 (COM)	72	Digital output change over contact DO13 (NC)
73	Digital output change over contact DO13 (NO)	74	Digital output change over contact DO14 (COM)
75	Digital output change over contact DO14 (NC)	76	Digital output change over contact DO14 (NO)
77	Digital output dry contact DO15 (COM)	78	Digital output dry contact DO15 (NO)
79	Digital output dry contact DO15 (COM)	80	Digital output dry contact DO15 (NO)
81	Digital inputs neutral or common	82	Digital input phase or positive DI11
83	Digital input phase or positive DI12	84	Digital input phase or positive DI13
85	Digital input phase or positive DI14	86	Positive analog input 3 thermocouple / mA / V / pulse
87	Negative analog input 3 thermocouple / mA / V / pulse	88	Positive analog input 4 thermocouple / mA / V / pulse
89	Negative analog input 4 thermocouple / mA / V / pulse	90	Positive analog output 2 mA / V / PWM
91	Negative analog output 2 mA / V / PWM		

2.5 DESIGN GUIDELINES

-  In the selection of configuration parameters analyze, in addition to the specific rule, any risks associated with certain modes of operation, choosing values which do not jeopardize the safety of the application. Before installing the unit, check that the configuration parameters conform to what has been defined.
-  ALBEN BC is designed for fixed installations and is meant to be electrically connected in a permanent and fixed manner. The reverse / neutral connection may compromise the security of the system. Do not use different phase between the various voltage inputs and do not apply voltages on the output or serial communication terminals.
-  The EMC emissions of the application must be checked following the incorporation of the final application of the burner control device. The EMC application requirement shall be tested after the incorporation of the burner control device into the final equipment.
-  Burner safety shut down, for unsafe application conditions (emergency, overheating, in correct pressure values etc), is guaranteed removing the relative digital input or removing the power for voltage output (terminal 3 and 53). The same recommendation is valid for instruments that are controlled by serial communication, where the ignition and shut down commands cannot be considered for safety but only for regulation control.
-  The input digital signal must be pulse-type and must not be present during the instrument's auto diagnosis when the input has the function for Reset/Stop, Only Reset and Only stop; whilst it must be stable when the input has other functions. The reset command is not accepted if the pulse duration is less than or greater than what has been specified.
-  In case of power supply interruption, the device restarts its program sequence from the beginning checking all interlocks. Refer to interlocks documentation in case they have to be reset.
-  ALBEN BC can activate the high temperature operation detecting the furnace temperature. As alternative the high temperature operation command can be connected to a digital input and the command must derive directly from the safety temperature detector (a part of the protection system according to the ISO EN13577-4). The high temperature operation guarantees indirect flame control, monitoring that the minimum combustion chamber temperature is enough to guarantee ignition of the fuel introduced. Refer to the specific application norm for the choice of these devices.
-  The power supply for the solenoid fuel valves must be derived only from dedicated outputs on the ALBEN BC. Control of the fuel solenoid valves by other not safety devices is not allowed (normal relay, not safety PLC...) that receive the command from the device.
-  When replacing the output protection fuse, the fuse must be fast acting and with a value that does not exceed the maximum permissible current. Otherwise, the not replaceable fuse blows to protect internal relays, so that the device does not work anymore.
-  After replacing the resettable fuse, before reconnecting the instrument to the application it is imperative to check the absence of internal damage. Check the insulation between the power supply phase terminal and the safety valve output phase terminals. Otherwise, the device must be sent to the manufacturer.
-  The HV ignition cable must not exceed a length of 2 meters (ideally 1 meter, maximum limit if an electronic transformer is used). The ignition transformer must be positioned near the burner.
-  Foreseen the noise filter connector for connecting the HV cable to the ignition electrode
-  For unirod detection systems use only specific ignition transformers, that allow operation for unirod ignition and detection. Make sure that ALBEN BC is connected correctly to the earth protection before ignition to avoid irreparable damage.
-  Avoid igniting the burner too close together. Consider a minimum time between one switch-on and the next equal to the sum of the prewash time and the first safety time, increased by at least 5 seconds. In any case, do not switch on more than 2 times in a period of 30 seconds.



ALBEN BC is a device that controls burner safety organs and functioning (a part of the protection system according to the ISO EN13577-4). It is not intended for burner regulation for which there are appropriate instruments.



If the supply system has a phase-phase type power or not earth-bonded, install an insulation transformer, connecting it to one end of the secondary winding referred to protection earth.



The safety change over output of AEM01 (DO5, DO6, DO13, DO14) can be used to control fuel valves or safety devices. In this case they must be fed by a safety voltage output of Safe Unit (DO1, DO2, DO9, DO10), and the total consumption of the connected loads cannot be higher than the maximum allowed for voltage output of Safe Unit.



Incorrect installation can cause damage to things or people, as well as altering the performance of the combustion system. ESA declines any responsibility in the event of incorrect installation of its products.



In case of malfunctioning ALBEN BC must be sent back to the manufacturer for repair. Any type of repair or alteration done by third parties causes the general guaranteed conditions to expire and compromises the device safety

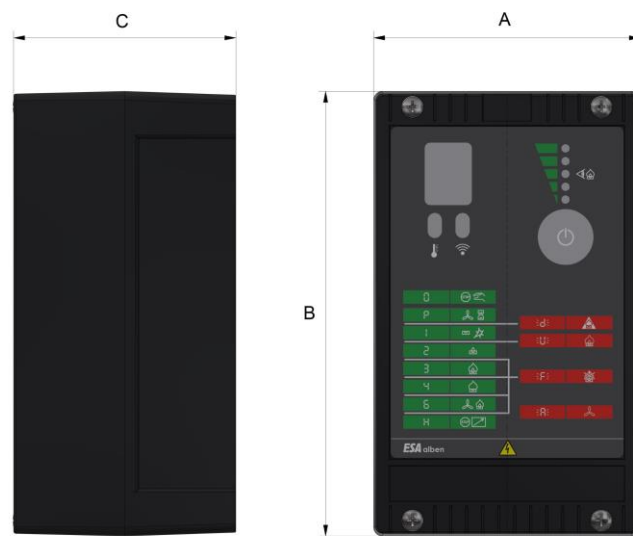


For selecting the position of the HTO sensor in the application, the effect of exposing it to radiant heat directly from the flame is taken into account, see e.g. EN 746-2 or EN ISO 13577-2.



Record the configuration of the parameters set during the design phase or defined following system validation, in order to ensure their availability for any spare parts requests.

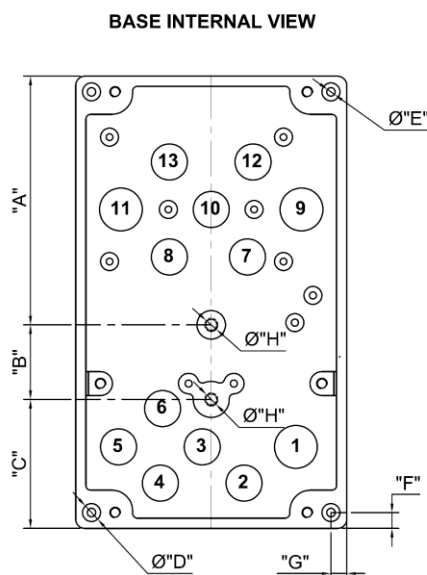
2.6.1 DIMENSIONS ALBEN BC S



Models	A [mm]	B [mm]	C [mm]	Mass [kg]
ALBEN BC S without ignition transformer	120	200	100	1.6
ALBEN BC S with TAR10 ignition transformer	120	200	100	2.7

Models	A [inch]	B [inch]	C [inch]	Mass [lbs]
ALBEN BC S without ignition transformer	4.72	7.87	3.94	3.6
ALBEN BC S with TAR10 ignition transformer	4.72	7.87	3.94	6.0

2.6.2 ALBEN BC S FIXING AND CABLE ENTRY



METRIC

Models	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H
ALBEN BC D	110	33	57	8	3.5	7	7	M6

IMPERIAL

Models	A [inch]	B [inch]	C [inch]	D [inch]	E [inch]	F [inch]	G [inch]	H
ALBEN BC D	4.33	1.30	2.24	0.31	0.14	0.28	0.28	M6

Provision for holes PG11 1, 9, 11

Provision for holes M16x1.5 or PG9 2, 3, 4, 5, 6, 7, 8, 10, 12, 13



The device can be mounted using the two threaded holes on the rear side (reference H). Alternatively, you can use the through holes located on the corners of the unit.



Cable entry is provided on the rear of the base, using knockout holes. The number of entries to be opened must be determined based on the wiring required for the application, opening only the necessary holes.



ALBEN BC is supplied without cable glands or plugs. Provide cable glands based on the number and type of cables entering the device.

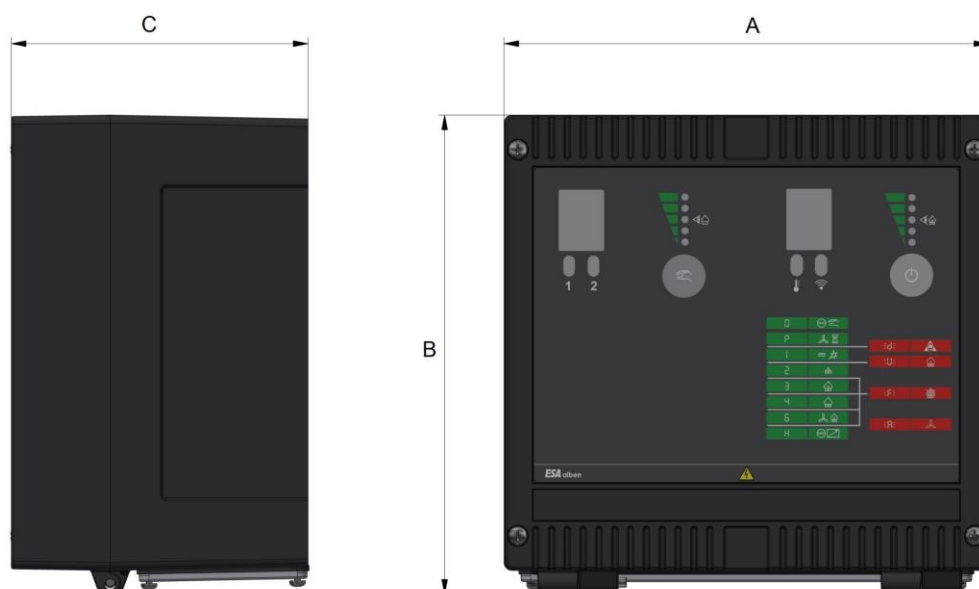


The presence of ALBEN AEM01, precludes the possibility to mount the ignition transformer inside ALBEN. In this case it is necessary to use the TRAFO box to contain the ignition transformer (E5004).



The mounting of the ignition transformer precludes the use of holes 7 ÷ 13.

2.6.3 DIMENSIONS ALBEN BC D



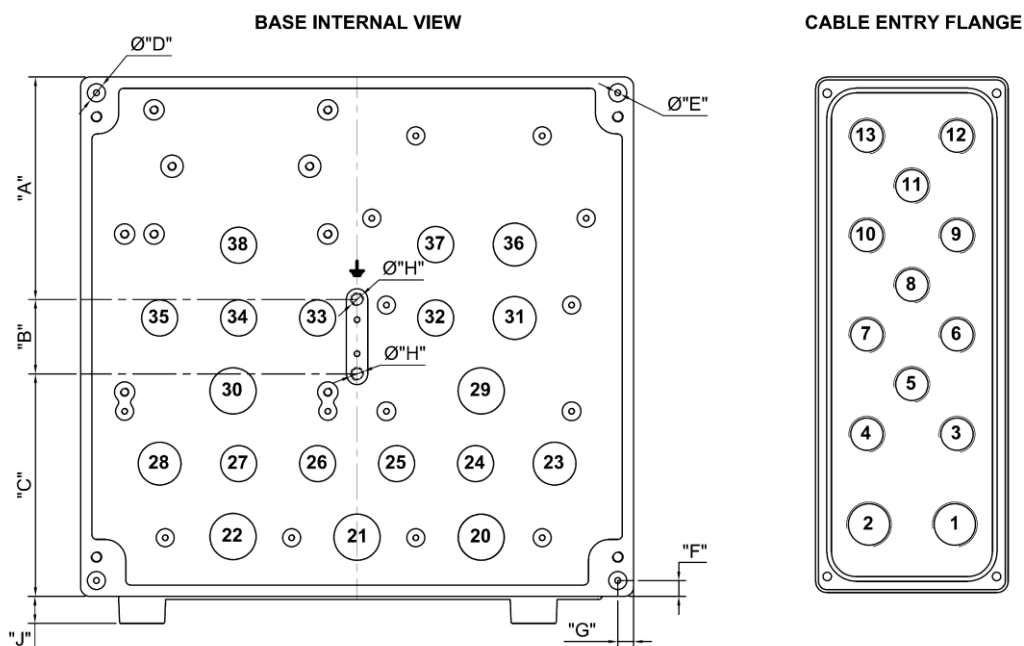
METRIC

Models	A [mm]	B [mm]	C [mm]	Mass [kg]
ALBEN BC D without ignition transformer	245	242	150	4.7
ALBEN BC D with TAR-10 ignition transformer	245	242	150	6.0
ALBEN BC D with TAR-07, TAR-11, TAR-13 ignition transformer	245	242	150	6.6

IMPERIAL

Models	A [inch]	B [inch]	C [inch]	Mass [lbs]
ALBEN BC D without ignition transformer	9.65	9.53	5.90	10.4
ALBEN BC D with TAR-10 ignition transformer	9.65	9.53	5.90	13.3
ALBEN BC D with TAR-07, TAR-11, TAR-13 ignition transformer	9.65	9.53	5.90	14.6

2.6.4 ALBEN BC D FIXING AND CABLE ENTRY



METRIC

Models	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H	J [mm]
ALBEN BC D	98.5	33	98.5	8	2.6	7	7	M6	12

IMPERIAL

Models	A [inch]	B [inch]	C [inch]	D [inch]	E [inch]	F [inch]	G [inch]	H	J [inch]
ALBEN BC D	3.88	1.30	3.88	0.31	1.02	0.28	0.28	M6	0.47

Threaded holes M20x1.5	1, 2
Threaded holes M16x1.5	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Provision for holes M20x1.5 o PG13.5	20, 21, 22, 29, 30
Provision for holes PG11	23, 28, 31, 36
Provision for holes M16x1.5 o PG9	24, 25, 26, 27, 32, 33, 34, 35, 37, 38



The device can be mounted using the two threaded holes on the rear side (reference H). Alternatively, you can use the through holes located on the corners of the unit.



Cable entry is provided on the underside of the base, through the cable entry flange. Additional cable entries are provided on the rear side of the base, which can be drilled as needed depending on the wiring required by the application.



The cable entry flange is supplied with threaded holes but without cable glands or plugs. Provide cable glands and plugs based on the number and type of cables entering the device.



Mounting the ignition transformers precludes the use of holes 30, 33, 34, 35, and 38. Other options may preclude other holes on the rear side of the base.

3. INSTALLATION

-  In case of failure to comply with the following warnings, the general warranty conditions and ESA is not responsible for any damage to things or people.
-  All the operations described in this chapter must be carried out by qualified technical personnel, in compliance with all the points indicated in this manual. The indications given in this document do not exempt the customer/user from compliance with the general and specific legal provisions.
-  Any modification or repair carried out by personnel not authorized by ESA.
-  The operator must wear suitable clothing and PPE in accordance with the legal requirements, respecting the general safety and risk prevention regulations.
-  The operation of the device is guaranteed only if the characteristics of the system (connections, type of power supply, operating temperatures, etc...) are compatible with the technical data of the product.
-  In case of malfunctions, follow the instructions in the paragraph "Troubleshooting" or contact customer service ESA.

3.1 ASSEMBLY

-  Combustion system components can reach high temperatures. Pay maximum attention to exposed hot parts.
-  Avoid placing ALBEN BC near intense magnetic or electric fields and in conditions of direct exposure to heat or combustion products, liquids, solvents or corrosive gases.
-  Do not limit in any way the area surrounding the instrument, but guarantee adequate space and ventilation to avoid overheating the device
-  The declared enclosure protection degree is guaranteed using specific cable glands or plugs with equal or higher protection degree value. Install cable glands or plugs as necessary to complete the wiring.
-  All reworkings of the enclosure box necessary for installation of the instrument must provide a minimum degree of protection of IP40. For systems used in open air, the minimum protection degree must be equal to IP54. The protection degree can also be guaranteed by the appliance in which the instrument is installed.

3.2 WIRING

-  The body of the burner and all the metal elements connected to it must be connected to the protective earth of the system with suitable conductors.
-  The connection cables must be positioned away from heat sources.
-  The ignition electrode connection cable must be specific for high voltage (hereinafter called HV) and unshielded. For positioning, sizing and other information on the HV cable, refer to the technical bulletin of the ignition transformer

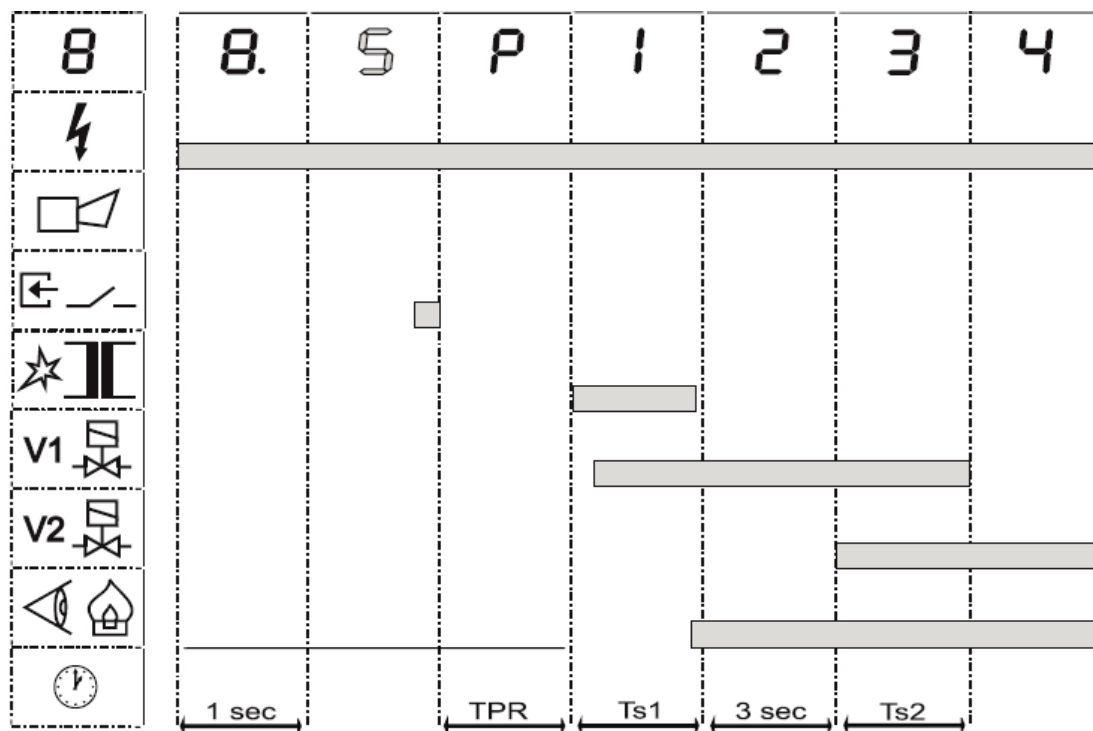
-  The detection electrode connection cable must have a minimum section of 1mm² and must be suitable for the purpose. The use of an HV cable is recommended.
-  The UV sensor connection cable must have a minimum section of 1mm² and must be suitable for the purpose. For more information, please refer to the UV sensor technical datasheet.
-  The HV cable must be laid individually, away from power cables and not in metal ducts, ideally it should be left in free air.
-  The HV ignition cable must not exceed a length of 2 meters (ideally 1 meter, maximum limit if an electronic transformer is used). The ignition transformer must be positioned near the burner.
-  Use the noise filter connector for connecting the HV cable to the ignition electrode.
-  During wiring refer to the technical documentation, respecting polarity between phase and neutral.
-  The terminals for the electrical connections are screw-on type and can accept wires with sections from 0.5 to 2.5mm² and the choice of conductors and their location must be suitable for the application.
-  Adequately tighten the wires into the terminals to prevent malfunction or overheating which can lead to dangerous conditions. Numbering and the use of appropriate terminals on the conductors is recommended.
-  The laying out of the flame signal cables must be separated from power cables and other cables. The use of multi-core cables is not allowed, nor the use of shielded cables. The type of cables must ensure the minimum insulation required between the conductors.
-  Detection probes and any connectors must be isolated and made inaccessible using proper protection, so as to allow access only to qualified personnel.; if it is considered necessary, place warnings near the probes.
-  In applications with multiple burners, parallel connections between the outputs of the instruments are not allowed. If the system is controlled via communication lines, follow the specific wiring instructions.
-  The laying out of the communication lines must be separated from power lines, motor control (inverter) and network voltage.
-  For the ECS communication lines, use the specific ECS CABLE; alternatively, we recommend the use of busway systems taking into account a maximum length of the connecting cable between the busway and instrument of 1 m, both for communication and for the power supply. MULTIPOLAR nor SHIELDED cables are allowed.
-  Check the correct connection after installation. Before powering the instrument make sure that the voltage and frequency are correct; ensure that users do not have an absorption greater than the maximum capacity of the output contacts.

3.3 FUNCTIONING

3.3.1 ALBEN BC BASIC CYCLE

ALBEN BC performs a basic burner ignition cycle with the following diagram:

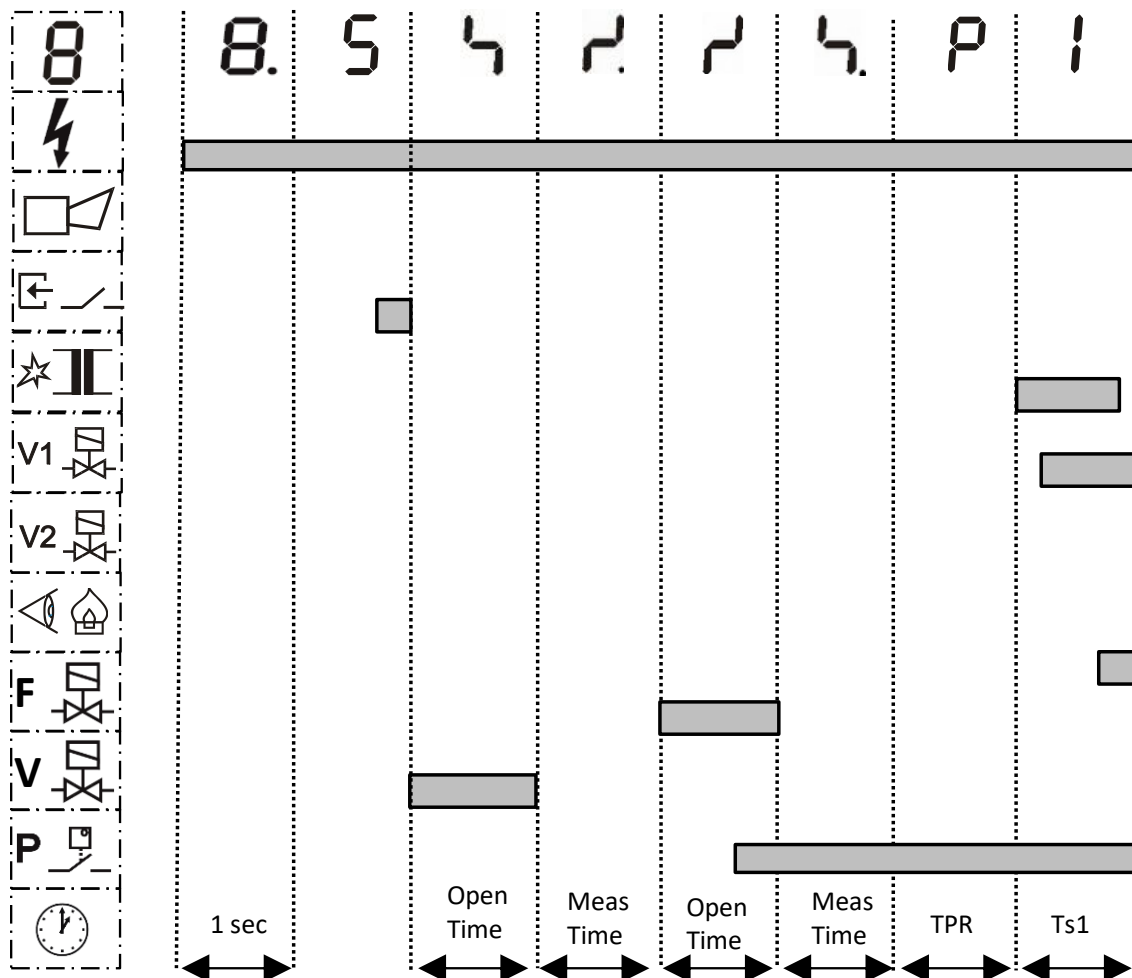
- At power-on ALBEN BC performs a full self-test.
- ALBEN BC stop in "stand-by state".
- Reset input unlock the device.
- ALBEN BC proceeds to "prepurge state".
- ALBEN BC ignites the transformer and opens the V1 valve for the 1st safety time.
- After flame is detected, ALBEN BC opens the V2 valve for the 2nd safety time.
- At the end of the sequence only V2 valve is open.



3.3.1 ALBEN BC BASIC CYCLE WITH VPS FUNCTION ENABLE

In case ALBEN BC shall performs VPS sequence before burner ignition, the following diagram cycle is executed:

- At power-on ALBEN BC performs a full self-test.
- ALBEN BC stop in "stand-by state".
- Reset input unlock the device.
- ALBEN BC executes the VPS sequence activating alternatively the "Vent" and "Fill" valve and checking the VPS pressure switch.
- At the end of VPS sequence, ALBEN BC proceeds with the same sequence of BASIC cycle.



4. ORDERING CODE

**ALBEN BC [01] [02] [03] [04] [05] [06] [07] [08] [09] [10] [11] - [12]
[13] [14] [15] [16] [17] [18] [19]**

[01] – ALBEN BC version	code
Single in thermosetting box	S
Double in Aluminium box	D

[02] – ALBEN Safe unit n°1	code
Safe Unit with double safety outputs EV1& EV2, ECS, RS485 and BLE/WIFI	B
Safe Unit with single safety output EV1 & dry contact output, ECS, RS485 and BLE/WIFI	C
Safe Unit with single safety output EV1 & EV2 change over, ECS, RS485 and BLE/WIFI (¹)	F
Safe Unit with double safety outputs EV1& EV2, ECS (¹)	M
Safe Unit with single safety output EV1 & dry contact output, ECS (¹)	N
Safe Unit with single safety output EV1 & EV2 change over, ECS (¹)	O
Safe Unit with single safety output EV1, ECS (¹)	T
1. Special execution	

[03] – ALBEN Safe unit n°2 only for ALBEN BC D	code
Not installed	/
Safe Unit with double safety outputs EV1& EV2, ECS, RS485 and BLE/WIFI	B
Safe Unit with single safety output EV1 & dry contact output, ECS, RS485 and BLE/WIFI	C
Safe Unit with single safety output EV1 & EV2 change over, ECS, RS485 and BLE/WIFI (¹)	F
Safe Unit with double safety outputs EV1& EV2, ECS (¹)	M
Safe Unit with single safety output EV1 & dry contact output, ECS (¹)	N
Safe Unit with single safety output EV1 & EV2 change over, ECS (¹)	O
Safe Unit with single safety output EV1, ECS (¹)	T
1. Special execution	

[04] – Parameter available	code
No function associated	/

[05] –ALBEN Power supply voltage	code
115 Vac	1
230 Vac	2

[06] – ALBEN AEM01 n°1
code

Not installed

/

AEM01 with digital input 115/230Vac, digital output, analog inputs and output

B

AEM01 with digital input 24Vac/Vdc, digital output, analog inputs and output (¹)

C

AEM01 with digital input 115/230Vac, digital output

D

AEM01 with digital input 24Vac/Vdc, digital output

E

1. Special execution

[07] – ALBEN AEM01 n°1 analog inputs type
code

Not installed or analog section not available

/

N°2 Thermocouple inputs

T

N°2 mA or V or pulse inputs

A
[08] – ALBEN AEM01 n°1 analog output type
code

Not installed or analog section not available

/

N°1 mA or V or PWM output

A
[09] – ALBEN AEM01 n°2 only for ALBEN BC D
code

Not installed

/

AEM01 with digital input 115/230Vac, digital output, analog inputs and output

B

AEM01 with digital input 24Vac/Vdc, digital output, analog inputs and output (¹)

C

AEM01 with digital input 115/230Vac, digital output

D

AEM01 with digital input 24Vac/Vdc, digital output

E

1. Special execution

[10] – ALBEN AEM01 n°2 analog inputs type only for ALBEN BC D
code

Not installed or analog section not available

/

N°2 Thermocouple inputs

T

N°2 mA or V or pulse inputs

A
[11] – Alben AEM01 n°2 analog output type only for ALBEN BC D
code

Not installed or analog section not available

/

N°1 mA or V or PWM output

A
[12] – Communication bus
code

RS485 and ECS

485E

Only ECS

OECS

AFC Ethernet - IP

AEIP

AFC Modbus TCP

ATCP

AFC Profinet

APNT

AFC Profibus

APDP

[13] - Container details code

ALBEN BC S Thermosetting glass fiber	T
ALBEN BC D Aluminium with flange with 11 M16 and 2 M20 cables entries	A

[14] – Ignition transformer type code

Not installed	//
TAR07 ⁽¹⁾	07
TAR10	10
TAR11 ⁽¹⁾	11
TAR12 ⁽¹⁾	12
TAR13 ⁽¹⁾	13
TRS723 UL ⁽¹⁾	23

1. Special execution only for ALBEN BC D

[15] – Parameter available code

No function associated	/
------------------------	---

[16] – Connection terminals code

Standard	//
Terminal block on the base for Phase, Neutral and PE ⁽¹⁾	A1
Terminal block on the base for EPB burner ⁽¹⁾	A2

1. Special execution only for ALBEN BC D

[17] – Special version code

Standard	/
Pre wiring	C

[18] – Parameter available code

No function associated	/
------------------------	---

[19] – Parameter available code

No function associated	/
------------------------	---

ESA contacts



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www.esapyronics.com

 ESA Italia (Headquarter)

via E. Fermi 40, 24035 Curno (Bergamo), Italy
tel. +39.035.6227411 - esa@esacombustion.it

 ESA Belgium

Zoning Industriel, 4ème rue, B-6040 Jumet, Belgium
tel. +32.71.256970 - marketing@pyronics.be

 ESA India

Plot No. J-17, MIDC, Bhosari, Pune, 411 026, India
tel. +91 68197024 - esaindia@esapyronics.com

 ESA Germany

Ziffling 1, Willmering bei Cham, D-93497 – Germany
esadeutschland@esacombustion.com

 ESA China

CN-201206 SHANGHAI (under establishment)
esachina@esacombustion.com