

*Electronic*



## ESA UV-2 checking device for permanent operation

ESA SHUTTER SHR (E7003 rev. 01 - 17/04/2018)

## 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 SHUTTER SHR is in compliance with European Union directives **2009/142/EC** Gas directive & **2014/35/EC** Low voltage directive with reference to standards: **EN61000-6-2** (Immunity for industrial environments), **EN61000-6-4** (Emission standard for industrial environments) and **EN60204-1** (Machine electrical equipment).

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ESA SHUTTER SHR is a dimming device for ESA UV-2 flame detectors, in permanent burner operation applications.

The device is installed between the burner and the flame detector, so that it interrupts the light radiation to the sensor when it is activated. Consequently, ESA SHUTTER SHR allows ESA burner control devices to periodically check the functionality of the ESA UV-2 flame detectors. ESA SHUTTER SHR has an aluminum body particularly suitable for industrial applications, allowing application in the immediate vicinity of the burner.

## APPLICATIONS

- Dimming of ESA UV-2 flame detectors for periodic checks of the sensor, for permanent operation.
- Time check of the flame sensor with the burner kept on.

## CHARACTERISTICS

- Supply voltage: 115 or 230Vac, +10÷-15%
- Power frequency: 50÷60 Hz
- Power supply type: phase-to-neutral, not suitable for phase-to-phase
- Neutral type is suitable both for systems with neutral to ground as well as systems with neutral not to ground.
- Absorption: 51 VA max
- Working temperature: -20÷60 °C
- Storage temperature: -20÷80 °C
- Wiring: quick connector with rectifier
- Electric connector cable input: female threaded inputs M20x1.5
- Mass: 900g
- Protection degree: IP65
- Mounting position: any, but not upside coil down
- Coil direction: 360°
- Working environment: Not suitable for explosive or corrosive environments
- Body material: aluminum, brass, steel
- Body fixing: Male-female 3/4" - DN20 thread
- KIT SHUTTER Burner connection thread: Male 3/4" DN20 or 1/2" DN15

**NB: the ESA UV-2 flame detector is excluded from the supply of ESA SHUTTER SHR. For more information about ESA UV-2 see the data sheet nr. E7001.**

ESA SHUTTER SHR



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ESA SHUTTER SHR  
assembled with ESA UV-2



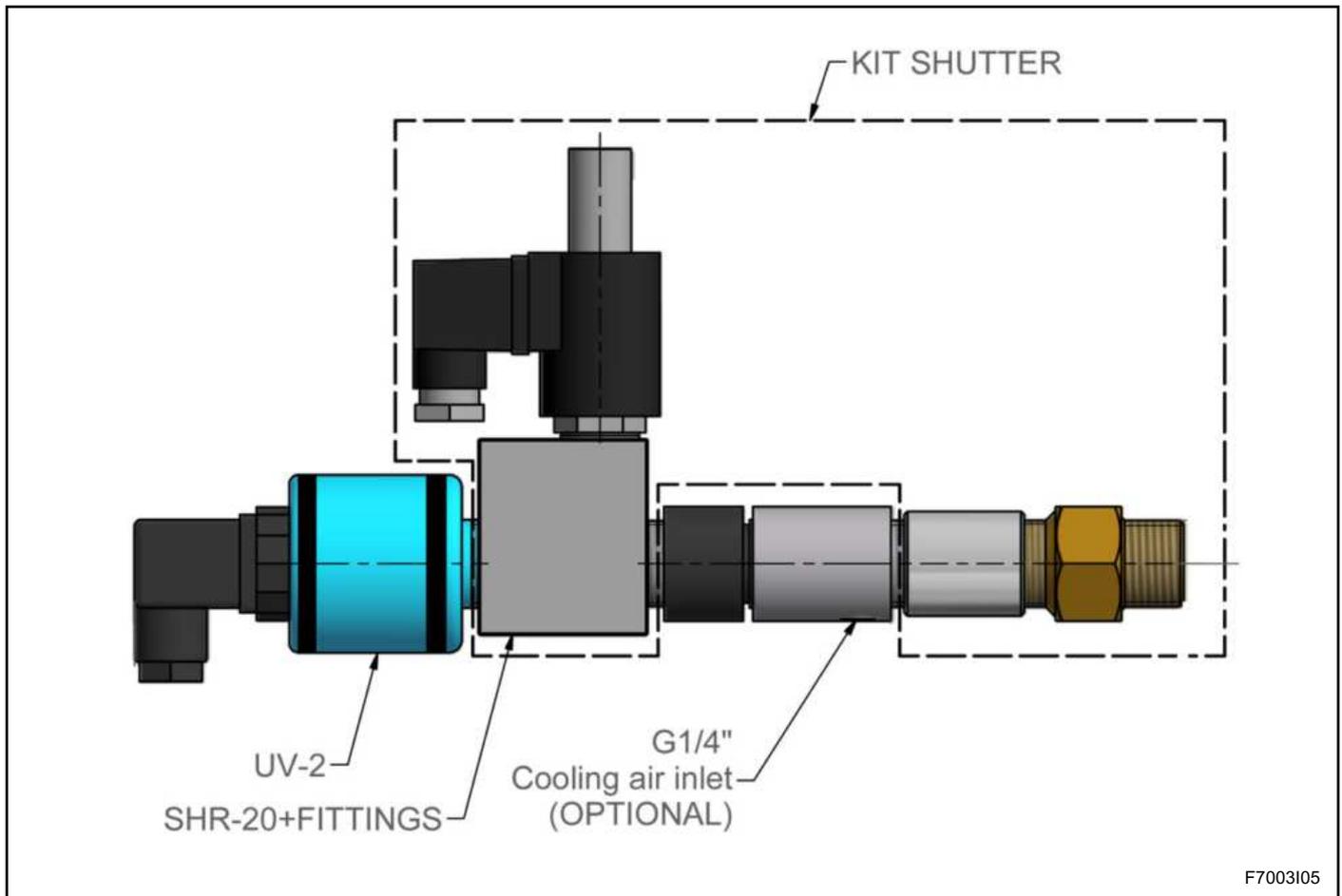
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## DESCRIPTION

ESA SHUTTER SHR has an internal shutter that has the purpose of stopping light radiation from entering the ESA UV-2 ultraviolet flame detectors. The shutter is normally open type and is closed following the coil command. By interposing ESA SHUTTER SHR between the burner and the ultraviolet flame sensor, it is possible to perform periodic checks of the flame sensor required for burners

with permanent operation.

The device is supplied with a kit of fittings that allow easy installation on the burner: ESA SHUTTER SHR must be interposed between the sensor and the insulating fittings of ESA UV-2, then a quick coupling allows fixing to the burner without having to rotate everything.



## FUNCTIONING

ESA SHUTTER SHR is an electric actuator controlled by the burner control organ. When the command is present, the shutter closes by dimming the ESA UV-2 sensor, while keeping the burner always on.

The burner control device, to check the correct functioning of the flame sensor, periodically commands ESA SHUTTER SHR and checks the sensor response in the pre-

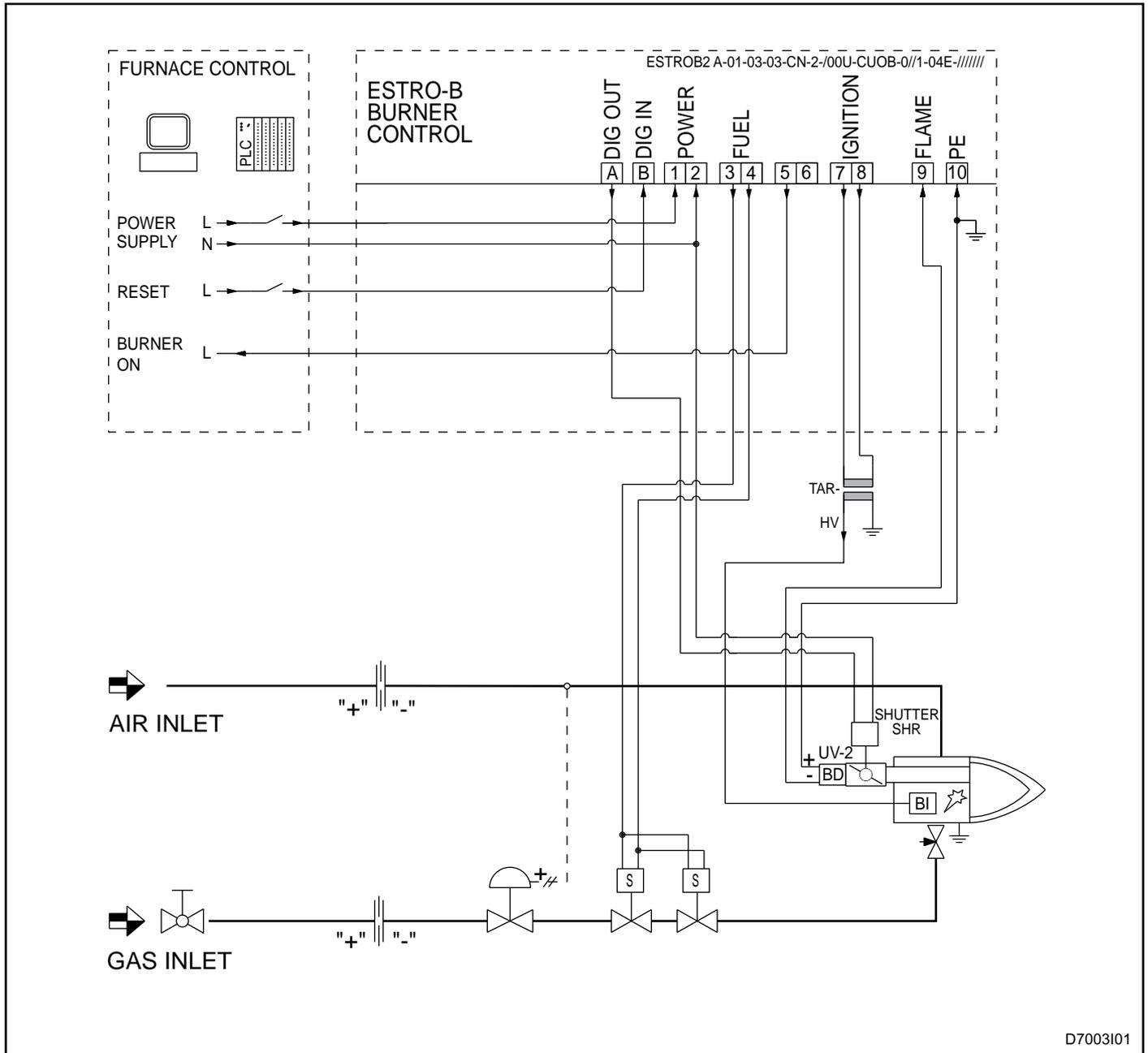
established times. With the positive result of the test, the burner is kept on while in case of a negative result the burner stops for safety purposes.

ESA SHUTTER SHR works in combination with ESA ESTRO or ESA REFLAM-H series burner flame control devices or flame detectors.

**EXAMPLE OF APPLICATION 1 - ESA SHUTTER SHR**

ESA SHUTTER SHR is directly controlled by the digital output of the burner control, appropriately configured for this purpose.  
In order to activate the periodic control function of the

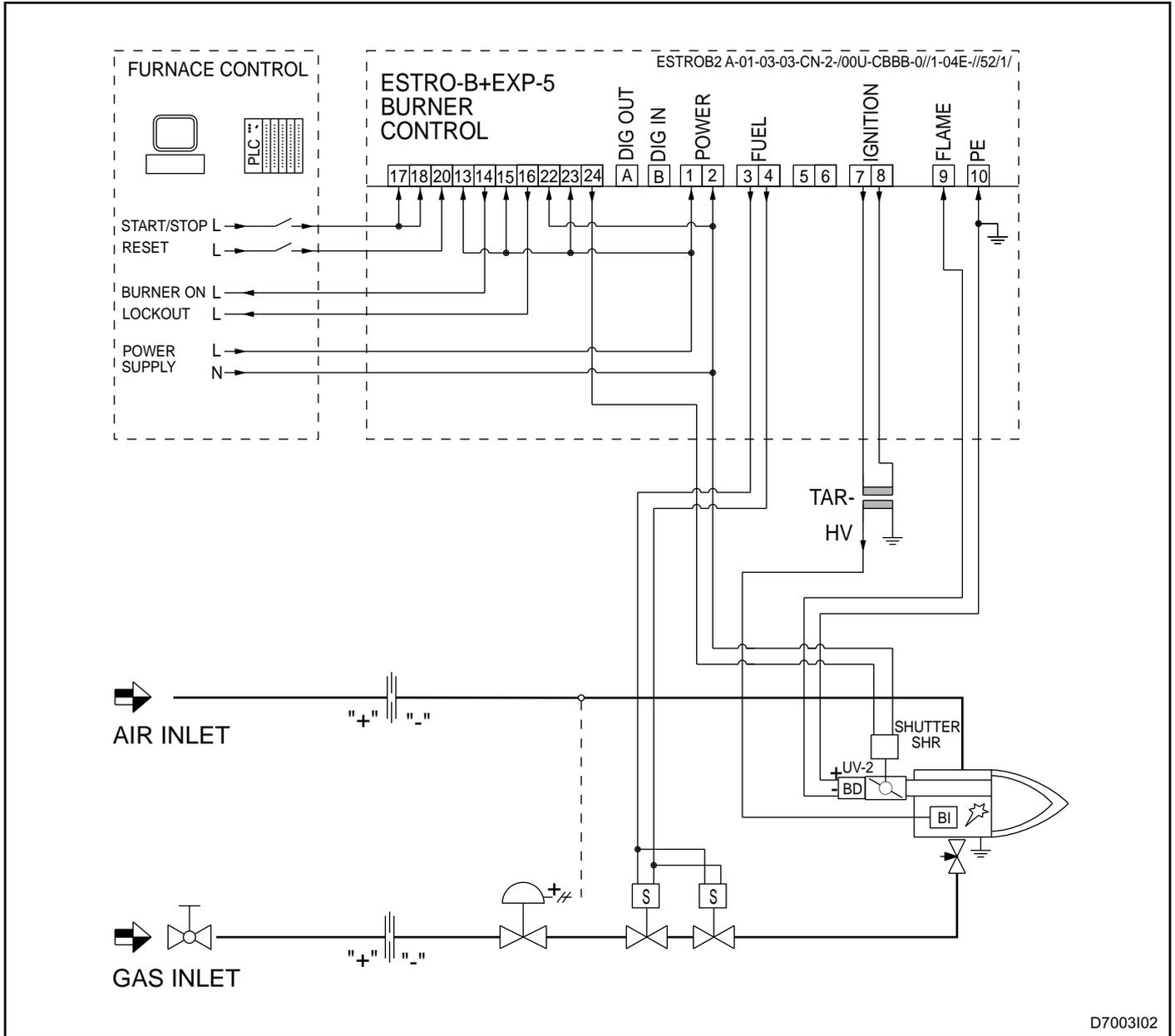
ESA UV-2 flame sensor, in the burner control the type of operation "Permanent with UV and shutter" must be selected.



## EXAMPLE OF APPLICATION 2 - ESA SHUTTER SHR

ESA SHUTTER SHR is directly controlled by the specific output of the EXP-5 MODE1 expansion installed in the burner control, leaving the digital output available for other functions.

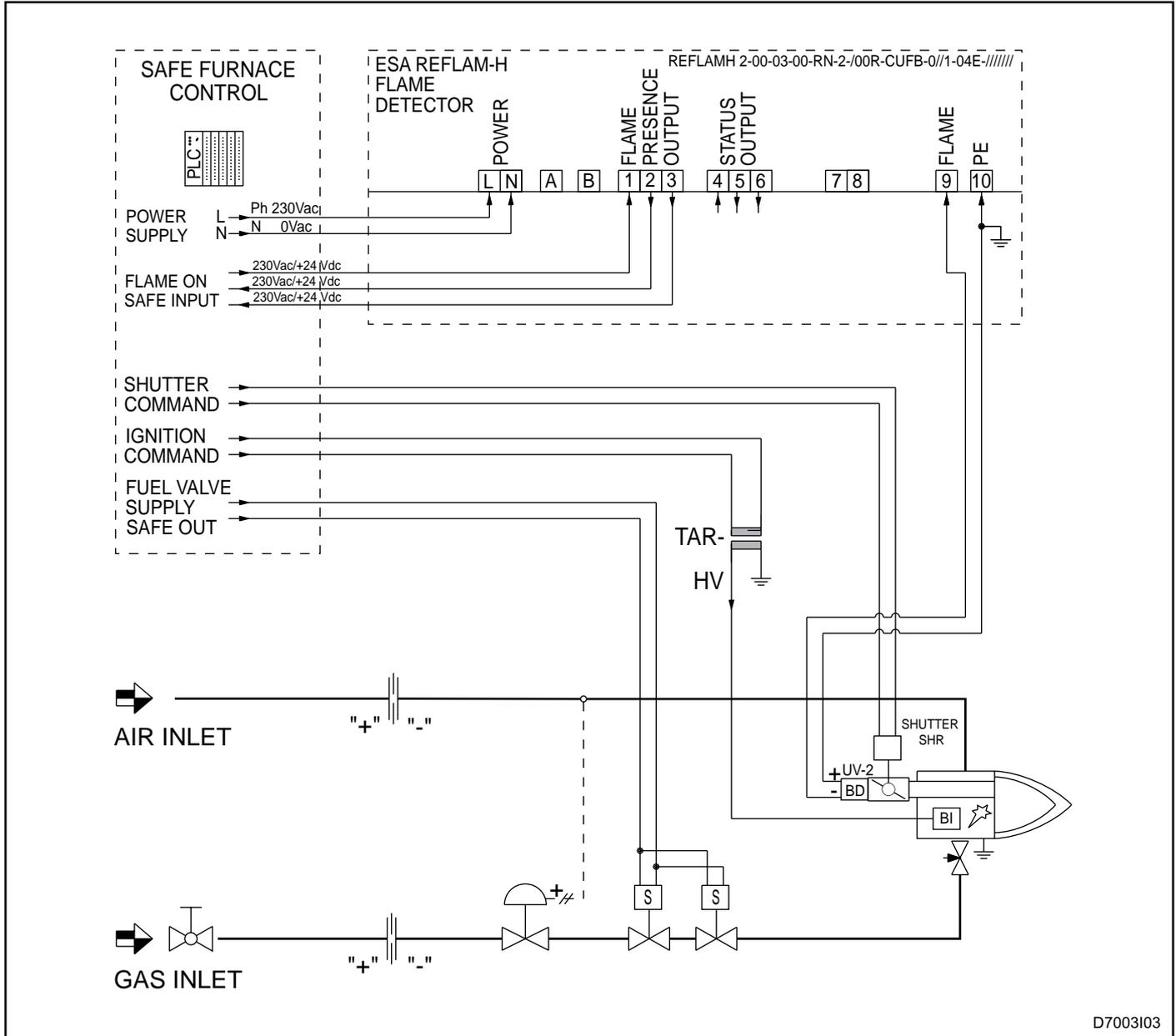
In order to activate the periodic control function of the ESA UV-2 flame sensor, in the burner control the type of operation "Permanent with UV and shutter" must be selected.



**EXAMPLE OF APPLICATION 3 - ESA SHUTTER SHR**

ESA SHUTTER SHR is directly managed by the central safety unit which, when desired, activates it to check the response of the flame sensor and the ESA REFLAM-H flame presence detector, ensuring that the flame presence detection chain functions correctly.

In this case the periodic control function of the flame sensor is assigned to the central safety unit, so it must not be enabled in the ESA REFLAM-H flame presence detector.



## WARNINGS

For correct use of the device, follow the warnings below:

■ When choosing the model, supply voltage and type of command must respond to the application. Before installing the device, make sure that the features conform with the definition.

■ ESA SHUTTER SHR is meant to be electrically connected in a permanent and fixed manner. The reverse/neutral connection may compromise the safety of the system. The device works with a quick connector with rectifier, so the use of other connectors will alter its operation.

■ Check the correct installation and connection after installation. Before applying power to the device ensure that the voltage, frequency and control signals are correct.

■ ESA SHUTTER SHR moves the shutter only when the supply voltage is present. Operate on the actuator only in the absence of supply voltage.

■ During the installation phases, screw the device by levering the aluminum body using specific tools. Avoid using the electric coil in any way, otherwise the device will be damaged.

■ In case of malfunctioning ESA SHUTTER SHR must be sent to the manufacturer for repair. Any modifications or repairs made by a third party automatically void the warranty and compromise the security of the application.

■ ESA SHUTTER SHR is an electric actuator used by the protection system for periodic checks. Failure to operate causes the burner to stop safely because the burner control device detects the fault and intercepts the fuel with specific safety outputs.

## INSTALLATIONS

For correct installation follow the instructions below:

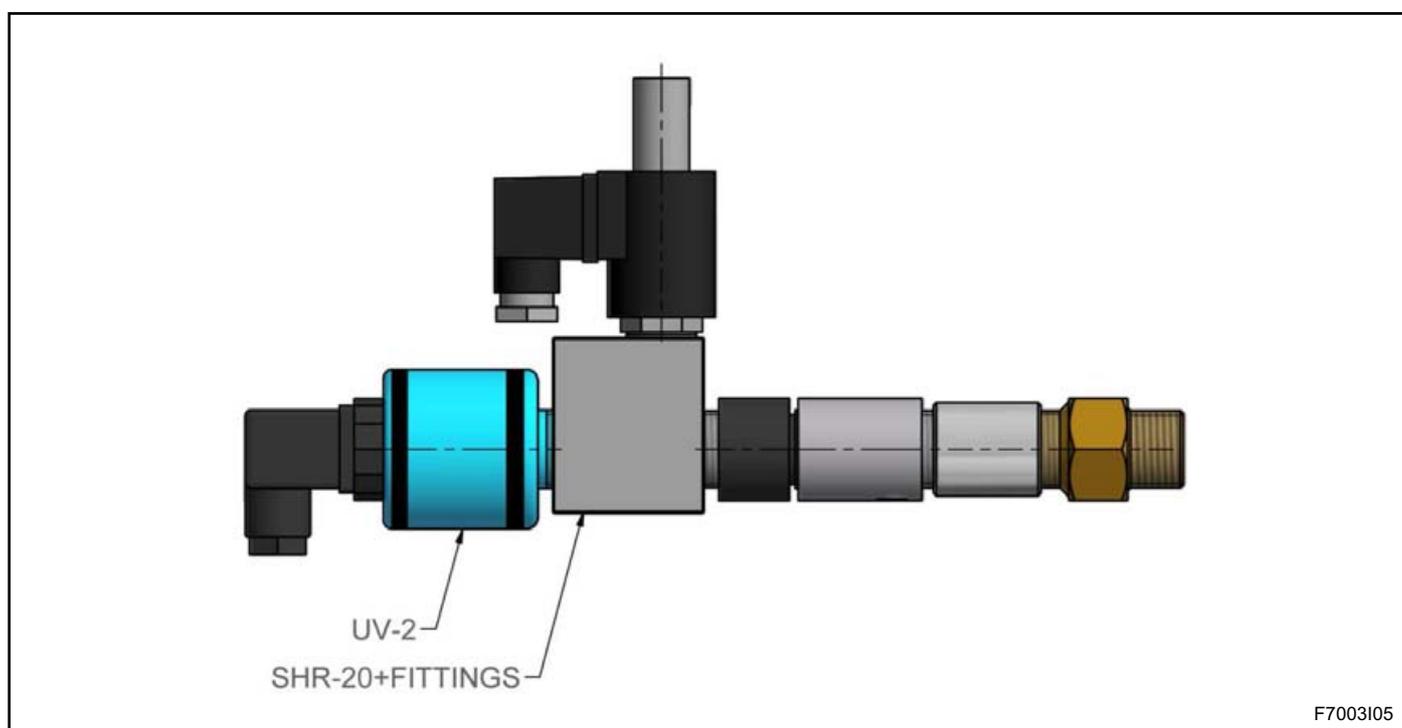
### MOUNTING

- 1 - The installation must be performed by qualified personnel in compliance with the regulations in force at the time and place of installation.
- 2 - Avoid placing ESA SHUTTER SHR 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.
- 3 - ESA SHUTTER SHR can be installed in any position, except upsidedown. Do not limit in any way the area sur-

rounding the actuator, but ensure adequate ventilation space to prevent overheating of the device, in addition to making maintenance operations easier.

4 - Disassemble the cooling insulation fitting from the ESA UV-2 flame detector. Interpose the ESA SHUTTER SHR device between the two elements, screwing it on with a discrete force to the insulating connection. The flame detector must be screwed into the device without exerting too much force.

5 - Mount the sleeve and the swivel joint on the insulating fitting, after which screw everything on the burner. Use the swivel joint to position the ESA SHUTTER SHR, with the coil facing upwards or sideways.



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### ELECTRICAL CONNECTION

- 1 - The connection must be made on the quick connector with rectifier that is supplied with the device.
- 2 - Use the cable gland mounted in the connector or replace it with other cable glands or sheaths that guarantee a degree of protection equal to or not lower than IP40. For systems used in open air the degree of protection shall be equal to IP54. The degree of protection can also be provided by the container in which the device is inserted.
- 3 - Verify that the actuator is compatible with the control system, for both the supply voltage as well as type of command.
- 4 - The device control must come from the burner control or from a central safety unit, depending on how the periodic verification takes place.
- 5 - During the electrical connection refer to the technical documentation, respecting the polarity between phase and neutral. The terminals for the electrical connections are

screw type and can accept wires with sections from 0.5 to 1.5mm<sup>2</sup> and the choice of conductors and their location must be suitable for the application.

6 - 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.

7 - Always make sure the protective earth is connected to the appropriate terminals. Failure to connect the device to the protective earth, causes a dangerous condition for the operator. For the connection of conductors of protective earth use the screw provided in the connector of the device.

8 - After connection, make sure that the wires do not interfere with the components inside the connector. Close the connector cover, checking the proper positioning of the gasket and that the wires do not remain pressed between the cover and internal devices.

## REGULATION AND SETTING

ESA SHUTTER SHR does not need a specific calibration as it does not have any regulation device. Following the first ignition of the burner, after the expect-

ted interval, verify that ESA SHUTTER SHR correctly dims the flame sensor ESA UV-2.

## GENERAL MAINTENANCE PLAN

Check	Type	Advised time	Operation
Actuator closing	O	periodic	Verify that the upper cylindrical plug is always closed to prevent dirt, dust and moisture from entering and damaging the device.
Connection cable integrity	O	half-yearly	Verify the integrity of the outer insulation and the absence of abrasion or signs of overheating of the conductors.
Actuator fixing	O	half-yearly	Check the actuator is properly fixed with the coil upwards or sideways.
Actuator response	O	yearly	Check that the burner control device periodically controls the actuator.
Actuator replacement	E	/	Replacement is necessary if the device is no longer functioning.

NOTES:

Key: O = ordinary / E = extraordinary

## ORDINARY MAINTENANCE

For proper maintenance of ESA SHUTTER SHR carefully follow the instructions below. Before performing maneuvers with the system on, ensure that the process and operator safety are not compromised and possibly inspect with the system off.

### ACTUATORS CLOSING CHECK

■ The closure of the actuator is fundamental for its correct functioning as it avoids the entry of agents that could compromise the operation. Check that the upper cylindrical plug adheres to the coil so that the gasket tightness is efficient. If there is dirt on the inside, first disconnect the electric supply from the device and then eliminate the dirt by blowing with compressed air. Do not use any mechanical means for this operation.

### CABLE INTEGRITY CHECK

■ The integrity of the electric cables can be checked

visually. If it is necessary to work on the cables for inspection, if not completely visible, disconnect the power to the device before performing any type of operation. Before replacing the actuator, make sure that it is indeed the actuator causing the malfunctioning.

### ACTUATOR FIXING

■ The position of the actuator can be checked visually, and it is essential that it is designed to prevent malfunctioning that may lead to inadvertent burner shutdowns.

### ACTUATOR RESPONSE

■ The check of the actuator is carried out with the burner on, periodically checking (approximately every hour) that the actuator is activated by the burner control and at the same time the cancellation of the flame signal is shown for an instant.

## EXTRAORDINARY MAINTENANCE

For proper maintenance of ESA SHUTTER SHR, strictly follow the instructions to be carried out with the system turned off.

### ACTUATOR REPLACEMENT

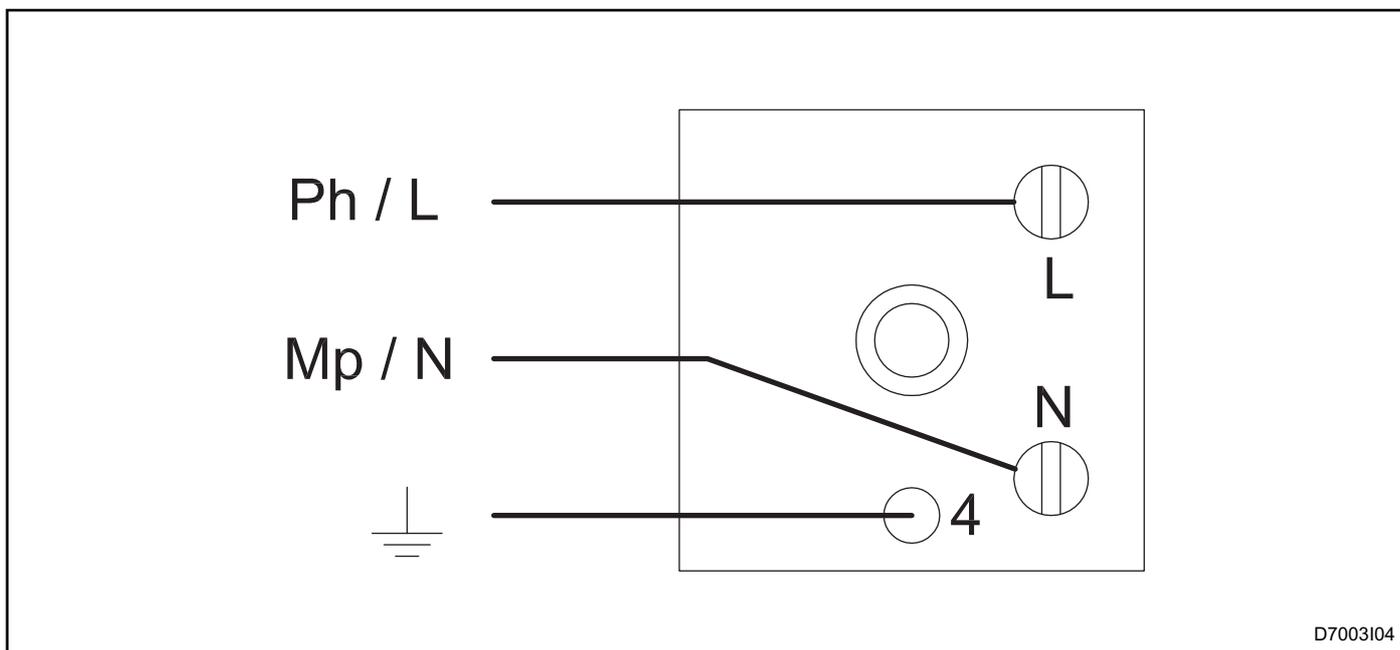
**1** - Make sure that the actuator is indeed the cause for improper operation or malfunctioning and that you have an identical spare actuator to replace the faulty one, checking the data on the identity label.

**2** - The replacement of the device must also include the replacement of the electrical connector.

**3** - Switch off the power supply, remove the connector cover and then disconnect the electrical connections from the terminal board. Extract the conductors from the housing taking care not to damage them.

**4** - Replace the actuator with the new part by repeating all the steps indicated in the "INSTALLATION" and "REGULATION & SETTINGS" sections.

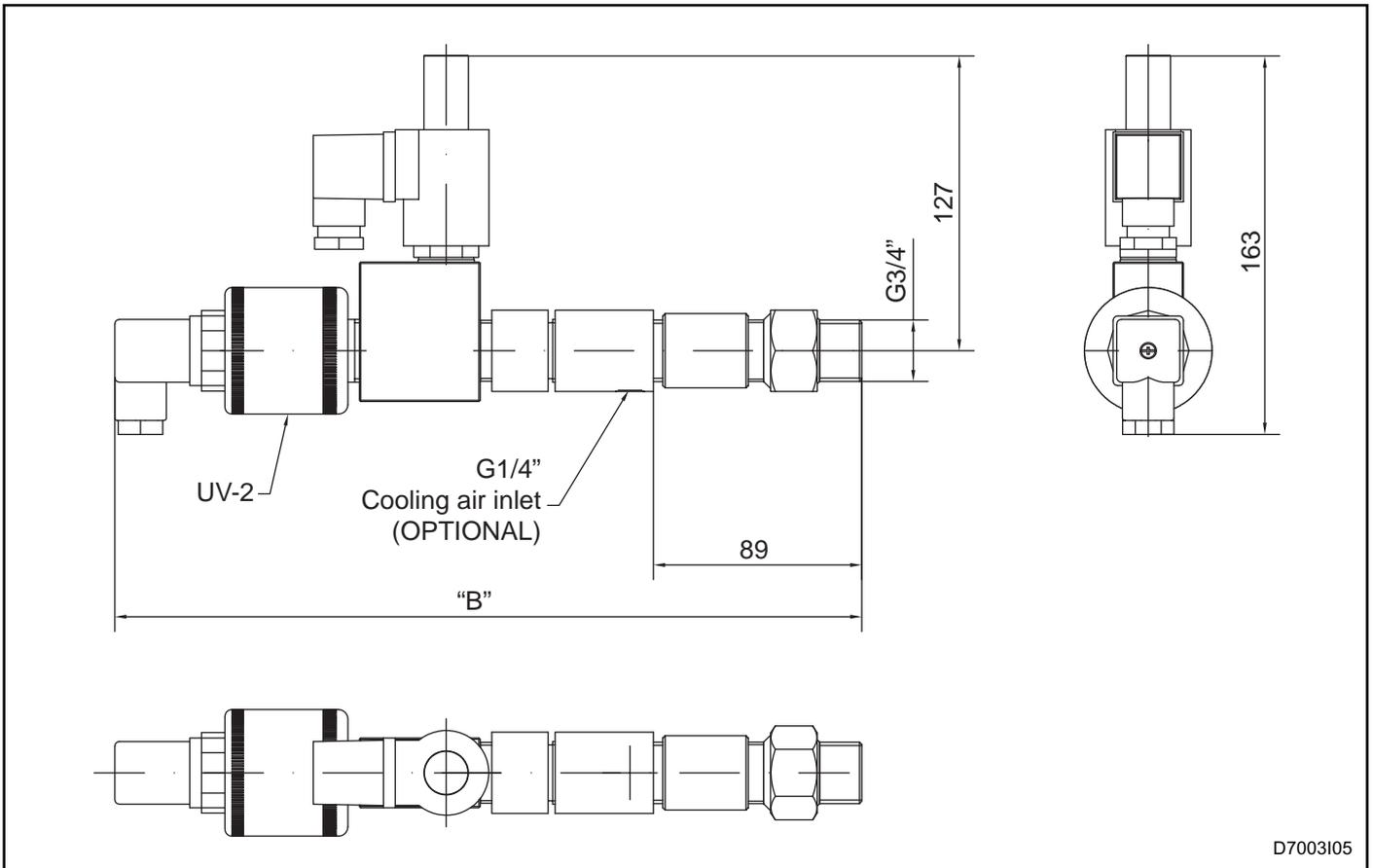
## ELECTRIC CONNECTIONS - ESA SHUTTER SHR



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Pos.	Description	Pos.	Description
L	Power supply phase	4	PE protection ground
N	Power supply neutral		

**OVERALL DIMENSIONS - ESA SHUTTER SHR**



B mm	Burner connection thread
319	DN20 3/4" GAS THREAD
302	DN15 1/2" GAS THREAD

**ORDERING CODE - ESA SHUTTER SHR**

ESA SHUTTER SHR  -  -

ESA SHUTTER SHR BODY THREAD 01	
DN20 3/4" gas thread	DN20

03 BURNER CONNECTION THREAD KIT	
DN20 3/4" gas thread	G 3/4"
DN15 1/2" gas thread	G 1/2"

SUPPLY VOLTAGE 02	
230Vac	230V
115Vac	115V