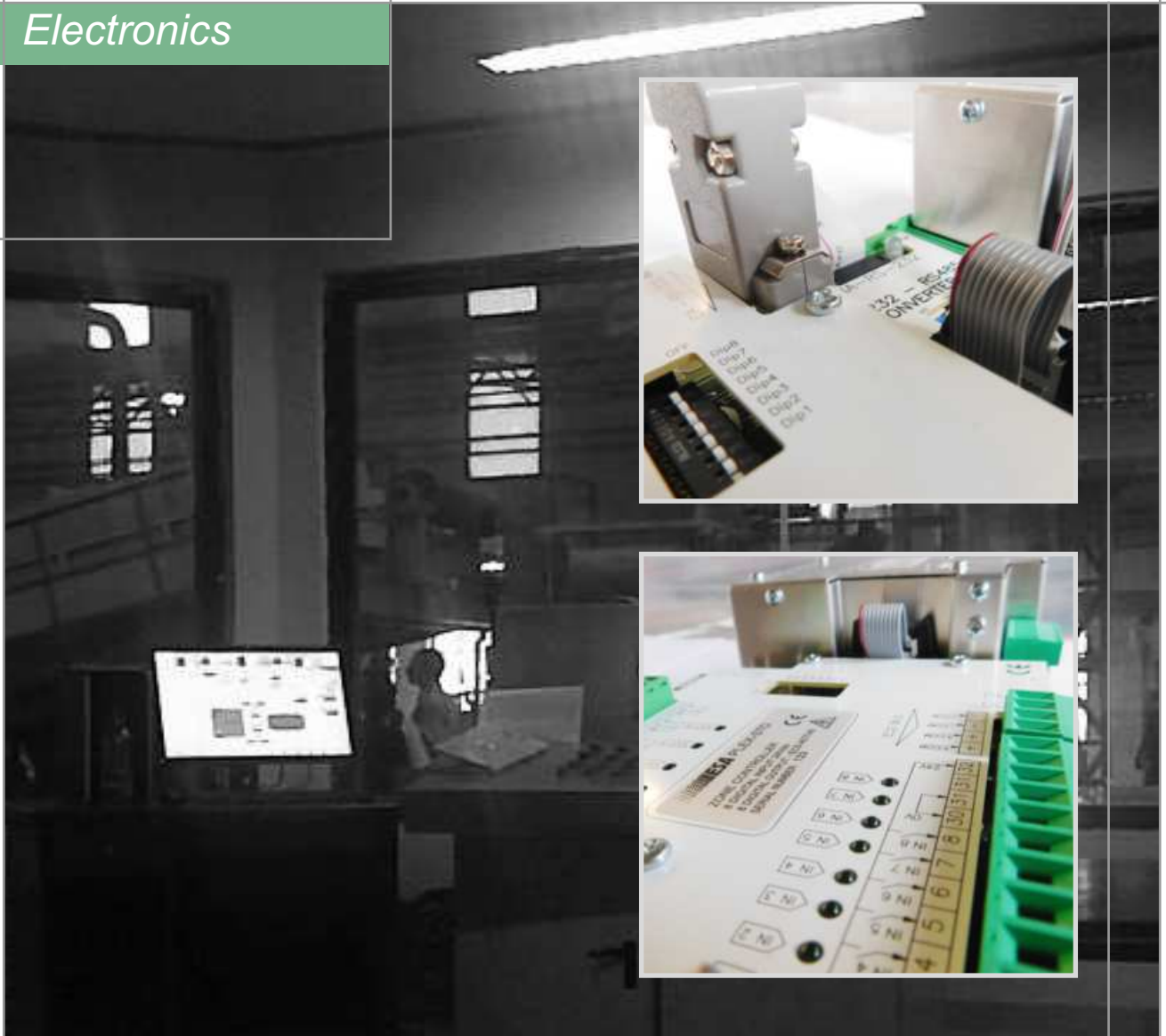**Electronics**

Serial converter for Esa Estro and Esa Reflam

ESA PLEX-COM1 (E7104 rev. 03 - 03/11/2015)

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-COM1 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).

The products conform to the requests for the Euroasian market (Russia, Belarus and Kazakhstan).
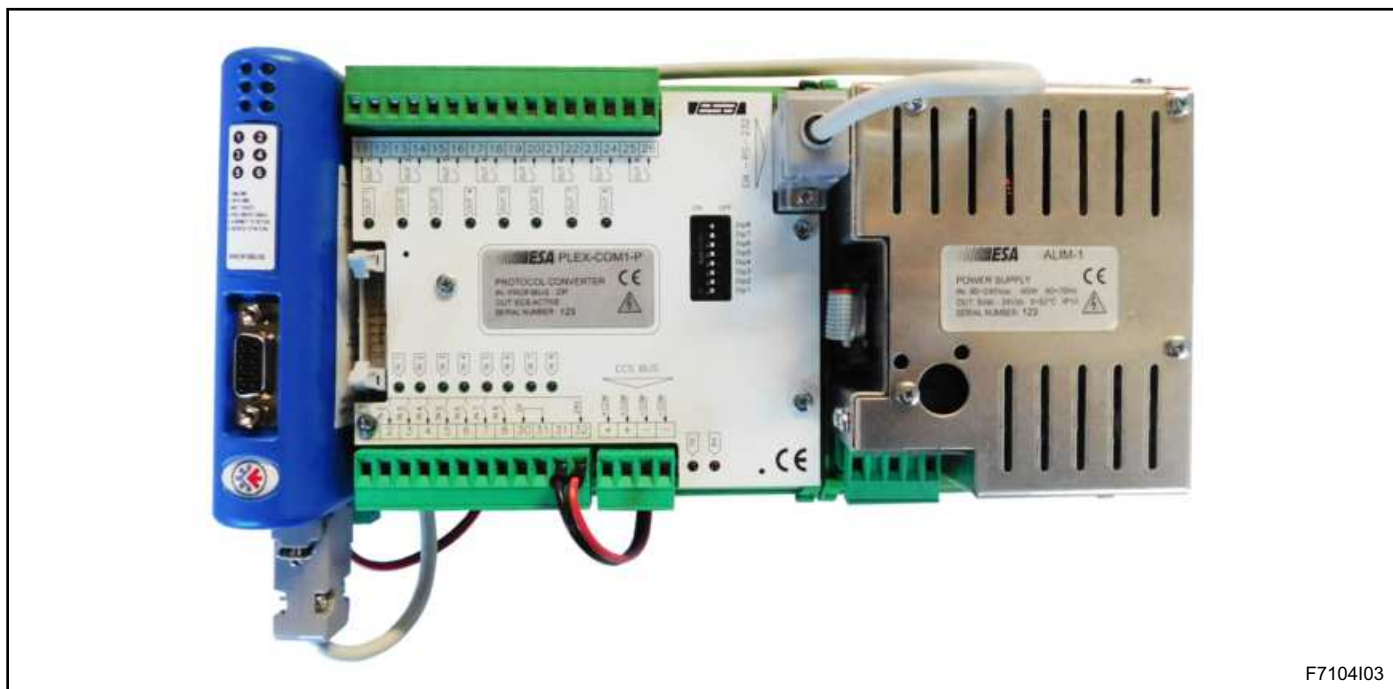
ASSISTANCE/CONTACTS:

F7104I03

ESA PLEX-COM1 is a serial protocol converter used to suervise the ESA ESTRO flame control device or ESA REFLAM flame presence indicators. The card allows any control or supervising comand (PLC, PC, DCS etc...) to comand and receive informationon the burner state via the Modbus RT serial protocol in a quick and versatile manner.

APPLICATIONS

■ Intelligent serial protocol converter for management ESA ESTRO flame controls and ESA REFLAM flame presence indicators

■ Remote serial communication controller for ESA ESTRO flame controls

■ Serial protocol converter with EIA-RS-232 or EIA-RS-485 interface from Modbus-RTU to ECS for ESA ESTRO or ESA REFLAM

■ Serial protocol converter from Profibus DP® to ECS for ESA ESTRO or ESA REFLAM

■ Serial protocol converter from DeviceNet® to ECS for ESA ESTRO or ESA REFLAM

■ Serial protocol converter from Ethernet® to ECS for ESA ESTRO or ESA REFLAM

■ Serial protocol converter from Profinet® to ECS for ESA ESTRO or ESA REFLAM.

CHARACTERISTICS

GENERAL:

■ Supply voltage: 90÷240 Vac
■ Supply frequency: 40÷70 Hz
■ Max. absorption: 40 VA

■ Operating temperature: 0÷50 °C

■ Storage temperature: -10÷70 °C

■ Fixing: on 35mm DIN guide (EN50022)

■ Mounting position: any

■ Protection degree: IP10

■ Atmospheres: not suitable for use in explosive or corrosive atmospheres

■ Dimensions PLEX-COM1-M232: 220X125 H80mm

■ Dimensions PLEX-COM1-M485: 270X125 H80mm

■ Dimensions ESA PLEX-COM1-PDP/DNT/ETH/PNT: 250X160 H80mm

■ Weight ESA PLEX-COM1-M232: 900g
■ Weight ESA PLEX-COM1-M485: 1000g
■ Weight ESA PLEX-COM1-PDP/DNT/ETH/PNT: 1050g
■ Digital input voltage: 24Vdc
■ Digital input length line: max 5 m
■ Maximum output capacity: 2A @ 230V cosφ=1
1A @ 230V cosφ=0.5
■ Length of RS-232 serial line: max 15 m
■ Length of RS-485 serial line: max 1000 m
■ Units connectable to RS-232 serial line: only 1
■ Units connectable to RS-485 serial line: max 32
■ Data receiving speed for PLEX-COM1-M232/M485: 9600 baud
■ Data receiving speed for PLEX-COM1-PDP/DNT/ETH/PNT: see paragraphs below
■ Number of controllable burners: max 100
■ ECS fieldbus voltage: max 25Vdc
■ ECS fieldbus data transmission speed: max 9600 baud
■ Length ECS line: max 200m with ECS cable or busway
■ Units connectable to ECS active output: max 70 4800 baud, max 60 9600 baud

DESCRIPTION

ESA PLEX-COM1 communicates with the supervisor via a EIA-RS-232 or EIA-RS-485 bus and, by taking advantage of field converters, it manages the flame controls directly using other communication protocols, such as Profibus DP®, DeviceNet®, Ethernet®, PROFINET® etc.... The speed of communication with the supervisor is configurable at will and may also differ from the ECS bus communication speed to the flame controls. ESA PLEX-COM1 is main function is to convert flag-bit controls into serial controls for the devices and, vice-versa, to facilitate interpretation of the status of the flame controls. ESA PLEX-COM1 continuously communicates with the flame control devices sending the commands received from the supervisor and receiving the status of the burners. The device can control up to one hundred burners, while the number of flame controls that can be connected to the ECS bus output depends on the set speed of communication. If this exceeds the specific limit, an ECS signal repeater will be needed (ESA ECS DRIVER). For every burner ESA PLEX-COM1 has two bytes or two words (depending on the set-up): one for reading and one for writing. Flag-bit management lets you perform all flame control operations, such as ignition, stop, switching to manual mode or lockout. Flag-bit also lets you detect the status of the flame controls, such as ignited burner, burner off, burner in alarm mode, etc...

ESA PLEX-COM1 also manages the following functions:

- Automatic burner lockout.
- Filtering of any interference in the ECS communication bus.
- Control of the locally controlled burners for maintenance, with the option of switching these off after a configurable time-limit (timeout).
- Management of the sequential switching-off of the burners for cyclical flame control efficiency tests, with the possibility of setting the shut down repition time and the warning time for the test start supervisor.

The ESA PLEX-COM1 device is fitted with a set-up software so you can adapt it to suit all burner and system types equipped with the ESA ESTRO flame controls or ESA REFLAM flame indicators. This software lets you personalise all the ESA PLEX-COM1 functions, including the flame control interface address set-up, ECS bus communication speed selection and the device/supervisor interface address set-up. The power section, consisting of a universal ESA ALIM1 (switching) power supply, accepts a wide range of voltages to ensure that the device works in hostile environments. ESA PLEX-COM1 is supplied with a DIN rail connector for its installation in electric panels and the connections are made with quick extraction connectors for easier maintenance and wiring operations. The device has a pair of LEDs for each input and output, indicating the status, and two LEDs to indicate the data flow direction on the ECS line: one lights up when the interface is transmitting and the other when it is receiving.

DISPLAY SECTION

ESA PLEX-COM1 is fitted with diagnostic LEDS that are activated to indicate the current status of the device and any malfunctioning.

Below there are all teh possible statuses with their corrisponding indications.

DEVICE	LED NAME	COLOR	DESCRIPTION
ESA PLEX-COM1	OUT-1	GREEN	Indication of alarm on ECS bus: **off** - ECS bus operating normally (output deactivated) **on steady** - anomaly on ECS bus due to short-circuits or polarity reversal (output active)
ESA PLEX-COM1	OUT-8	GREEN	Indication of ESA PLEX-COM1 device status: **on steady** - device fully operational (output active) **intermittent** - device in configuration mode (output intermittent) **off** - device not operating or not powered (output deactivated)
ESA PLEX-COM1	TX	RED	Indication of data transmission on ECS bus: **flashing rapidly** - transmission of commands to the flame controls; each flash corresponds to a communication **flashing slowly** - transmission of cumulative commands to the flame controls, or no answer from ECS bus **off** - device is not transmitting any command (not powered or in configuration) **on steady** - device has a damaged transmission stage
ESA PLEX-COM1	RX	RED	Indication of data reception from ECS bus: **flashing** - reception of status from flame controls; each flash corresponds to a communication **off** - device is not receiving any status **on steady** - anomaly on ECS bus due to short-circuits or polarity reversal
ESA ALIM-1	-	GREEN	Indication of 24 V DC output presence: **on steady** - output present **off** - output absent
ESA ALIM-1	-	RED	Indication of 5 V DC output presence: **on steady** - output present **off** - output absent
Converter RS-232/485	RS-232	-	Indication of communication on RS-232 port: **flashing green** - reception of communications from RS-232 line; each flash corresponds to a communication. **flashing red** - transmission of communications on RS-232 line; each flash corresponds to a communication. **on steady red** - polarity reversal of RS485 connection **on steady green** - slave unit not connected. **off** - no communication or not powered.
Converter RS-232/485	RS-485	-	Indication of communication on RS-485 port: **flashing green** - transmission of communications from RS-485 line; each flash corresponds to a communication. **flashing red** - reception of communications on RS-485 line; each flash corresponds to a communication. **on steady green** - polarity reversal of RS485 connection. **on steady red** - slave unit not connected. **off** - no communication or not powered.

INDICATION STATUS

DEVICE	LED NAME	COLOR	DESCRIPTION
HMS Communicator Gateway	1	-	Indication of line status to supervisor refer to Gateway documentation
HMS Communicator Gateway	2	-	Indication of line status to supervisor refer to Gateway documentation
HMS Communicator Gateway	3	-	Indication of line status to supervisor refer to Gateway documentation
HMS Communicator Gateway	4	-	Indication of line status to supervisor refer to Gateway documentation
HMS Communicator Gateway	5	-	Indication of Modbus-RTU line status to ESA PLEX-COM1 refer to Gateway documentation
HMS Communicator Gateway	6	-	Indication of Gateway configuration status refer to Gateway documentation

During operation scheme the ESA PLEX-COM1 continuously transmits the comands to the flame control devices and receives their state so every time the Tx led flashes there must be a corresponding flashing Rx led. If the device sends cumulative comands to the burners in the presence of anomalies, ESA PLEX-COM1 does not receive any reply and only displays the slow flashing of the Tx led.

This indication occurs in the following conditions:
- activation of the general stop command of all the burners;
- com-timeout alarm present towards the supervisor due to missing requests or connection interrupted;
- connection interrupted on the ECS bus;
- address and baudrate configuration not corresponding between device and flame control;
- flame control device contemplated but not installed.

SYSTEM SET-UP

ESA PLEX-COM1 is available in various versions that can be selected according to the plant needs. The versions differ from each other according to the type of comunication going towards the supervisor and are the the following:

- ESA PLEX-COM1-M232: with Modbus-RTU communication via EIA-RS-232 interface
- ESA PLEX-COM1-M485: with Modbus-RTU communication via EIA-RS- 485 interface
- ESA PLEX-COM1-PDP: with Profibus® communication
- ESA PLEX-COM1-DNT: with DeviceNet® communication
- ESA PLEX-COM1-ETH: with Ethernet® communication
- ESA PLEX-COM1-PNT: with Profinet® communication

The different versions of the card maintain the same control logic as well as the monitoring capacity of the flame control device. ESA PLEX-COM1 allows different configurations of the burner control system and the choice depends on the numer of burners to be controlled and on the type of comunication contemplated on the supervisor. Below a few plant configuration possibilities have been indicated:

■ **Type A**: using an M232 ESA PLEX-COM1 device you can control up to seventy burners with the EIA-RS-232 bus. In this case there must be just one devices and should be placed near the supervisor due to the EIS RS-232 bus limit. If up to one hundred burners must be controlled, or if the ECS length exceeds the limit, it is necessary to install a n ECS signal repeater as indicated in Type C.

■ **Type B**: using one or more ESA PLEX-COM-M485 devices you can control up to one hundred and forty bruenrs with the EIS-RS-485 bus. In this case there can be just one device or more than one. and can be placed near the furnace. With this configuration the serial control line can come directly from the superivisor or from a Gateway conversion from the field bus (Profibus®, DeviceNet®, etc...) to Modbus-RTU on the RS-485 line. If up to one hundred burners per ESA PLEX COM1 device are controlled, or if the ECS bus length exceeds the limit, it is necessary to install an ECS signal repeater as indicated in Type C.

■ **Type C**: using an ESA PLEX-COM1-PDP/DNT/ETH/PNT device you can manage up to one hudnred burners from a field bus (Profibus®, DeviceNet®, etc...). In this case you can use just one device or several and these can be placed near the furnace. The serial control line is connected to a Gateway, which is in turn connected to the ESA PLEX-COM1 device via an incorporated connection in the EIA RS-232. An ECS signal repeater (ESA ECS-DRIVER-D) is fitted to let you manage up to 100 burners.

ESA PYRONICS INTERNATIONAL

SIAD Group

SYSTEM SET-UP
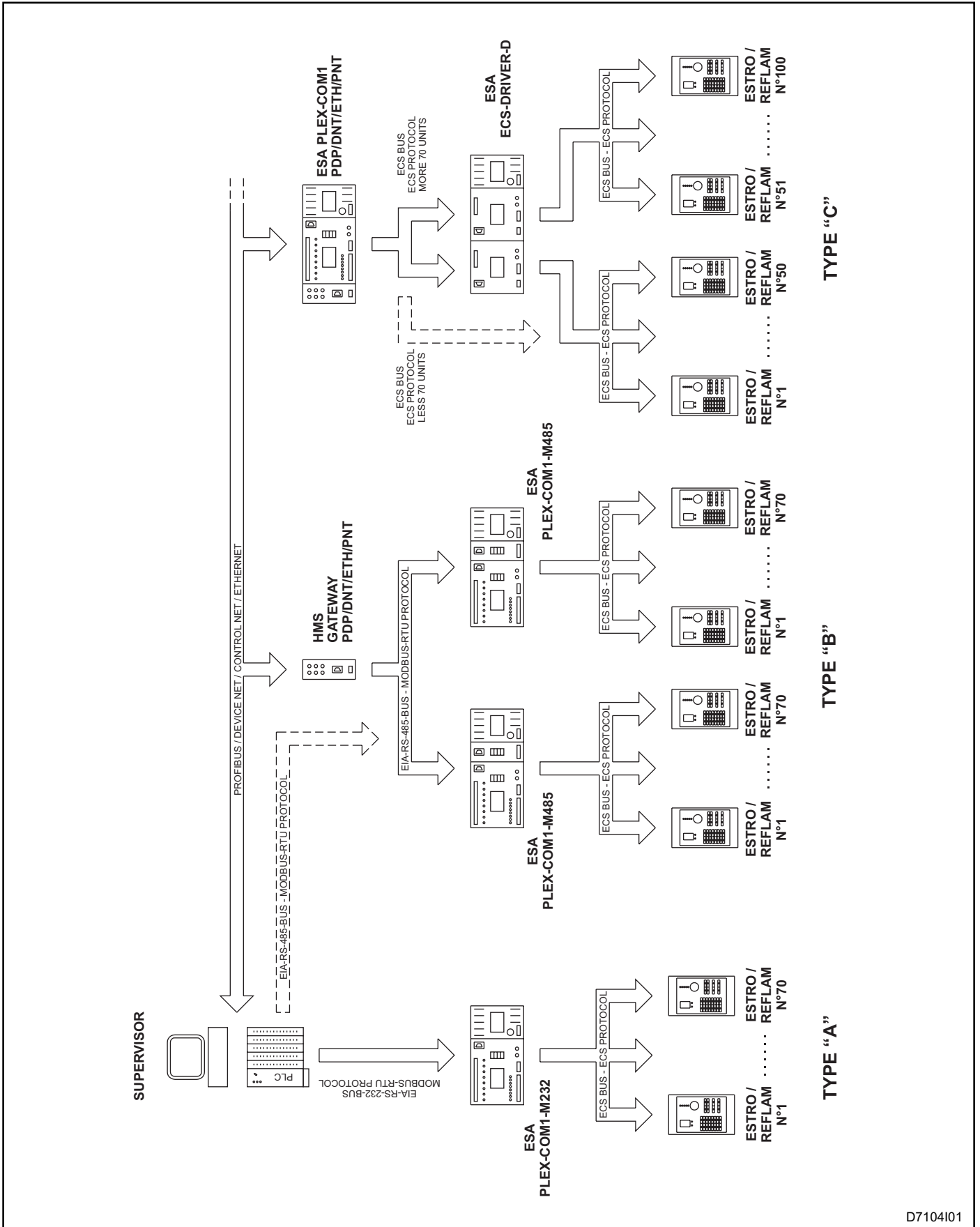
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FUNCTIONING

ESA PLEX-COM1 is a Modbus-RTU protocol converter using the ECS protocol with additional functions for flame control management. The main functions of the device are described in the paragraphs below.

SERIAL COMMUNICATION

Communication towards teh supervisor or gateway takes place with Modbus-RTU protocol where ESA PLEX-COM1 is a slave that responds only after haveing recieved a request from the master, The data transmitted are 8 bits, no parity, 1 or 2 stop biys and the baude rate is 9600 baudes. The communication is Half Duplex type and the minimum scan rate is 100ms. Please note that all the devices connected to the same network must have different addresses. ESA PLEX-COM1 accepts the following requests from the sueprvisor:

MODBUS-RTU FUNCTION CODE		ENQUIRY TYPE	N° WORDS MAX FOR COMMUNICATION	N° BYTES MAX FOR COMMUNICATION
03 (dec)	03 (hex)	reading of n... words	25	50
06 (dec)	06 (hex)	writing of 1 word	1	2
16 (dec)	10 (hex)	writing of n... words	25	50

ESA PLEX-COM1 has two memory tracks per burner: one for writing the command and one for reading the status, plus two further general memory tracks for device management. Depending on the data format selected, these memory tracks can be either word or byte tracks, as explained in the paragraphs below. Communication to the flame controls connected to the ECS output is cyclical: ESA PLEX-COM1 continuously updates the command and enquiries the status of each instrument.

This type of operation is only interrupted if there are specific general commands or active alarms, such as the time-out for communication to the supervisor or problems with the ECS bus. The ECS bus communication speed needs to be set up and must respect the selected baudrate in the flame controls. In the memory of the device are stored all the serial addresses for the instruments on the plant, corresponding to the physical position of each burner (from 1 to 100).

STEADY BURNER MENAGEMENT

As soon as it's powered, ESA PLEX-COM1 goes to steady burner management mode, that is indicated by the fixed digital output OUT8 and by continuous sending of the commands on the ECS bus (TX LED flashing). In this mode, the device continuously communicates with the flame controls, sending the data commands it receives from the supervisor and receiving the burner status signals. All the addresses of the flame controls configured in the device are interrogated in turn during communication (from the first to the last); this means that during the configuration stage, you must insert the correct number of burners actually installed on or contemplated for the furnace. The commands for each burner are managed in bits: the combination of these by the supervisor, therefore, makes all process requests easier. These commands are first converted by the ESA PLEX-COM1 into ECS protocol and then sent to the flame controls. The status signal for each burner received by the device is also converted into 8 bits for easy identification by the supervisor. See the relevant paragraph below for further details. During operation scheme, if there are no command bits or an installed burner is not detected, this is forced to stop by the ESA PLEX-COM1. As soon as the 1st or 2nd gas stage ignition bit is activated, the burner is ignited and reaches to the requested condition: both gas stages are maintained when both bits are present, instead if only the 1st gas stage is required, the 2nd gas stage is stopped.

In this condition you can activate/deactivate the bit for the 2nd gas stage to control the pulse-heat boosting in double-stage burners, taking advantage of the 2nd gas stage. Simply deactivate both bits to switch the burner off. When the burner needs to be ignited, ESA PLEX-COM1 sends the command and checks that the burner ignites; if the burner goes into lockout or is stopped by the local button, the device will automatically try to unlock the burner a few times. Moreover, the ESA PLEX-COM1 allows the option of manual control for each burner, i.e., local control of the burner, which is passively monitored by the supervisor. As well as managing the single burner controls, ESA PLEX-COM1 lets you activate certain generic functions for all connected burners, such as a general stop and the cyclic flame control efficiency test. The device also constantly checks the communication with the supervisor and to the flame controls: if there is no communication with the supervisor, ESA PLEX-COM1 activates the Com-timeout alarm and forces all the burners to switch off; if, on the other hand, there are problems on the ECS communication line (e.g. a short circuit or an inverted connection on one or more flame controls), the device commands the shut down of all the burners, activates digital output OUT1 to send the relevant warning signal to the remote control device and sends the supervisor a "non communicating" status signal for all flame controls.

FUNCTIONING

AUTOMATIC UNLOCK MANAGEMENT

ESA PLEX-COM1 can automatically attempt reignition of the burners that are in lock out. During configuration the maximum number of attempts for each burner is determined. Note that the European Norm EN746-2 allows a maximum of 3 automatic attemots to unblock the burner provided that the plant safety is not compromised. The condition necessary for the burner to be reignited automatically is that the supervisor requests ignition. Vice versa, every other command prohibits this function. If the allowed ignition attempts have been performed, the intervention of the operator is necessary to identify the cause for burner lockout.

Only after fault clearance is it possible to reset the unlock counter. The automatic unlock register of each burner is reset via the activation of the reset bitor by activating the burner manual mode bit. Furthermore when all the burners are stopped via the the activation of the specific bit in the general command, the unlock registers of all the burners are reset. If the automatic unlock function is disabled, ESA PLEX-COM1allows direct unlocking of the burner on behalf of the supervisor by activating the reset bit with the burner ignition bits present. During the attempts to unlock the burner, the card sends the state of the current burner to the supervisor.

LOCAL OR MANUAL CONTROL OF THE BURNER

ESA PLEX-COM1 allows each burner to operate manually, which allows to swicth the burner on or off locally on th eflame control device, facilitating any type of maintenance operation or burner regualtion. Activating this function the device does not send any comand ti the burner control device but simply checks the current state indicating it to the supervisor.
ESA PLEX-COM1 can determine a possible shut down of the burner put into manual after a limited amount of configurable time , avoiding having burners running not direc-

tly managed by the control system. Burner shut down occurs when the manual function is activated and when the seletced 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.
In applications where ESA PLEX-COM1 carries out only burner supervision and not control, the manual fucntion must always be enabled and automatic shut down for having exeeded the limit time must be disabled.

NO RESPONSE FROM THE FLAME CONTROL MANAGEMENT

ESA PLEX-COM1 waits for a response (indicating the state of the burner) to each command sent to the flame controls connected to the ECS bus. If a flame control fails to respond immediately to the command, the device waits for a set period, after which it then checks the next flame 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-COM1 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-COM1 stores but doesn't show the consecutive missing responses of each flame control. It checks that they do not exceed the defined limit.

FUNCTIONING

GENERAL STOP

ESA PLEX-COM1 makes available a general stop command to be able to rapidly bring to ahlt all the burners installed or to keep them off during the furnace ignition and shut down phases.

by activating the general stop command, all the running burners are forced to shut down and all those burners in lockout are forced by remote to stop. In the meantime, the supervisor will only see the state of the burners in shut down from remote (virtual state).

Furthermore the device changes the commands of all the burners and resets the automatic unlock registers as well as the missing responses.

To activate the general stop command it is sufficient to activate the specific bit in the general command of the ESA PLEX-COM1 device and automatically the commands of each burner is ignored until this command is on.

CYCLIC FLAME CONTROL EFFICIENCY TEST

ESA PLEX-COM1 can autonomously manage the sequential shut down and ignition of all the burners for the correct functioning check of the flame control devices and theri detection system. by activating this function the device checks one burner at a time, checking in sequence all the burners that are on. The running burners that are in manual mode are not checked.

Burner inspection is performed in two phases:

In the first, ESA PLEX-COM1 send the shut down command and waits for the burner to swicth off. After this, in the second phasethe device commands the burner to swicth on and as soon as it swithces on, it moves onto checking the next burner.

The cyclic test of theflame control devices is commande by the supervisor by activating the specific bit in the general command of the ESA PLEX-COM1 device or it can be activated automatically by the card after a certain waiting time following the last cyclic test performed. During confi-

guration it determines whether the device should automatically start the cyclic tests, as well as the waiting time that must pass between each test and the next. Furthermore, in case of automatic start-up ESA PLEX-COM1 can notify the supervisor by activating the general state signal in advance. When the automatic start of the cyclic tests is enabled, even if the supervisor is commanding it before the waiting time expires, the test is performed immediately and next start is generated automatically after the above mentioned waiting time. In applications in which more ESA PLEX-COM1 devices have been installed, the cyclic test must only be activated by the supervisor and the automatic start of the test must be disabled. During the cyclic test ESA PLEX-COM1 does not accept any command regarding the burner during the test phase and communicates its current state besides the indication that it is in the test phase. It also activates the specific indication on the general state.

SAFETY AND CONTROLS

ESA PLEX-COM1 has various communication safety controls, such as the supervision system watch-dog, a communication Com-timeout, and the ECS bus test:

■ **Supervision system Watch-dog:** to allow the supervisor to continuously check all communication with the device, ESA PLEX-COM1 has a specific bit in the general command and a bit in the general state: when the supervisor activates the bit in the command, ESA PLEX-COM1 activates the one in the state, and vice-versa. This function may also not be used by the supervisor, as ESA PLEX-COM1 does not use it as an alarm.

■ **Communication Com-timeout**: if there is no communication by the supervisor for more than 10 seconds, ESA PLEX-COM1 activates the Com-timeout alarm. When this alarm is active, the device forces all the bur-

ners to switch off and ensures that they remain off until the communication is restored. The burners need to be switched off, as the application is out of control; once communication with the supervisor has been restored, ESA PLEX-COM1 re-ignites the burners according to previous commands. This alarm can be disabled by setting 0 minutes as the maximum time for manual burner control.

■ **ECS bus test**: ESA PLEX-COM1 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 connected controls flame or a line short circuit that, if prolonged, could compromise the transmission stage of the ESA PLEX-COM1 device.

CONFIGURATION PARAMETERS

Configuration defines the functioning of the ESA PLEX-COM1 adapting it to the plant's needs. Changes in parameters are made in configuration mode via the dedicated software ESA ELBP-110 communicating via the EIA RS-232 port.

In the configuration mode that can be entered activating the Dip swicth Dip1 and that is signalled by the flashing of the OUT8 output, the device does not manage any communication on the ECS bus. For this reason before activating the configuration mode, make sure that the missing burner control of the ESA PLEX-COM1 does not give problems or damage the application. The software allows to modify the following parameters:

PARAMETER	DESCRIPTION
Number of burners controlled	Number of burners controlled directly by the device (max. 100). You should also consider the burners that could be installed at a later date when setting this parameter, bearing in mind that burners that are configured but not installed will slow down the ECS bus communication cycle.
Control flame serial address	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.
Baud-rate ECS bus	ECS bus transmission speed, which must be equal to that set for the flame controls (baud rate 4800 or 9600).
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 limite for manual control	The Time limit (accepted range: 0-120 minutes) after which ESA PLEX-COM1 forces the manually controlled burner to switch off. Set this parameter as 0 to disable the automatic switchingoff at the time-out and disable the supervisor communication Com-timeout alarm.
Number of filtered missing responses	The max. number of consecutive filtered missing responses from the flame control compensated for by ESA PLEX-COM1 (accepted range: 1-5).
Start cyclic test waiting time	Waiting time (accepted range: 0-168 hours) between the end of one cyclic burner test and the automatic start of the next one. Set this parameter as 0 to disable the automatic starting of the cyclical test.
Start cyclic test warning	Warning time (accepted range: 0-168 hours) between the end of one cyclic burner test and the warning that the next is about to begin. Set this parameter as 0 to disable the warning. The time between the warning and the start of the cyclic burner test is equal to the difference between the cyclic test waiting time and this parameter.
Device serial address	Modbus-RTU address for the device (accepted range: 1-254).
Format of transmitted data	Selection of the format for transmissions via the Modbus-RTU line of the writing and reading data: byte (type 1), word (type 2) or byte for Gateway devices (type 3).

CONTROL AND STATE FLAGS

ESA PLEX-COM1 has two memory tracks for each burner - write and read - for max. 100 burners, plus two general memory tracks for device management.

GENERAL ESA PLEX-COM1 DEVICE FUNCTION CONTROL FLAG

The general control for the ESA PLEX-COM1 device is a Flag-bit byte that controls all the generic functions of the device, such as the start of the cyclic flame control test, the watch-dog control and the general stop. The X flag bit inidcates the indifferent value.

GENERAL COMMAND	FLAG-BIT								DESCRIPTION
	7	6	5	4	3	2	1	0	
Cyclic test start	0	X	0	X	0	0	X	1	Forcing of the cyclic test of all ignited burners.
Watch-dog	0	X	0	X	X	0	1	X	Writing Bit used to check for redundancy watch-dog between the supervisor and ESA PLEX-COM1.
General stop	0	X	0	X	1	0	X	X	General stop command for all controlled burners.
Enable ESA REFLAM control	0	1	0	X	X	0	X	X	Enabling of the ESA REFLAM indicator management and exclusion of the "ignition only 1st gas stage" command.

GENERAL ESA PLEX-COM1 DEVICE FUNCTION STATUS FLAG

The general status of the ESA PLEX-COM1 device consists of a Flag-bit byte where the status of the general device functions are indicated, including cyclical test active, watch-dog status or a warning of the start of the cyclic test:

GENERAL STATE	FLAG-BIT								DESCRIPTION
	7	6	5	4	3	2	1	0	
Cyclic test active	0	X	0	0	0	X	X	1	The device is currently carrying out the cyclic test of all ignited burners.
Watch-dog	0	X	0	0	X	X	1	X	Copy of the Writing Bit received from the supervisor to check for redundancy between the supervisor and ESA PLEX-COM1.
Cyclic test start warning	0	X	0	0	X	1	X	0	The device will automatically perform the cyclic test of all ignited burners at the end of this set time.
General stop active	0	X	0	0	1	X	X	0	General stop command active and the device ensures all burners remain off.
High Temperature	0	X	X	1	X	0	X	X	High temperature function, ESA ESTRO flame control active. (At least one flame control with function ON).
ESA REFLAM control enabled	0	1	0	0	X	X	X	X	ESA REFLAM flame indicator control active and exclusion of the "ignition only 1st gas stage" command.

CONTROL FLAGS

SINGLE BURNER CONTROL

The control for each burner consists of a Flag-bit byte managed to suit the demands of the specific process. Each bit corresponds to a command, such as ignition of the 1st gas stage, ignition of the 2nd gas stage, unlock attempt reset and burner in manual mode, plus a bit that indicates whether the burner is actually installed or only contemplated.

BURNER COMMAND	FLAG-BIT								DESCRIPTION
	7	6	5	4	3	2	1	0	
Burner not installed	0	X	X	X	X	X	X	X	Corresponds to an uninstalled burner that is alwayscommanded to stop, regardless of the state of the other bits. Furthermore, if the control address is 00 the communication with this burner is skiipeed.
Burner shut down	1	0	0	0	0	X	0	0	Correposnds to the remote burner shut down command that is accepted only with the burner functioning.
Ignition 1st gas stage only	1	0	0	0	0	X	0	1	The command to ignite the 1st gas stage, accepted if the burner is switched off or in lockout mode (see automatic unlock) or if both the 1st and 2nd gas stages are ignited. This command is excluded when the ESA REFLAM indicator control is enabled.
Ignition 1st and 2nd gas stages	1	0	0	0	0	X	1	1	The command to ignite both the 1st and the 2nd gas stages; accepted if the burner is switched off or in lockout mode (see automatic unlock) or when just the 1st gas stage is ignited. Also valid for the command to ignite a single gas stage burner and for the ESA REFLAM indicators.
Purge	1	0	0	1	0	X	0	0	The ESA ESTRO flame control purges for the entire duration in which the bit is set.
Unlock attempt reset	1	0	0	0	0	1	X	X	Corresponds to the resetting of the automatic unlock counter, letting the device repeat the accepted number of unlock attempts. This command is only valid when the automatic unlock function is active.
Direct burner reset	1	0	0	0	0	1	X	1	Corresponds to direct unlocking of the burner, only valid when the automatic unlock function is disabled.
Manual or local control	1	0	0	0	1	X	X	X	Corresponds to manual mode command for local control of the burner.

CONTROL FLAGS

STATUS OF THE SINGLE BURNER

The state of each burner received by the ESA PLEX-COM1 is made up of a Flag-bit byte where the flame control states are indicated such as 1st gas stage access, 2nd gas stage access, burner off from remote, burner in manual mode, burner in lockout and others. The X flag-bit indicates an immaterial value.

BURNER STATUS	FLAG-BIT								DESCRIPTION
	7	6	5	4	3	2	1	0	
No response	0	0	0	0	0	0	0	0	The flame control does not respond or is not installed.
Burner off	0	0	0	X	X	0	0	1	The burner is off following a remote stop command from the supervisor or from the ESA PLEX-COM1 device.
1st gas stage ignited	0	0	0	X	X	0	1	0	Only the 1st gas stage of the burner is ignited.
2nd gas stage ignited	0	0	0	X	X	1	0	0	Only the 2nd gas stage of the burner is ignited. This only happens with burners with the 1st gas stage interrupted (ESA ESTRO-B).
1st and 2nd gas stages ignited	0	0	0	X	X	1	1	0	Both gas stages of the burner are ignited. Applications with ESA REFLAM indicators: flame presence detected.
Cyclic test active	X	X	X	0	1	X	X	X	Cyclic burner test in progress on the burner in question. Bits 0, 1, 2, 5, 6 and 7 let you see the current state of the burner.
Manual function active	X	X	X	1	0	X	X	X	Burner in manual mode for local control. Bits 0, 1, 2, 5, 6 and 7 let you see the current state of the burner being controlled locally.
Burner igniting	0	0	1	X	X	0	0	0	Burner in the prepurge or ignition phase.
Burner shutting down	0	1	0	X	X	0	0	0	Burner in shutting down phase, waiting for the flame to extinguish. This state is excluded when the ESA REFLAM indicator control is enabled.
Burner in lockout	1	0	0	X	X	0	0	0	Burner in lockout mode. Valid for all flame control lockout states.

DATA FORMAT

ESA PLEX-COM1 lets you manage the data for each burner in two different formats - Byte or Word - this is to be able to manage the data in the best format for the specific application. The paragraphs below describe the various transmission types.

Data management type 1 (Modbus-RTU)

This type of data management uses one byte for every command and one for every transmitted state signal. More specifically, the first word indicates the general state of the device, followed by the status of two burners for the next words. The same logic applies for the commands: the general command is given in the first word, followed by the commands for two burners for each word.

WORD N°	BYTE N°	DESCRIPTION	BYTE N°	DESCRIPTION
0	0	not used	1	device general state
1	2	burner 1 state	3	burner 2 state
2	4	burner 3 state	5	burner 4 state
....	....	....	....	....
50	100	burner 99 state	101	burner 100 state
51÷61	102÷123	at disposition		
62	124	not used	125	device general command
63	126	burner 1 command	127	burner 2 command
64	128	burner 3 command	129	burner 2 command
....	....	.....	....	....
112	224	burner 99 command	225	burner 100 command
113÷122	226÷245	at disposition		

Data management type 2 (Modbus-RTU)

This data management has a word for every command and one for every transmitted state signal. More specifically, the bits in the least significant byte are written and read in each word.

WORD N°	BYTE N°	DESCRIPTION
0	0÷1	device general state
1	2÷3	burner 1 state
2	4÷5	burner 2 state
....	....	....
100	200÷201	burner 100 state
101÷119	202÷239	at disposition
120	240÷241	device general command
121	242÷243	burner 1 command
122	244÷245	burner 2 command
....	....	.....
220	440÷441	burner 100 command
221÷239	442÷479	at disposition

DATA FORMAT

Data management type 3 (Modbus-RTU)

This data management has a byte for every command and one for every transmitted status signal. It is used when the device is connected to a field bus conversion Gateway (Profibus®, DeviceNet®, etc). More specifically, the general state of the device and the first burner state is read in the first word, followed by the state of two burners in each word. The same applies for the commands: the general command for the device and the first burner command is in the first word word, followed by the commands for two burners in each word.

WORD N°	BYTE N°	DESCRIPTION	BYTE N°	DESCRIPTION
0	0	device general state	1	burner 1 state
1	2	burner 2 state	3	burner 3 state
2	4	burner 4 state	5	burner 5 state
....	....	....	....	....
50	100	burner 100 state	101	at disposition
51÷60	102÷121	at disposition		
61	122	device general command	123	burner 1 command
62	124	burner 2 command	125	burner 3 command
63	126	burner 4 command	127	burner 5 command
....	....	.....	....	....
111	222	burner 100 command	223	at disposition
112÷121	224÷243	at disposition		

ESA PLEX-COM1 WITH MODBUS-RTU COMMUNICATION ON EIA-RS-232

ESA PLEX-COM1-M232 is the basic version of the device that uses the port EIA-RS-232 to communicate with th esupervisor.

Because of the EIA RS-232 bus the device must be placed near the supervisor and must be the only one connected to the network.

DESCRIPTION	INTERFACE EIA-RS-232
slave units connected to supervisor	1
maximum bus length	15 mt
device connection type	Sub Din 9 pin (female) connector
baud-rate to supervisor	9600 baud

ESA PLEX-COM1-M232 allows you to manage the data using the three types described in the paragraphs above.

ESA PLEX-COM1 WITH MODBUS-RTU COMMUNICATION ON EIA-RS-485

ESA PLEX-COM1-M485 is the version of the device that uses an EIA-RS-232 / EIA-RS-485 converter module to communicate with the supervisor. The EIA-RS-485 bus lets you connect several devices to the same network and lets you place the ESA PLEX-COM1-M485 close to the furnace, thus reducing the length of the ECS bus.

DESCRIPTION	INTERFACE EIA-RS-485
slave units connected to supervisor	32, up to 254 with repeater
maximum bus length	1000 m without repeater
device connection type	3 pole quick extraction connector
baud-rate to supervisor	9600 baud

ESA PLEX-COM1-M485 allows you to manage the data using the three types described in the paragraphs above.

ESA PLEX-COM1 WITH PROFIBUS-DP® COMMUNICATION

ESA PLEX-COM1-PDP is the version of the device that uses a Profibus-Dp® Gateway in order to communicate with the supervisor. The Gateway comes already connected to the device and configured to communicate with it.

The Profibus-Dp® bus allows you to connect several devices to the same network and lets you place the ESA PLEX-COM1-PDP close to the furnace, thus reducing the length of the ECS bus.

DESCRIPTION	PROFIBUS-DP® INTERFACE
slave units connected to supervisor	refer to the protocol specifications
maximum bus length	
device connection type	Sub Din 9 pin (Female) connector
baud-rate to supervisor	up to 1.5 Mbit/S

ESA PLEX-COM1-PDP is supplied with GSD files for fast Gateway/supervisor interfacing. The Profibus-Dp® address is selected using the two rotary selectors at the front of the Gateway, while the address of the ESA PLEX-COM1-PDP device configures using the ESA ELBP-110 software must not be changed. ESA PLEX-COM1-PDP performs all the functions described above and has one byte for every command and every state signal. The Gateway has 104 bytes for writing the commands and 104 bytes for reading the state signals. Furthermore, the first command byte from the supervisor must have a value of 60 (Hex) to activate the communication between the Gateway and ESA PLEX-COM1.

WORD N°	BYTE N°	READING BYTE	WRITING BYTE
0	0	Gateway only	Gateway only - 60 Hex
	1	Gateway only	Gateway only
1	2	general state ESA PLEX-COM1	general command ESA PLEX-COM1
	3	burner 1 state	burner 1 command
2	4	burner 2 state	burner 2 command
	5	burner 3 state	burner 3 command
....	....	....	....
....	....	....	....
51	102	burner 100 state	burner 100 command
	103	not used	not used

ESA PLEX-COM1 DEVICENET® COMMUNICATION

ESA PLEX-COM1-DNT is the version of the device that uses a DeviceNet® Gateway in order to communicate with the supervisor. The Gateway comes already connected to the device and is configured to communicate with it. The DeviceNet® bus allows you to connect several devices to the same network and lets you place the ESA PLEX-COM1-DNT close to the furnace, thus reducing the length of the ECS bus.

DESCRIPTION	DEVICENET® INTERFACE
slave units connected to supervisor	refer to the protocol specifications
maximum bus length	
device connection type	5 pole quick extraction connector
baud-rate to supervisor	up to 500 Kbit/S

ESA PLEX-COM1-DNT is supplied with EDS files for fast Gateway / supervisor interfacing. The Device-net address and the baud-rate are selected using the Dipswitch bank at the front of the Gateway, while the address of the ESA PLEX-COM1-DNT device set using the ESA ELBP-110 software must not be changed. ESA PLEX-COM1-DNT performs all the functions described above and has one byte for every command and every state signal. The Gateway has 104 bytes for writing the commands and 104 bytes for reading the state signals. Furthermore, the first command byte from the supervisor must have a value of 60 (Hex) to activate the communication between the Gateway and ESA PLEX-COM1-DNT.

WORD N°	BYTE N°	READING BYTE	WRITING BYTE
0	0	Gateway only	Gateway only - 60 Hex
	1	Gateway only	Gateway only
1	2	not used	not used
	3	general status ESA PLEX-COM1	general command ESA PLEX-COM1
2	4	burner 1 state	burner 1 command
	5	burner 2 state	burner 2 command
3	6	burner 3 state	burner 3 command
	7	burner 4 state	burner 4 command
....	....	....	....
....	....	....	....
51	102	burner 99 state	burner 99 command
	103	burner 100 state	burner 100 command

ESA PLEX-COM1 WITH ETHERNET® COMMUNICATION

ESA PLEX-COM1-ETH is the version of the device that uses a Ethernet® Gateway in order to communicate with the supervisor. The Gateway comes already connected to the device and configured to communicate with this. The Ethernet® bus allows you to connect several devices to the same network and lets you place the ESA PLEX-COM1-ETH close to the furnace, thus reducing the length of the ECS bus.

DESCRIPTION	ETHERNET® INTERFACE
slave units connected to supervisor	refer to the protocol specifications
maximum bus length	
device connection type	RJ45 quick extraction connector
baud-rate to supervisor	10-100 Mbit/S

ESA PLEX-COM1-ETH is supplied with EDS files for fast Gateway / supervisor interfacing. Use the Gateway set-up software to select the Ethernet serial address, while the address of the ESA PLEX-COM1-ETH device set using the ESA Elbp-110 software must not be changed. ESA PLEX-COM1-ETH performs all the functions described above and has one byte for every command and every state signal. The Gateway has 104 bytes for writing the commands and 104 bytes for reading the state signals. Furthermore, the first command byte from the supervisor must have a value of 60 (Hex) to activate the communication between the Gateway and ESA PLEX-COM1-ETH.

WORD N°	BYTE N°	READING BYTE	WRITING BYTE
0	0	Gateway only	Gateway only - 60 Hex
	1	Gateway only	Gateway only
1	2	not used	not used
	3	general status ESA PLEX-COM1	general command ESA PLEX-COM1
2	4	burner 1 state	burner 1 command
	5	burner 2 state	burner 2 command
3	6	burner 3 state	burner 3 command
	7	burner 4 state	burner 4 command
....	....	....	....
....	....	....	....
51	102	burner 99 state	burner 99 command
	103	burner 100 status state	burner 100 command

ESA PLEX-COM1 WITH PROFINET® COMMUNICATION

ESA PLEX-COM1-PNT is the version of the device that uses a Profinet® Gateway in order to communicate with the supervisor. The Gateway comes already connected to the device and set-up to communicate with this. The Profinet® bus allows you to connect several devices to the same network and lets you place the ESA PLEX-COM1-PNT close to the furnace, thus reducing the length of the ECS bus.

DESCRIPTION	PROFINET® INTERFACE
slave units connected to supervisor	refer to the protocol specifications
maximum bus length	
device connection type	RJ45 quick extraction connector
baud-rate to supervisor	10-100 Mbit/S

ESA PLEX-COM1-PNT is supplied with GSDML files for fast Gateway/supervisor interfacing. The Profinet® address is selected using the Gateway software configuration, while the address of the ESA PLEX-COM1-PNT device configured using the ESA ELBP-110 software must not be changed. ESA PLEX-COM1-PNT performs all the functions described above and has one byte for every command and every state signal. The Gateway has 103 bytes for writing the commands and 103 bytes for reading for the status signals. Furthermore, the first command byte from the supervisor must have a value of 60 (Hex) to activate the communication between the Gateway and ESA PLEX-COM1-PNT.

WORD N°	BYTE N°	READING BYTE	WRITING BYTE
0	0	Gateway only	Gateway only - 60 Hex
	1	Gateway only	Gateway only
1	2	general status ESA PLEX-COM1	general command ESA PLEX-COM1
	3	burner 1 state	burner 1 command
2	4	burner 2 state	burner 2 command
	5	burner 3 state	burner 3 command
....	....	....	....
....	....	....	....
51	102	burner 100 state	burner 100 command
	103	not used	not used

WARNINGS

■ In the selection of configuration parameters to be analyzed, 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-COM1 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 the correct connection after installation. Before powering the instrument ensure that the voltage and frequency 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 device ESA PLEX-COM1 must occur in an environment with temperature fluctuations 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 digital output OUT1 of the ESA PLEX-COM1 device. 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-COM1 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-COM1 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 rime and place of installation.

2 - Avoid placing ESA PLEX-COM1 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 - The device must be placed inside electric panels and mounted on a DIN rail. The position must be accessible and have suitable ventilation.

ELECTRICAL CONNECTION

4 - 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.

5 - During wiring refer to the technical documentation respecting the polartity between phase and neutral. The connection terminals

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 and to all metallic frames using appropriate conductors. Failure to connect the device to the protective earth, causes a dangerous condition for the operator.

8 - The laying of the communication line must always be carried out separately from the power supply lines, motor control (inverter) and the mains voltage, in particular, neither MULTIPOLAR nor SHIELDED cables must be used.

9 - Use the ECS CABLE or unipolar cables with a cross section greater than 0.5mm² for communication lines; as an alternative, we recommend using the busway system, bearing in mind that a maximum length of cable of 1 m must be used between the busway and the instrument for both communication and power supply lines.

10 - The length of the communication lines must not exceed the specified limit. If the controller is a long way from the system, we recommend positioning the ESA PLEX-COM1 near the furnace or using an ECS signal repeater.

11 - We recommend placing a protection fuse on the active ECS line to prevent prolonged short-circuits from damaging the board; use 1 A quick blow fuses.

12 - The active output of only one ESA PLEX-COM1 device can be connected to each trunk of the ECS bus. If the number of flame control devices installed exceeds the permitted for the ECS output, an ECS signal repeater should be used; while, if the number of control flame to be controlled exceeds the amount that can be controlled by one ESA PLEX-COM1 device, several should be used, each one connected to its ECS bus trunk.

13 - As soon as the ESA PLEX-COM1 is powered, we recommend checking that the RX LED is not fixed on. If it is, disconnect the active output and look for the cause of the anomaly on the ECS bus.

GENERAL MAINTENANCE PLAN

CHECK	TYPE	FREQUENCY	OPERATION
Case closing containment panel	O	periodic	Check that the instrument is always closed to prevent dirt, dust and moisture from entering and damaging the device.
Connection cable integrity	O	every six months	Check the integrity of the outer insulation and the absence of abrasions or overheating of conductors.
Clamping of conductors	O/S	annual	Reduce to every six months for applications with vibrations.
Instrument replacement	S	/	Replacement is necessary if the device is no longer functioning.

NOTES: Key: O = ordinary / E = extraordinary

ORDINARY MAINTENANCE

For correct maintenance of the ESA PLEX-COM1 card, scrupulously follow the indications below: Before performing any operation with the plant running, make sure that the process safety as well as that of the operator is not in any way compromised. If necessary carry out inspection procedures with the plant off.

CASE CLOSING CHECK

The closure of the electrical panel of the device containment is fundamental for its correct functioning as it blocks agents from entering and damaging the control card. If dirt is present, first disconnect the power from the device and then eliminate the dirt by blowing with compressed air. Do not use any other mechanical tool for this operation.

INTEGRITY CHECK

The integrity of the electric wires can be checked visually. If it is necessary to operate on conductors for inspection, seen as they are not completely visible, disconnect the power from the device before performing any type of operation.

TIGHTENING OF CONDUCTORS

Checking the tightening of the conductors in their related clamps is necessary to avoid malfunctioning or overheating. During this operation also check that the insulation of the conductor reaches the inside of the clamp or the insulated terminal.

EXTRAORDIANRY MAINTENANCE

It is not possible to perform repair operations on the device or on its components. In case of breaking proceed to replacing the damaged part. The purchase of spare parts is however strongly recommended in case you need to replace a damaged part in little time.

REPLACEMENT OF THE INSTRUMENT

1 - Make sure that the device is indeed the reason for the malfunctioning and that you dispose of an identical spare device to replace the faulty one. Check all the data on the identification label and the plant documentation.

2 - Deactivate the electric power, unfasten the plug-in terminals of the card leaving the conductors connected to the female terminal. Remove the card from the DIN rail mounting adapter.

3 - Replace the card inside the female terminal connected to the wires housed inside the new instrument paying attention that they are inserted correctly and that they are not turned over or shifted.
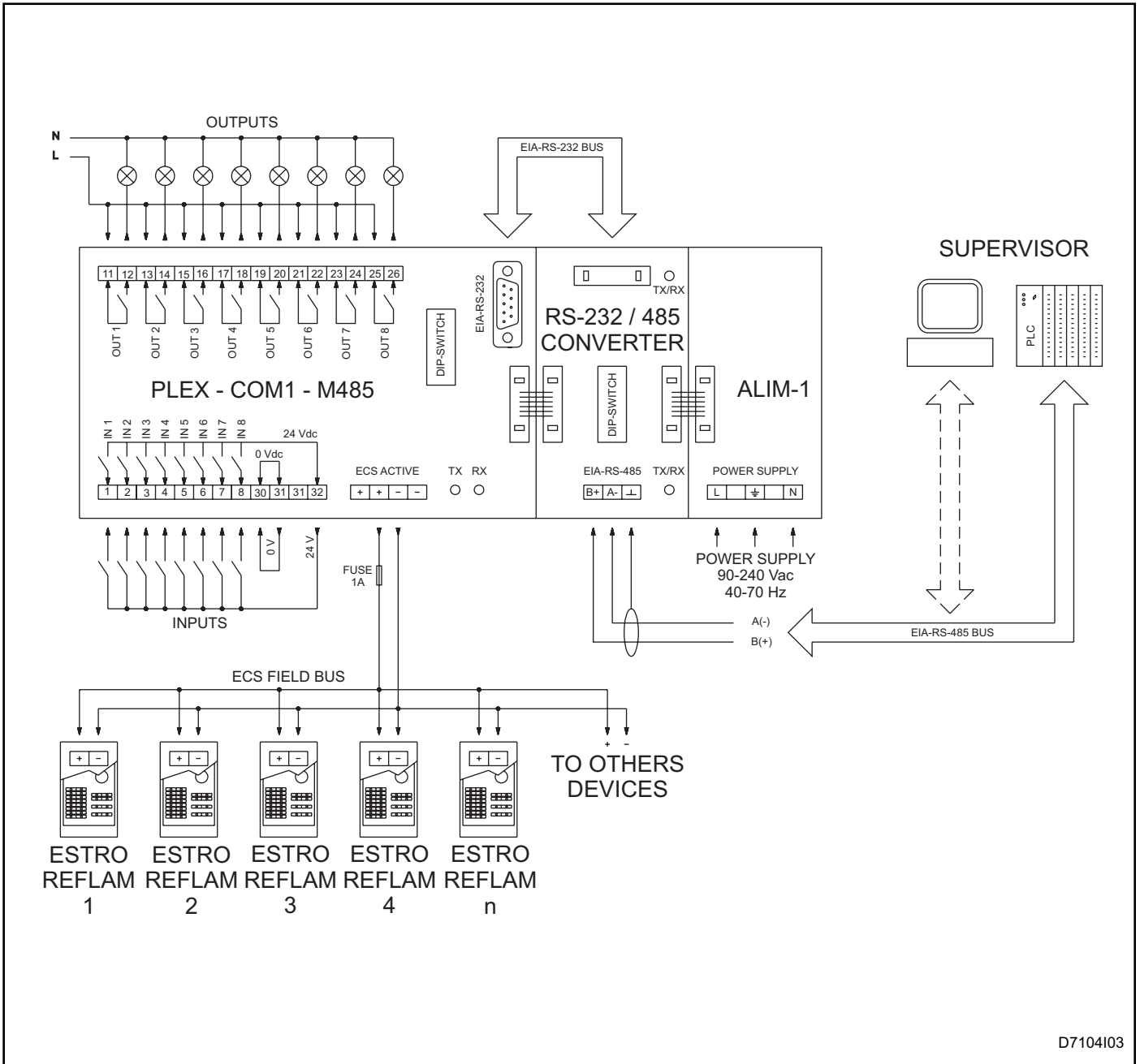
4 - Repower the device and check that the new card works properly.
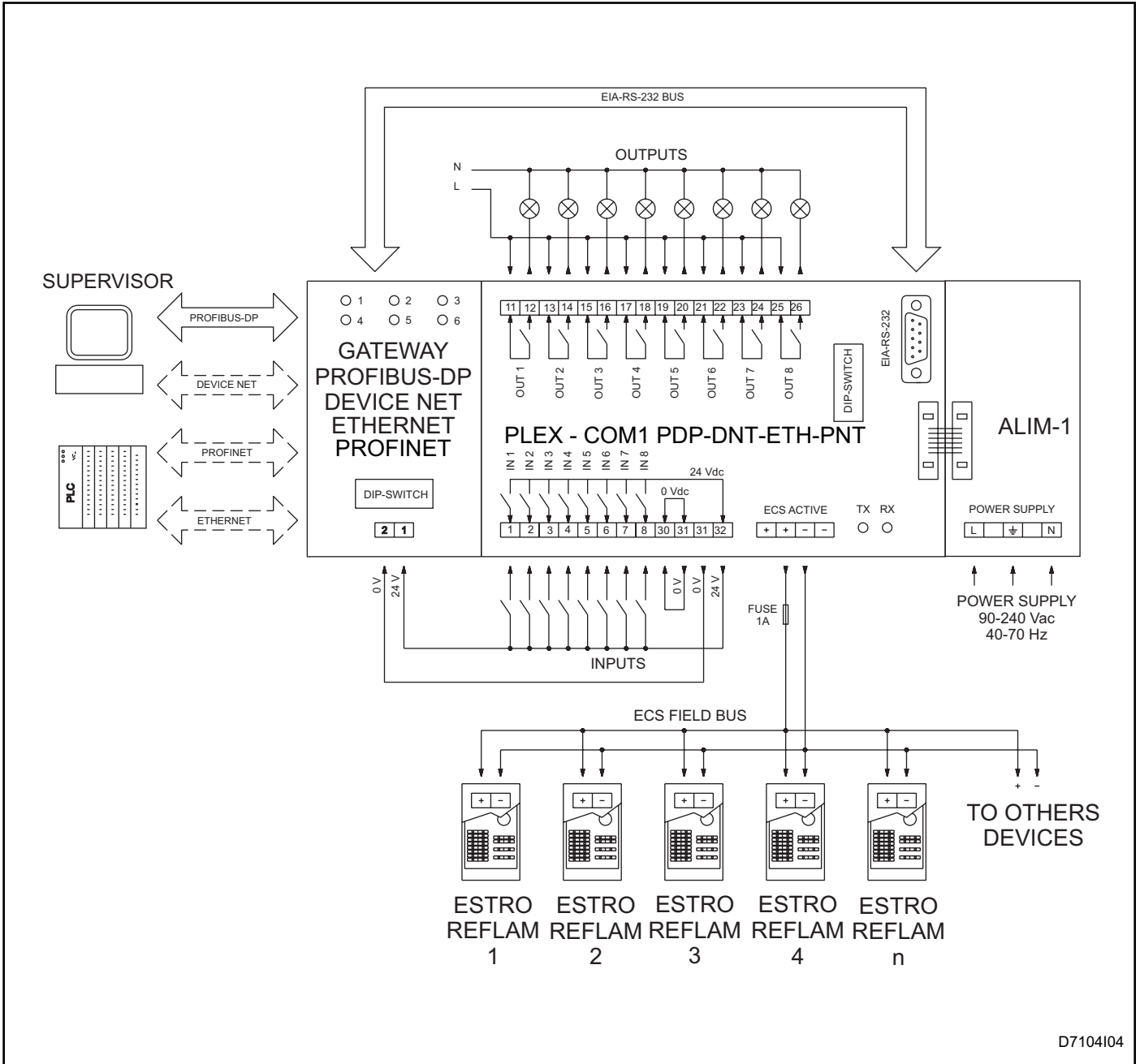
ELECTRICAL CONNECTION ESA PLEX-COM1-M232
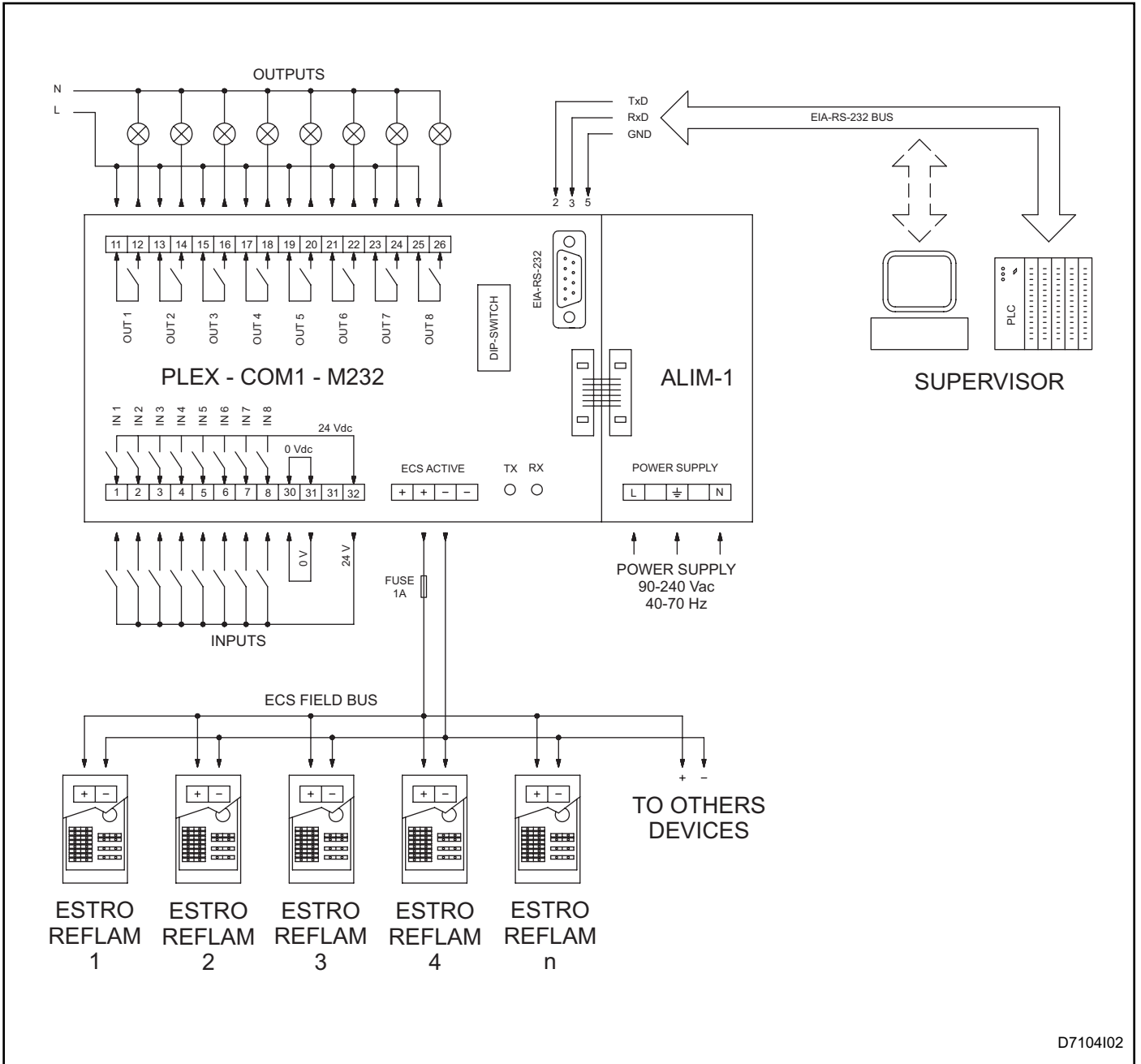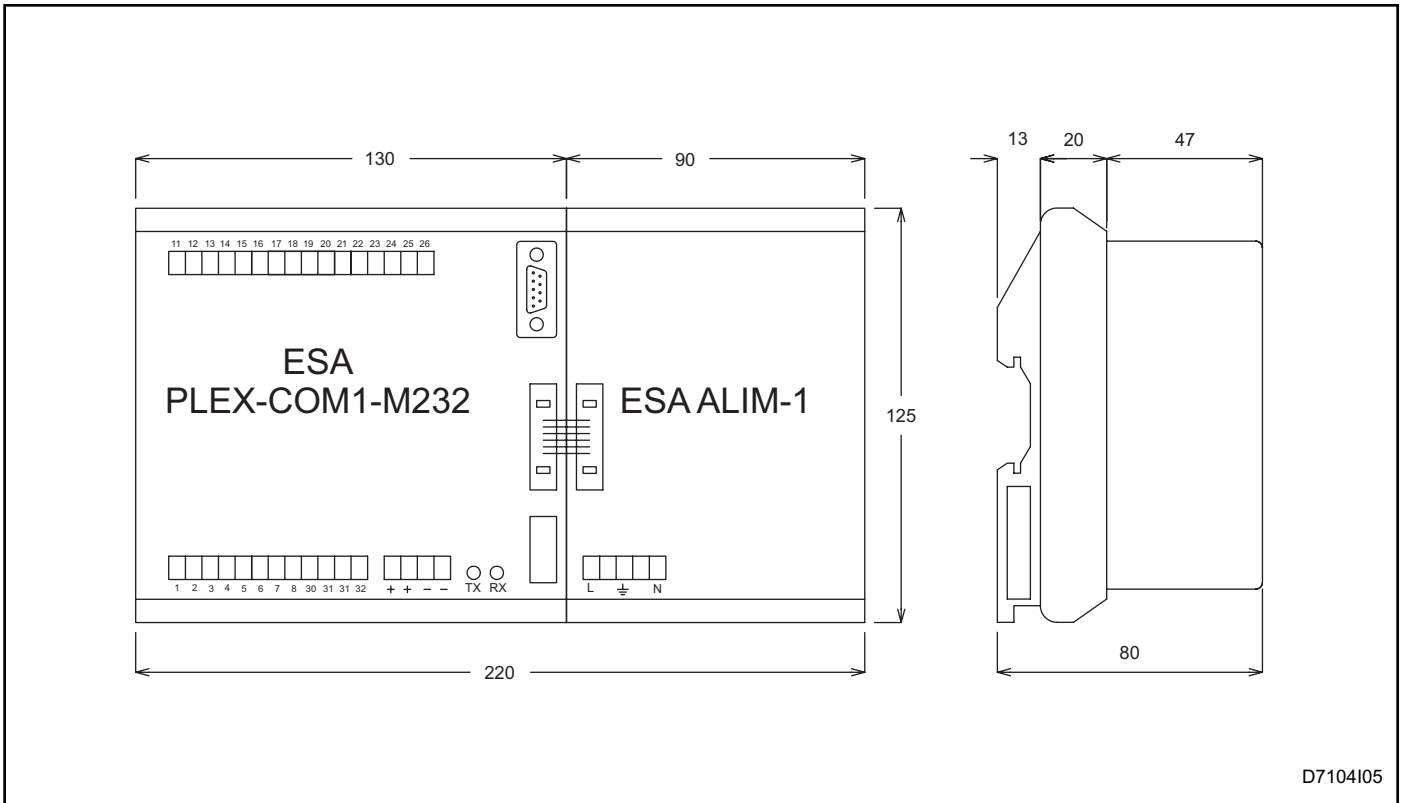

D7104I02

ELECTRICAL CONNECTION ESA PLEX-COM1-M485

D7104I03

ELECTRICAL CONNECTION ESA PLEX-COM1-PDP/DNT/ETH/PNT
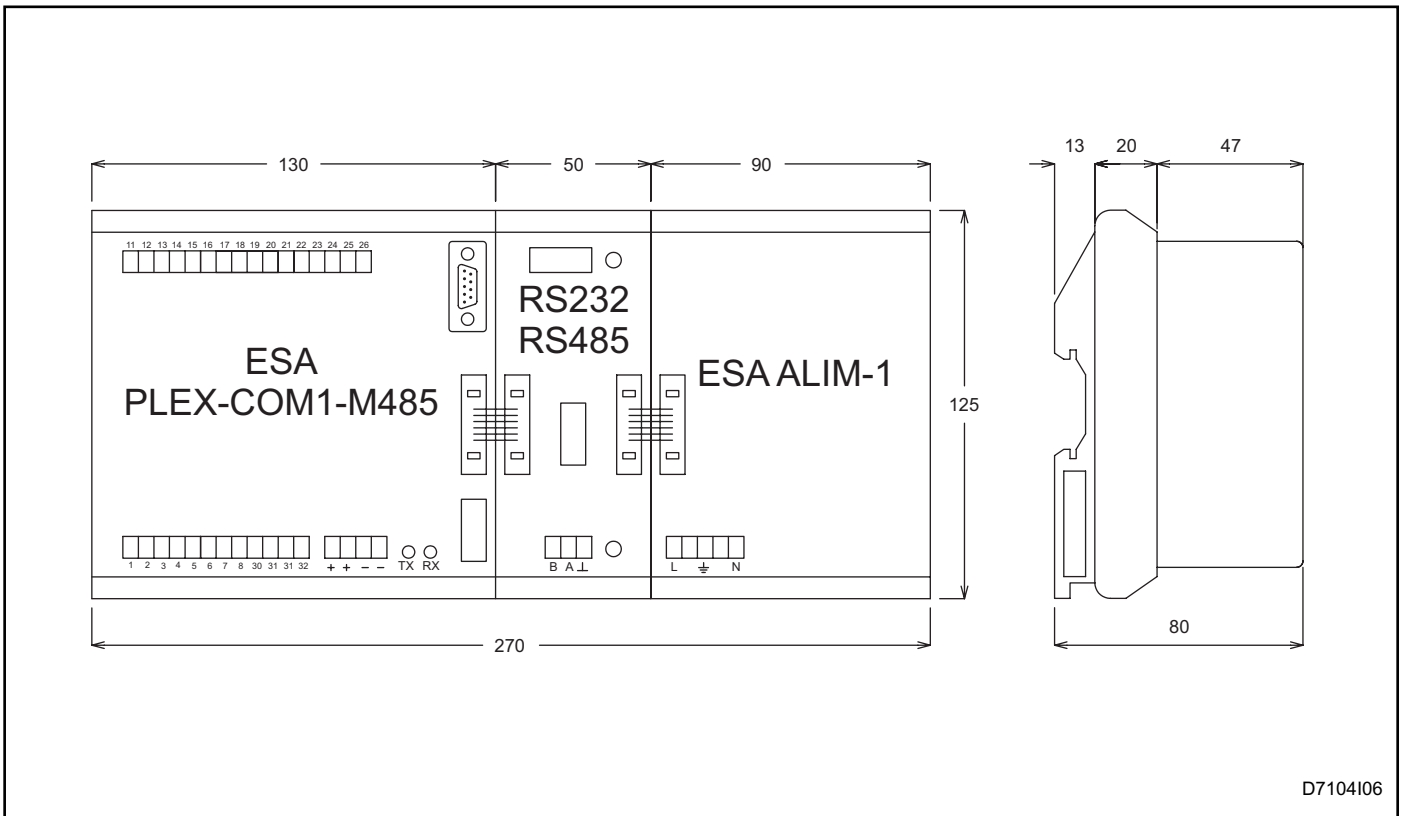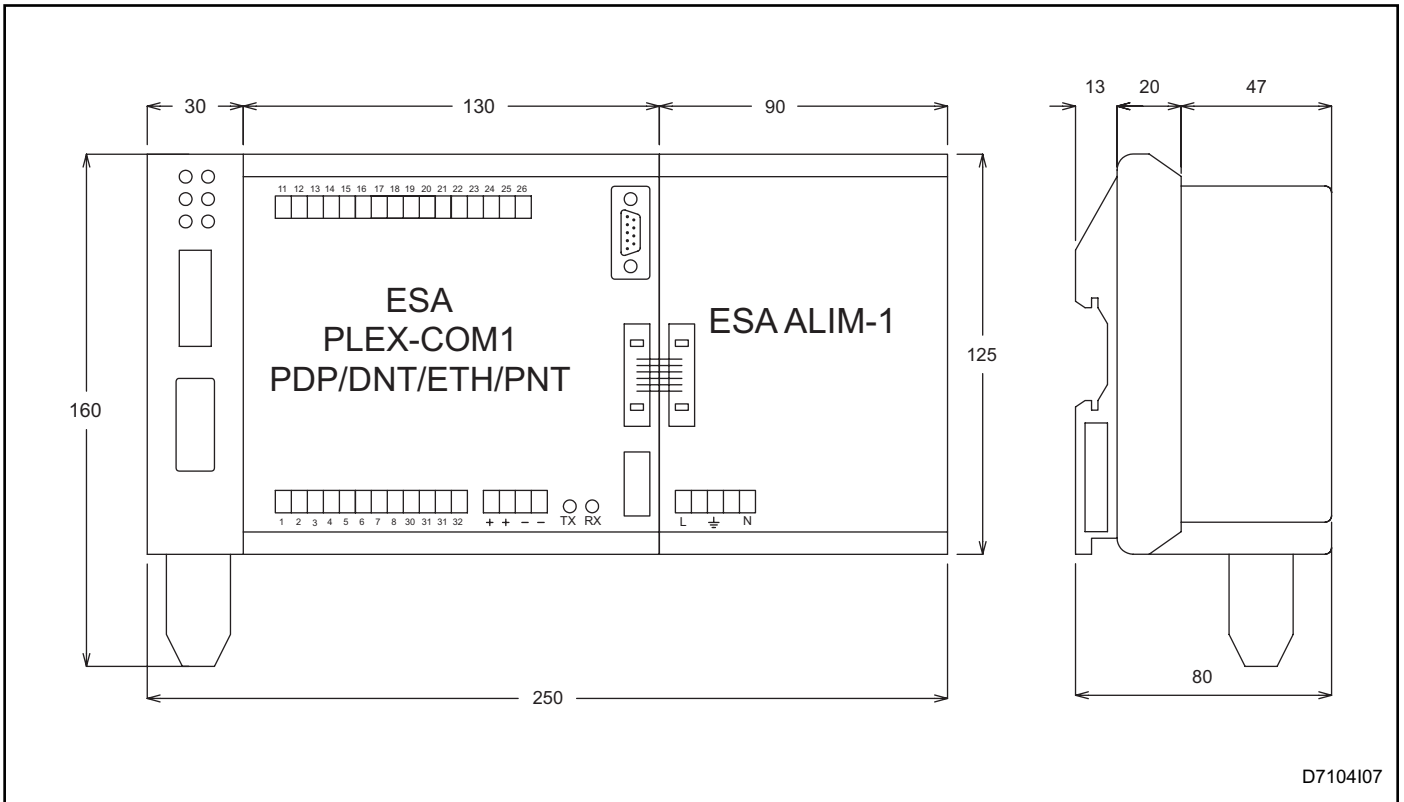

D7104I04

DIMENSIONS - ESA PLEX-COM1-M232

D7104I05

DIMENSIONS - ESA PLEX-COM1-M485

D7104I06

DIMENSIONS - ESA PLEX-COM1-PDP/DNT/ETH/PNT

ESA
PLEX-COM1
PDP/DNT/ETH/PNT

ESA ALIM-1

D7104I07

ORDERING CODE

ESA PLEX-COM1 □ □ □ □ □ □ □ □ □ □
01 02 03 04 05 06 07 08 09 10

DEVICE VERSION	01
Modbus-RTU on EIA-RS-232	**M232**
Modbus-RTU on EIA RS485	**M485**
Profibus-DP®	**PDP**
DeviceNet®	**DNT**
Ethernet®	**ETH**
Profinet®	**PNT**

NO. OF BURNERS CONTROLLED	02
From 1 to 100	**.....**

BAUD-RATE ON ECS BUS	03
Baud rate 4800	**4**
Baud rate 9600	**9**

AUTOMATIC UNLOCK NUMBER	04
From 0 to 5	**.....**

MANUAL CONTROL TIME-OUT	05
From 0 to 120 minutes	**5**

06	NUMBER OF FILTERED NO-RESPONSE
From 1 to 5	**....**

07	START CYCLICAL TEST WAITING TIME
From 0 to 168 hours	**000**

08	START CYCLICAL TEST WARNING
From 0 to 168 hours	**000**

09	DEVICE SERIAL ADDRESS (only for Modbus-RTU version)
From 1 to 254	**1**

10	DATA FORMAT
Data management type 1	**1**
Data management type 2	**2**
Data management type 3	**3**

The serial addresses for the flame controls for each of the burners installed must be listed in a table.

Each address consists of a segment and a node: all alphanumeric characters are valid (0-9 and capitals A-Z).

BURNER NUMBER	CONTROL FLAME SERIAL ADDRESS
1	node segment
2	node segment
.....	.....
number of burners controlled	node segment