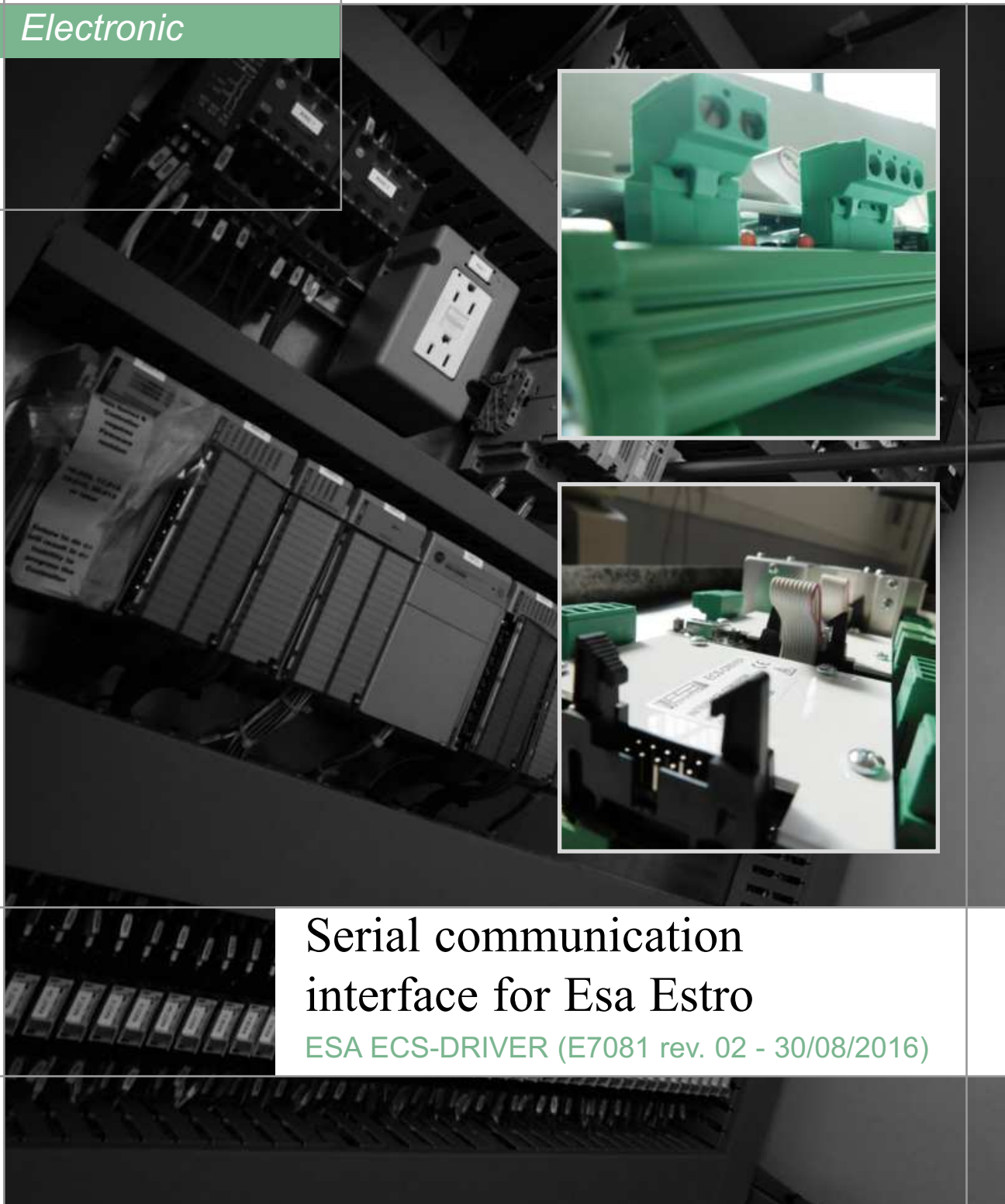


Electronic



Serial communication interface for Esa Estro

ESA ECS-DRIVER (E7081 rev. 02 - 30/08/2016)

GENERAL WARNINGS:



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

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

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

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

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

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

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

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

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

ESA PLEX-COM1 is in compliance with European Union directives and standards: **2004/108/EC** (electromagnetic compatibility) **2006/95/EC** (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).

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 ECS-DRIVER is in compliance with European Union directives and standards: **2014/30/EU** (electromagnetic compatibility) **2014/35/EU** (low voltage), **IEC 61000-6-4**, **IEC 61000-6-2**, **IEC 61000-3-2**, **CEI EN 55014-1** and **CEI EN 60204-1** (EMC electromagnetic compatibility, safety of machinery - electrical equipment of machines: general requirements).

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

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DESCRIPTION

The ECS bus provides a MASTER-SLAVE communication to a single active interface for each segment of the serial line. If the application finds a higher number of devices than the one supported by the active ECS output, ESA ECS-DRIVER can be used as a signal repeater. The connection to the control device can be made using the EIA-RS-232 interface or the EIA-RS-422 interface (selectable via jumper), with HALF DUPLEX communication and without hardware control signals. The ECS signal to the bus is taken from the active output. ESA ECS-DRIVER is supplied on attachment for

DIN rail to be positioned in electrical panels, placed near the master controller or located on the system. The power supply section, consisting of the ESA ALIM-1 universal power supply (switching), accepts a wide range of supply voltage ensuring the functionality of the interface in hostile environments. All connections are performed using quick-release connectors, which facilitate wiring or maintenance operations. ESA ECS-DRIVER has two LEDs that indicate the direction of the data flow on the serial line: one is activated when the interface transmits, while the second one is received.

COMMUNICATION SPEED

The choice of communication speed depends on several factors: the number of connected devices, the type of application, the expected wiring, and the environmental factors that can disturb the flow of data with more evident effects at high speeds. ESA ECS-DRIVER allows different communication speeds, without having to make

any changes or settings. The important thing is the setting of the same speeds between the controller and peripherals. The number of devices that can be connected to the active ECS output varies according to the communication speed used and the application, in the following table the allowed limits are specified.

Communication speed	ESA ECS-DRIVER Masters without derivation towards relay	ESA ECS-DRIVER Masters with derivation towards repeater	ESA ECS-DRIVER relay	Use of busway
4800 Baud	70 slave	50 slave	70 slave	Allowed
9600 Baud	60 slave	40 slave	60 slave	Allowed

DISPLAY SECTION

ESA ECS-DRIVER is equipped with diagnostic leds that are activated to indicate the current status or for any mal-

functions. The following are all the possible states with the corresponding indications:

DEVICE	LED NAME	COLOUR	DESCRIPTION
ESA ECS-DRIVER	TX	RED	Data transmission indication on ECS bus: flashing - transmission of commands to the flame controls, and at each blinking corresponds to a communication. off - the device is not transmitting any command (not powered or no master command). on steady - device has the damaged transmission stage.
ESA ECS-DRIVER	RX	RED	Data reception indication from the ECS bus: flashing - reception of statuses from the flame controls, and at each blinking corresponds to a communication off - the device is not receiving any status from the burner controls. lit steady - presence of an anomaly on the ECS bus due to short-circuits or polarity inversions.
ESA ALIM-1	-	GREEN	Indication of 24 Vdc output presence: on steady - present output off - output not present
ESA ALIM-1	-	RED	5 Vdc output presence indication: on steady - present output off - output not present

FUNCTIONING

MASTER OPERATION

ESA ECS-DRIVER is master when it receives the serial signal from the controller and transmits it on the ECS bus via the active output. The connection with the controller is via the EIA-RS-232 or EIA-RS-422 interface, its choice can be determined by the available port on the

supervisor or by the distance between it and the serial interface. For any type of interface selected, the serial signal cannot be connected to multiple ESA ECS-DRIVERS.

INTERFACE	MINIMUM DISTANCE FROM THE MASTER
EIA-RS-232	15 m
EIA-RS-422	1000 m

ESA ECS-DRIVER is supplied with the EIA-RS-232 port active, the selection of the EIA-RS-422 type occurs by moving the position of the jumper "J5". Before carrying

out the change make sure that the ESA ECS-DRIVER is not powered.

RELAY OPERATION

ESA ECS-DRIVER is relay when it receives the signal from an ESA ECS-DRIVER master or from ESA PLEX-COM1 and transmits it on another ECS bus trunk through its active output. The signal coming from the master serial interface must be connected to the passive input, respecting its polarity, the derivation from the master bus must be taken directly to the output of the

master interface. If multiple relays are used, they must all be derived from the ESA ECS-DRIVER master: each relay introduces slight distortions of the signal which, if placed in cascade, could lead to the bus not functioning. When ESA ECS-DRIVER is used as a relay, no device can be connected to the EIA-RS-232 and EIA-RS-422 communication ports.

FUNCTIONING

ESA OPERATION ECS DRIVER-S

ESA ECS-DRIVER-S is the serial interface with only one active ECS output. This version is suitable for all applications with a number of burners lower than the specified limit, or if the interface cards are located at different points and not grouped in the same panel, it is also recommen-

ded for the most demanding applications or with lengths of communication lines close to the specified limits. ESA ECS-DRIVER-S depending on the connection, allows both "Master" operation and "Relay" operation.

ESA OPERATION ECS DRIVER-D

ESA ECS-DRIVER-D is the serial interface with dual active ECS output. This version is suitable for all applications with a number of burners above the specified limit, provided that the interface cards are grouped in the same elec-

trical panel. ESA ECS-DRIVER-D depending on the connection, allows the operation of double "Master", double "Replay" or "Master-Relay" operation.

WARNINGS

■ The selection of the master bus between EIA-RS-232 and EIA-RS-422 must only occur with an unpowered device. The functionality of the device is not guaranteed if the selection takes place with powered device.

■ ESA ECS-DRIVER means permanently and permanently connected electrically. The inversion of the phase / neutral connection can compromise the safety of the system. Do not use different phases between the various voltage inputs and do not apply voltages to the output terminals.

■ Check the correct connection after installation. Before powering the instrument, make sure that the voltage and frequency are correct.

■ The device must be placed inside electrical panels, must not be exposed to direct radiation from heat sources nor must it be in contact with combustion products such as liquids, solvents or corrosive gases.

■ The use of the ESA ECS-DRIVER device must occur in an environment with temperature ranges within the permitted limits.

■ The inversion of the polarity on one or more flame controls entails the non-operation of the entire ECS bus, and is signaled by the fixed lighting up of the RX LED. The same situation occurs with a short circuit on the communication line. This malfunction if maintained leads to the breaking of the device.

■ The connection of equipment to the ECS bus during its operation could cause a brief suspension of the communication in progress.

■ In the event of a malfunction, ESA ECS-DRIVER must be sent to the manufacturer for repair. Any modification or repair carried out by third parties automatically void the warranty and compromise the safety of the application.

■ ESA ECS-DRIVER is a device for control and regulation on combustion plants. It is therefore not intended as an instrument to guarantee the safety, for which specific instruments exist.

INSTALLATION

For correct installation, respect the following instructions:

ASSEMBLY

1 - Installation must be carried out by qualified personnel in compliance with current regulations, at the time and place of installation.

2 - Avoid placing ESA ECS-DRIVER near strong magnetic or electric fields and in conditions that are not exposed to direct radiation from sources of heat and are not in contact with combustion products, liquids, solvents or corrosive gases.

3 - The device must be inserted inside electrical panels mounted on a DIN rail. The position must be accessible and must have adequate ventilation.

ELECTRICAL CONNECTION

4 - Where the feeding system is phase-phase type, an isolation transformer must be installed with connection of a second winding head referred to the earth.

5 - When making the electrical connection, refer to the technical documentation, respecting the between phase and neutral. The terminals for electrical connections which are screwed and can accept sections from 0.5 to 2.5mm² and the choice of conductors and of their location must be appropriate to the application.

6 - Tighten the conductors properly in the connecting clamps to avoid malfunctions or overheating that can lead to dangerous conditions. We recommend the numbering and use of appropriate terminals on the conductors.

7 - Always ensure that the protective earth is connected to the relative clamps and to all the metallic carcasses of

the elements connected with suitable conductors. The connection of the protective earth to the device, determines a dangerous condition for the operator.

8 - The laying out of the communication line must always take place separately from supply lines, motor drive (inverter) and network voltages; no MULTIPOLAR no SHIELDED cables must be used.

9 - Use the ECS cable for communication lines CABLE or unipolar wires for electrical use with sections greater than 0.5mm²; alternatively we recommend the use of busbar systems taking into account a maximum length of the connection cable between busbar and 1 meter instrument, both for communication and feeding.

10 - The length of the communication lines must not exceed the specified limit. Where the controller is distant from the plant, it is advisable to position the ESA ECS-DRIVER in the vicinity of the furnace or use an ECS signal relay.

11 - It is advisable to place a protection fuse on the ECS line to prevent prolonged short-circuits damaging the card; in case use 1A fast fuses.

12 - On each bus trunk it is possible to connect only one ESA ECS-DRIVER active connected to the master controller. If there is a larger number of slave devices in the installation than the one allowed, it is necessary to use ECS signal relays

13 - As soon as ESA ECS-DRIVER is powered, it is advisable to check that the RX LED does not come on steady; if this anomaly occurs, it is advisable to disconnect the active output and look for the cause of the fault on the ECS bus it is appropriate to disconnect the active output and look for the cause of the fault on the ECS bus.

GENERAL MAINTENANCE PLAN

Check	Type	Advised Time	Operation
Containment panel closure	O	periodically	Check that the instrument is always closed to prevent dirt, dust and humidity from entering and damaging the device.
Connection cable integrity	O	every six months	Check the integrity of the external insulation and the absence of abrasion or overheating of the conductors.
Wire tightening	O/S	yearly	Reduce to every six months in applications with vibrations.
Instrument replacement	S	/	Replacement is necessary if the device is no longer functioning.

NOTES: Key: O = ordinary / S = extraordinary

ORDINARY MAINTENANCE

For correct maintenance of the ESA ECS-DRIVER board, scrupulously follow the following instructions. Before carrying out maneuvers with the system on, evaluate that the safety of the process and the operator is not compromised, if necessary carry out the check procedures when the system is off.

CASE CLOSING CHECK

The closing of the electrical device containment panel is essential for its correct functioning as it avoids the entry of agents that can damage the control board. If there is dirt, first disconnect the power supply to the device and then remove the dirt by blowing with compressed air. Do not use any mechanical means for this operation.

INTEGRITY CHECK

The integrity of electrical cables can be checked visually. If it is necessary to operate on the conductors for verification, since they are not totally visible, disconnect the power supply from the device before carrying out any operation.

CONDUCTOR TIGHTENING

Checking the tightness of the conductors in the relative terminals is necessary to avoid malfunctions or overheating. During this operation, also check that the conductor insulation arrives inside the terminal or the insulated terminal.

EXTRAORDINARY MAINTENANCE

It is not possible to perform repairs on the device or its components. In case they break, replace the damaged piece. It is therefore strongly recommended to buy spare parts in advance in order to intervene quickly.

INSTRUMENT REPLACEMENT

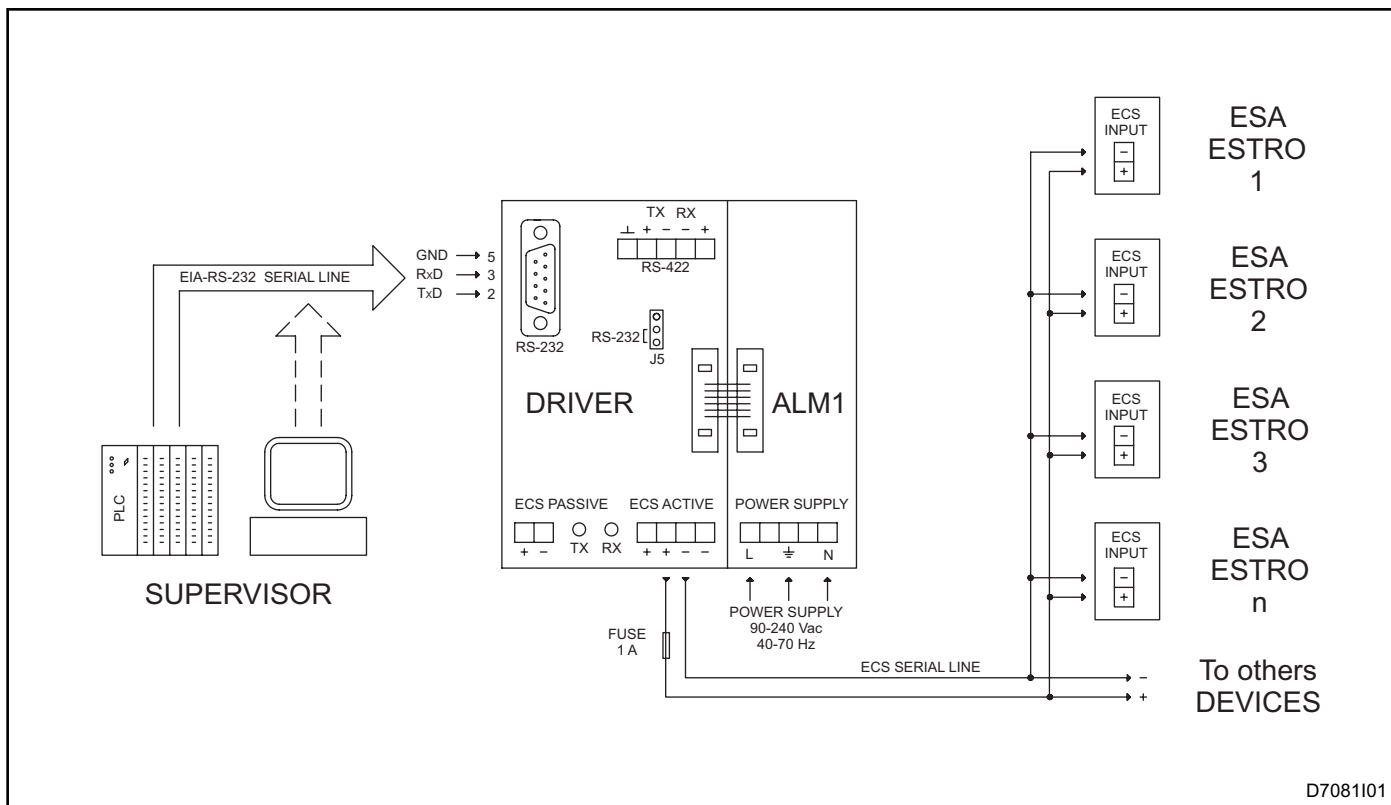
1 - Make sure that the device is the cause of failure or improper operation and that a replacement device similar to the one to be replaced is available, checking the data on the identification label and the system documentation.

2 - Deactivate the power supply, release the quick-release terminal of the board, leaving the wires connected to the female terminal block. Remove the DIN rail mounting card.

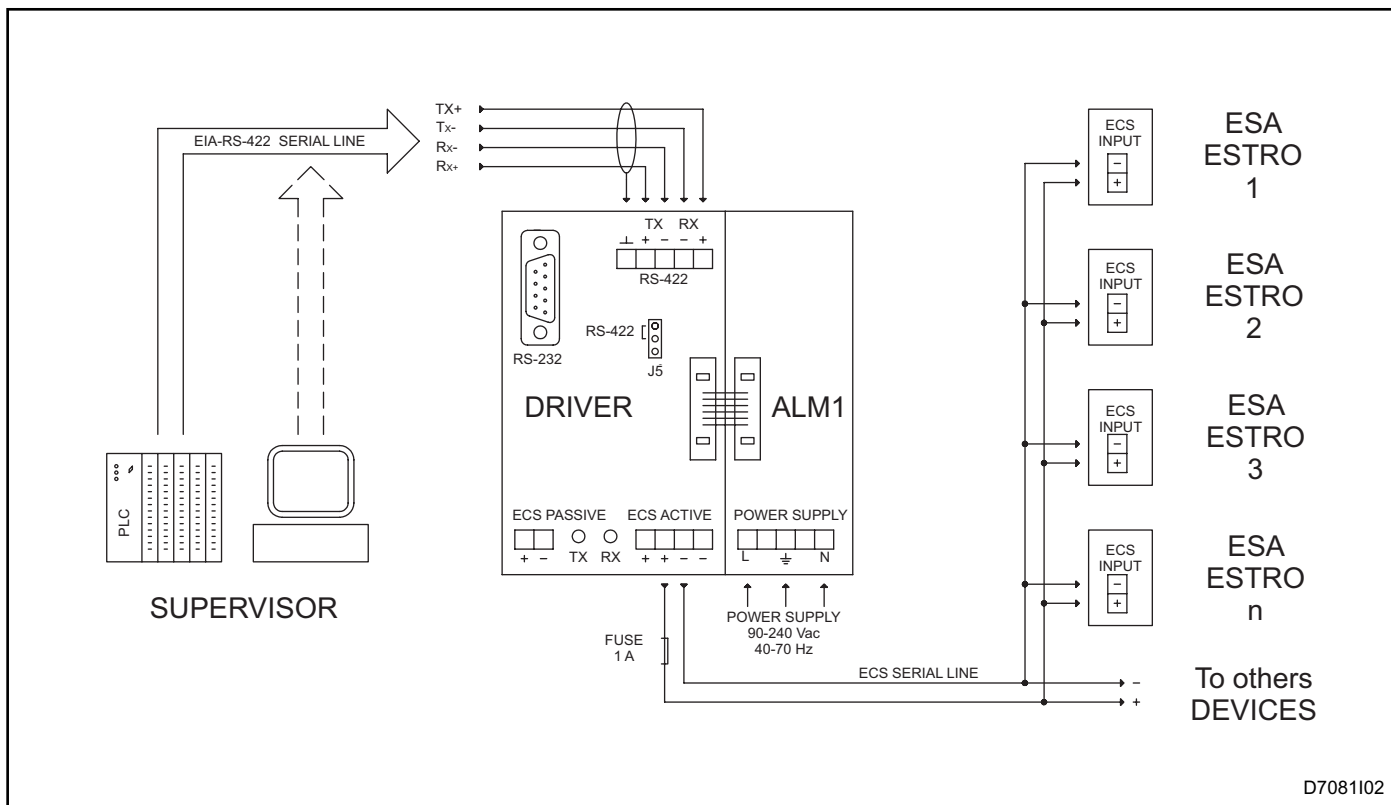
3 - Replace the device and insert the female terminal blocks connected to the cables in the housing on the new instrument, making sure that they are correctly inserted and not reversed or translated.

4 - Activate the power supply and check that the new device works correctly.

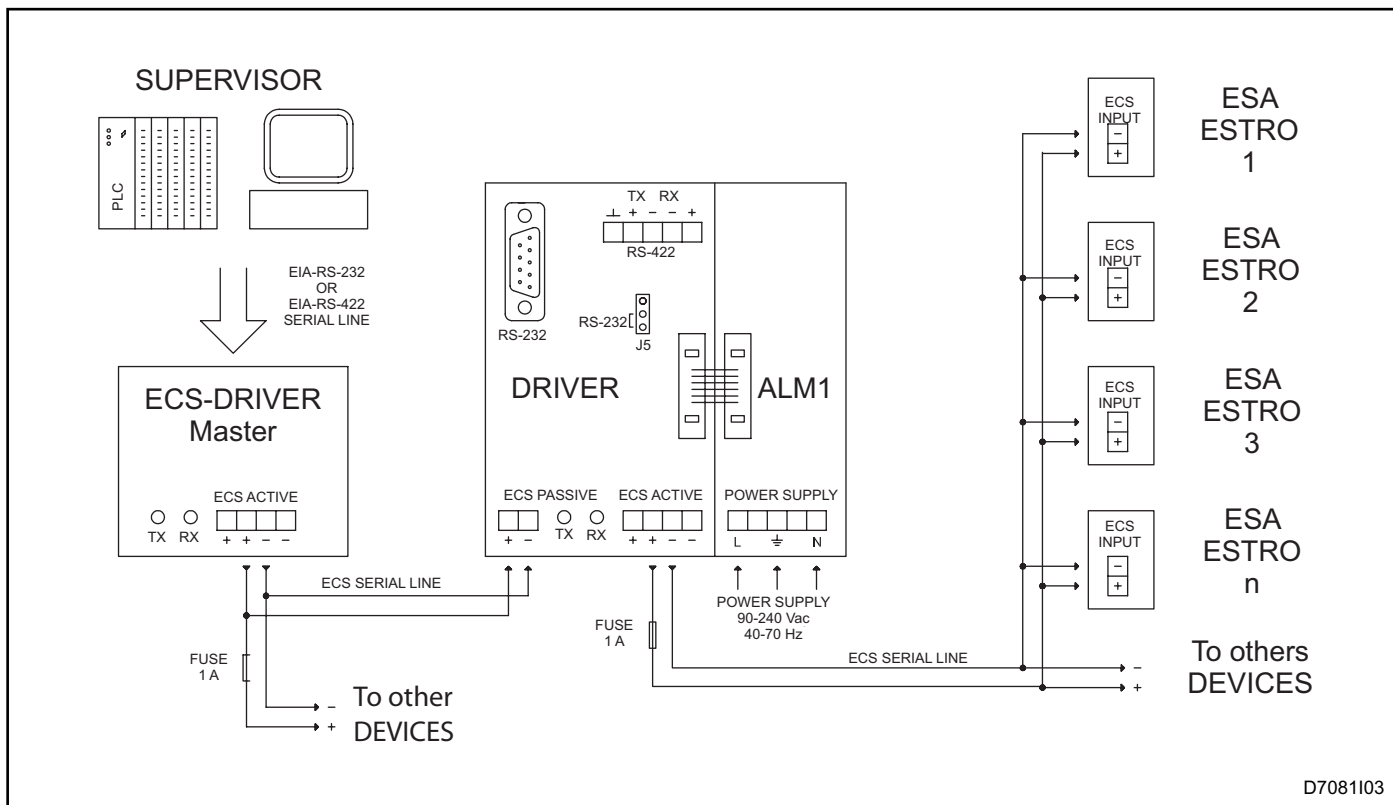
ELECTRICAL WIRING ESA ECS-DRIVER-S MASTER EIA-RS-232



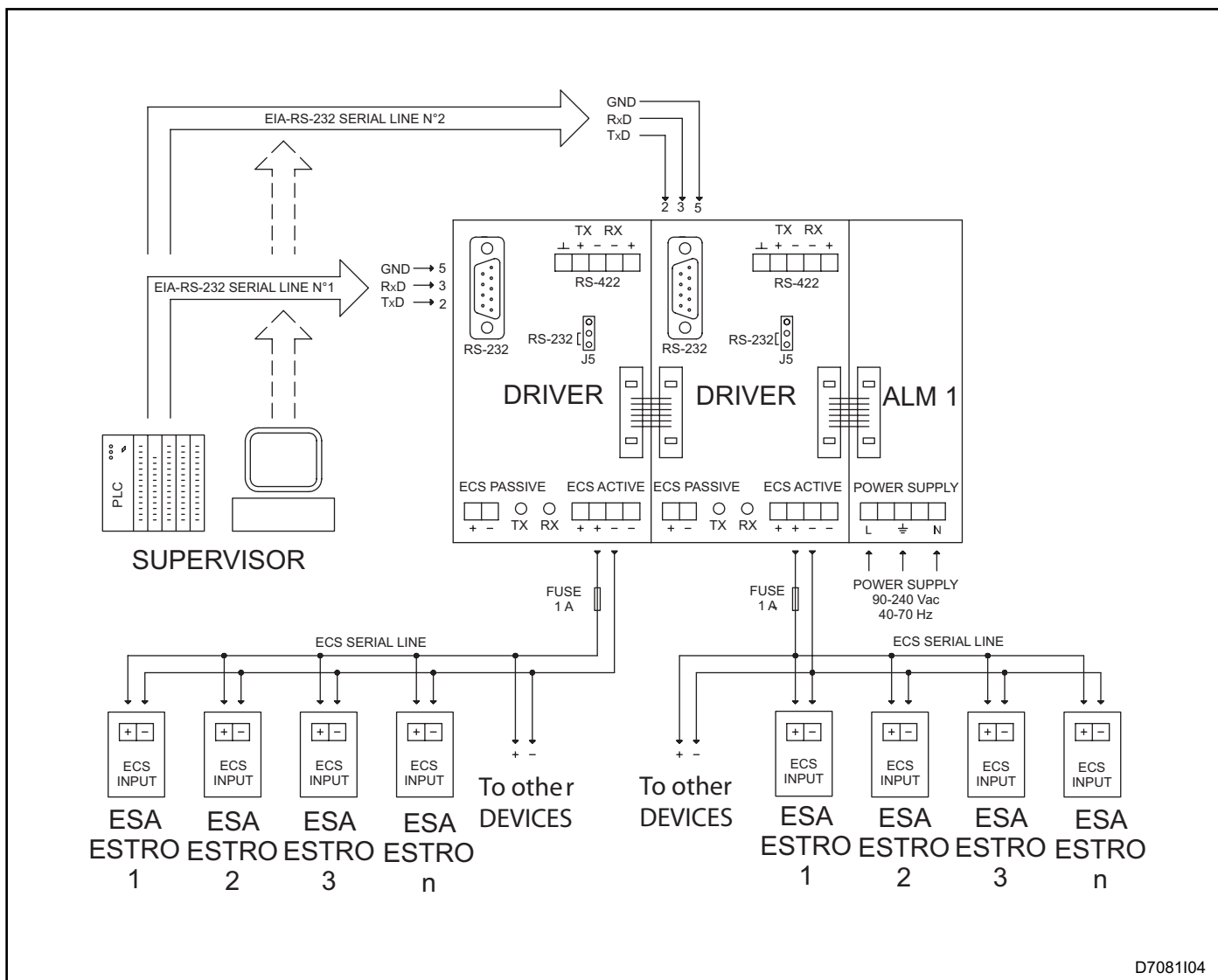
ELECTRICAL WIRING ESA ECS-DRIVER-S MASTER EIA-RS-422



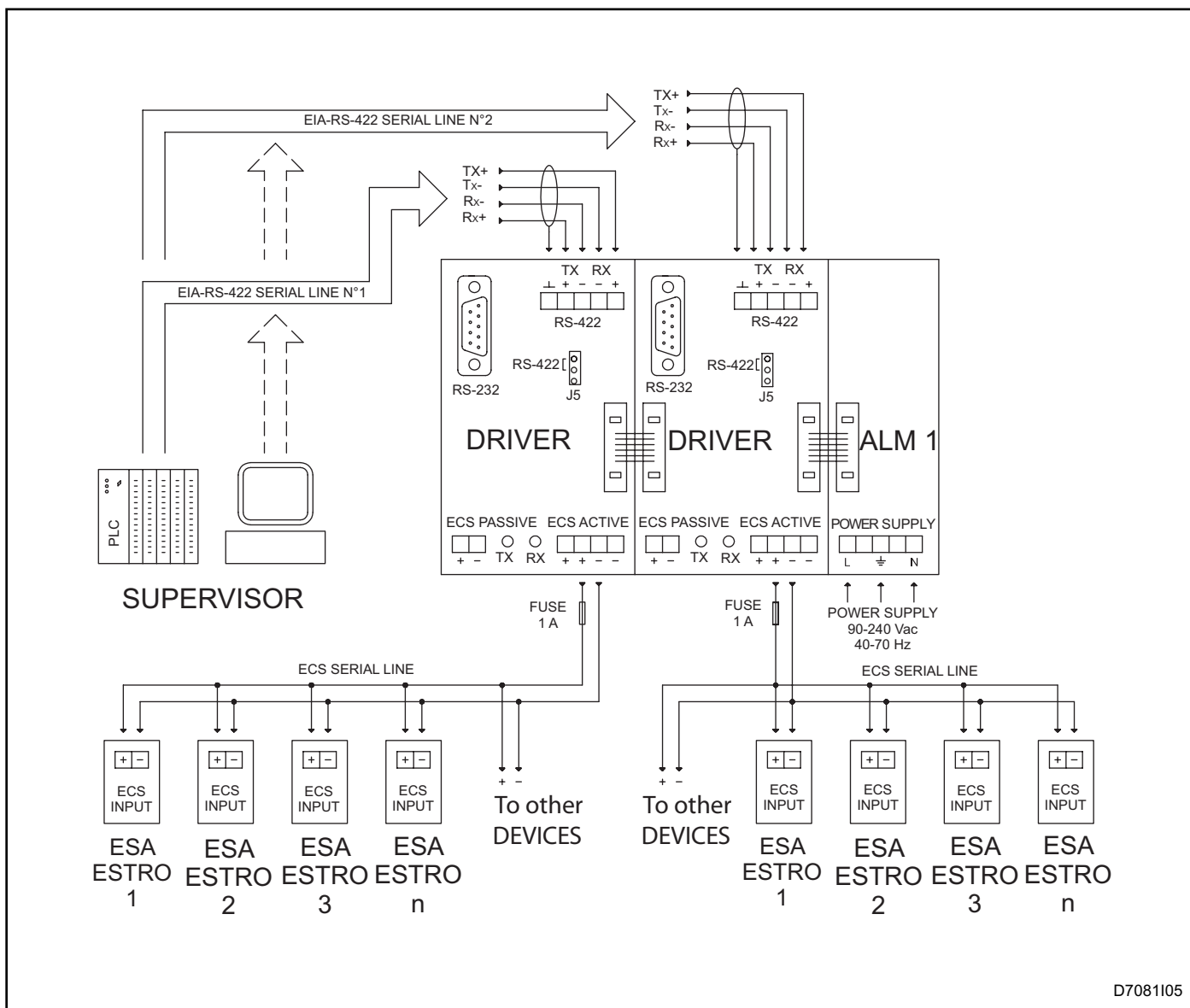
ELECTRICAL WIRING ESA ECS-DRIVER-S RELAY



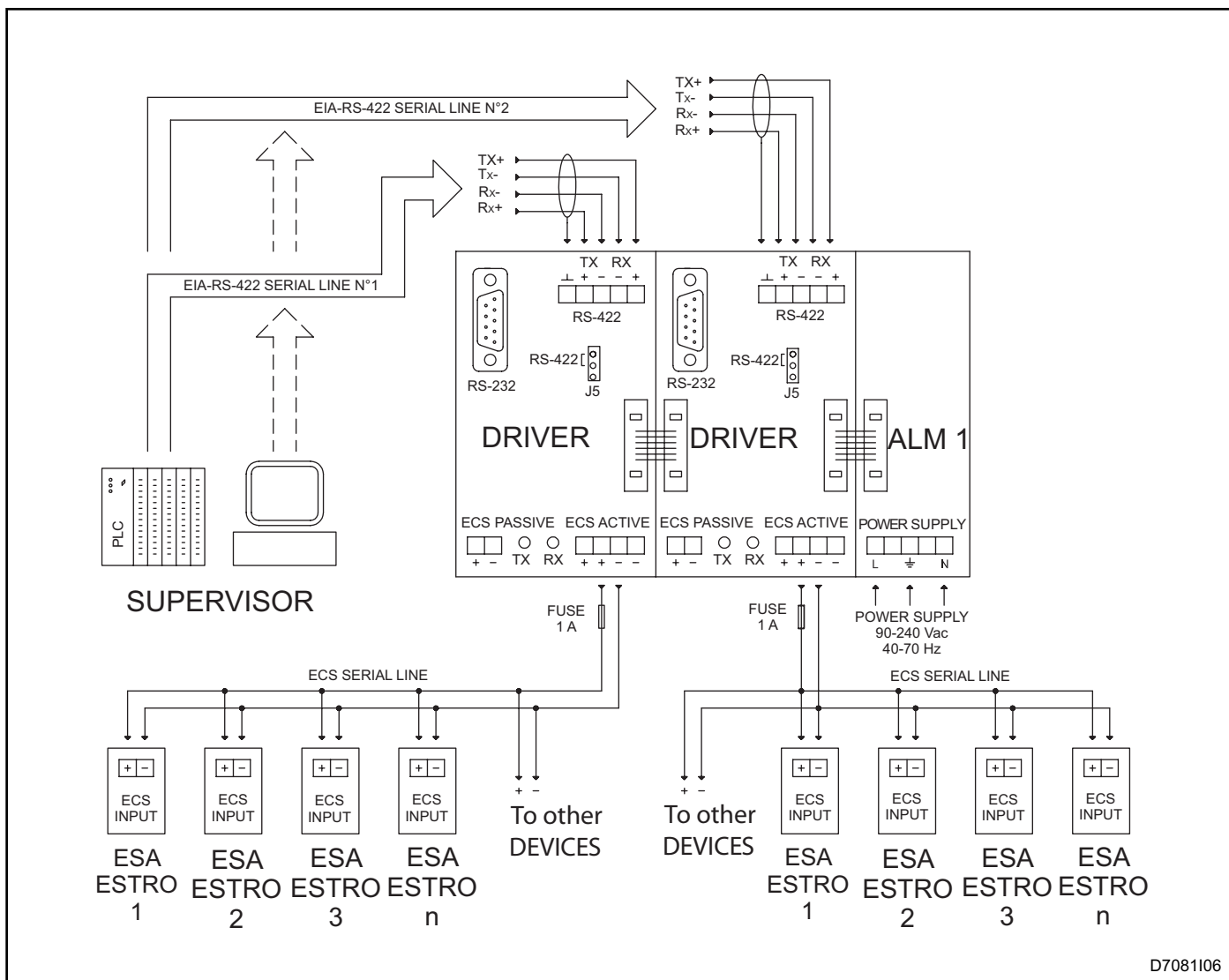
ELECTRICAL WIRING ESA ECS-DRIVER-D DOUBLE MASTER EIA-RS-232



ELECTRICAL WIRING ESA ECS-DRIVER-D DOUBLE MASTER EIA-RS-422

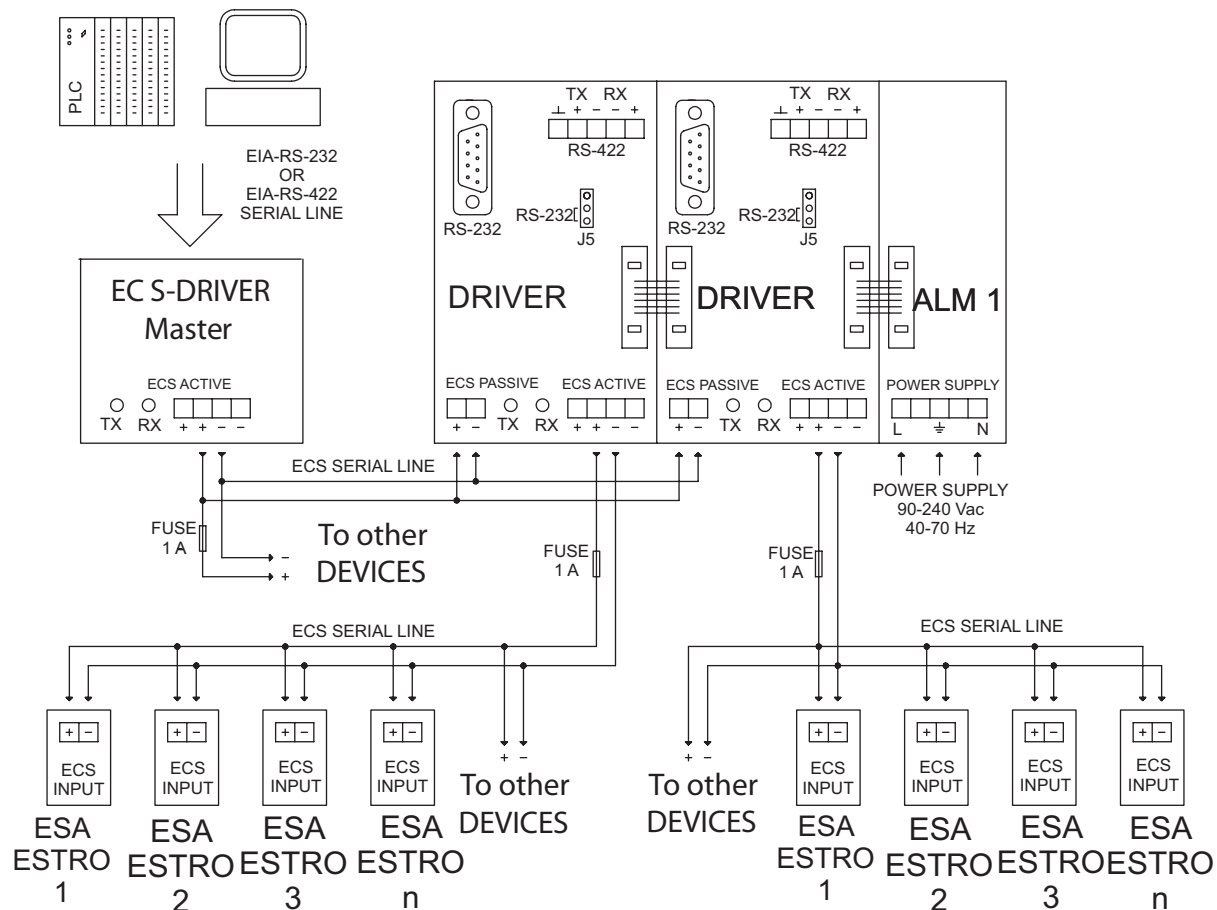


ELECTRICAL WIRING ESA ECS-DRIVER-D MASTER RELAY



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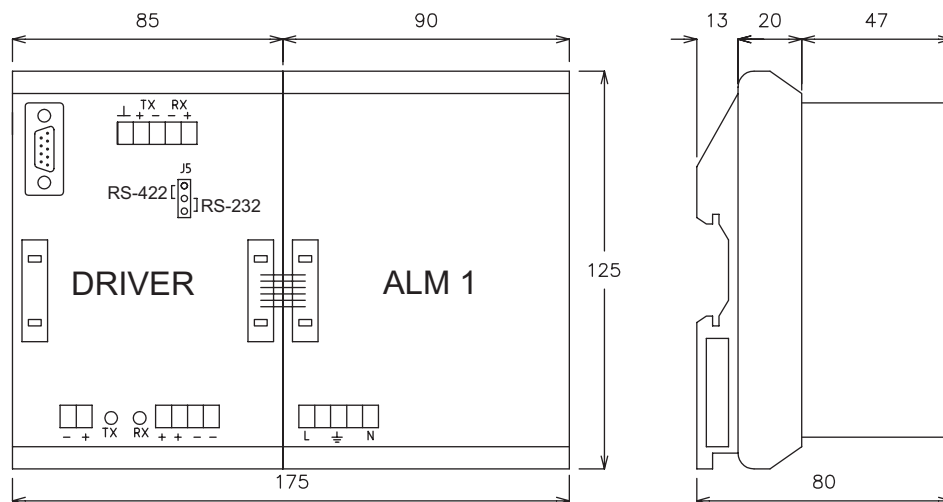
SUPERVISOR



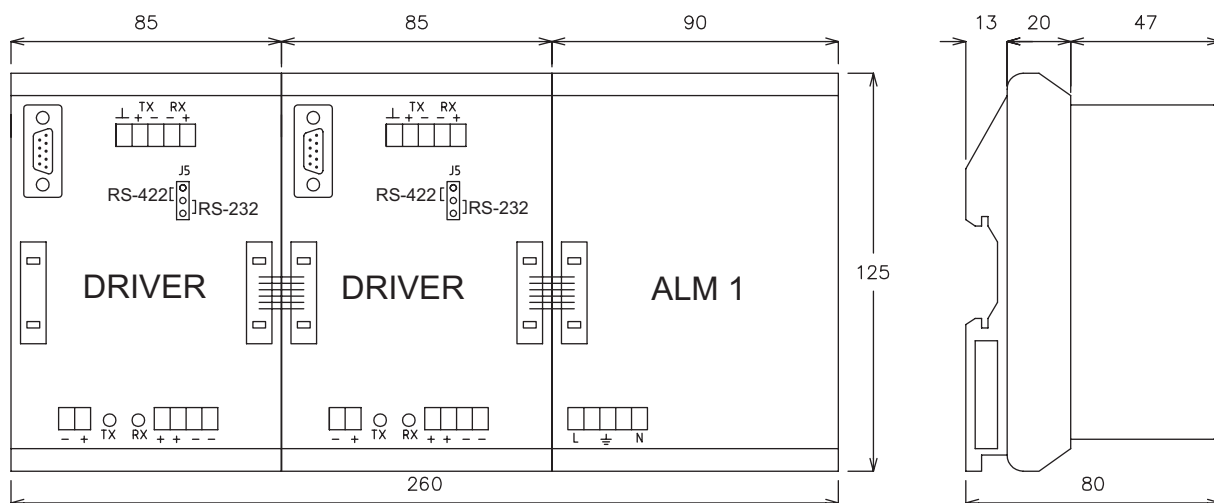
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OVERALL DIMENSIONS - ESA ECS DRIVER-S & ESA ECS DRIVER-D

ECS-DRIVER-S



ECS-DRIVER-D



D7081I08

ORDERING CODE

ESA ECS-DRIVER-

DEVICE VERSION		01
Single ECS output	S	
Double ECS output	D	