ROMANO
ELECTRONIC
division

Romano Injection System

'E'

Romano Injection System "E"

Romano ECU "E" is the last generation phased sequential system designed by Romano Srl.
This system is the result of the research and development process carried out by the Electronic Engineering Division of Romano group and his long-time experience in gas for autotraction use field.
Romano ECU "E" system is patented thanks to its new functions and its cutting-edge technology.

The characteristics of this new ECU are the following:

- a **Hardware** with innovative functions and concepts;
- a new **device**, named **DSI** (Digital Sensor Interface), designed just for this ECU which has completely changed the function of MAP SENSOR introducing a technology already known but used for the first time in this context. The new communication protocol and the new algorhitms allow communication among the **"E" ECU,** the **DSI** system and the **switch** so that they can manage all the parameters and functioning information on digital line.
- a **connector** with very low number of pins (20 pins) which, thanks to the new communication system, can be used on the ECU without missing the most important functions. Most of connecting wires are provided with connectors to avoid any kind of mistake during installation and saving time;
- **DIAGNOSIS** of the following devices:
  Presence of Gas injectors or short circuit;
  Presence of Switch
  DSI

- a **Software interface (**same of ANTONIO ECU**)** easy-to-use:
  - It's user-friendly and customizable;
  - Allows a fast communication with Gas ECU;
  - Interacts with new sensors of **"E" ECU** through **DSI** interface;
  - Has a Manuals section where the installer and the end-user can find all the useful information about the correct use of **"E" ECU**

SWITCH

New ECU **"ℰ"** is provided with a **new** switch with the following functions :

- Selection of fuel type: GASOLINE or GAS (LPG-CNG). The selected fuel type is indicated by LED lights.
- Indication of fuel level of gas in the tank for LPG or pressure in the tank for CNG;
- Light and acoustic signal when the fuel level in the tank (LPG or CNG) is not sufficient;
- Light and acoustic signal in case of problems with Gas system (diagnosis) ;
- EMERGENCY PROCEDURE: Usually with the injection systems the vehicle starts on gasoline and, once the engine gets the minimum pre-set conditions, switches to Gas automatically. When the vehicle has problems igniting on gasoline, EXTRAORDINARILY, by the switch it is possible to make the vehicle ignite on gas to let the end-user arrive to the nearest assistance workshop;
- Connection to ECU by digital line and new communication protocol.

DSI (Digital Sensor Interface)

Thanks to this new device the **"ℰ"** ECU can get and manage some information on digital format.

- DSI is provided with a specific nozzle connected to vehicle aspiration manifold. DSI detects and sends to **"ℰ"** ECU instant by instant the right engine load so that, analyzing other functioning parameters, it can decide the right fuel quantity to supply.
- DSI is provided with an apposite nozzle connected to gas hose.dispone di un ugello passante di opportuno diametro che è collegato al tubo del gas.
- DSI detects and sends to**"ℰ"** ECU instant by instant gas pressure and temperature so that, analyzing other functioning parameters, it can decide the right fuel quantity to supply.
- By a dedicated wire DSI can read and understand engine RPM. Optionally, during calibration, this wire can be used to read lambda sensor signal. In this condition **"ℰ" ECU** will calculate engine RPM by gasoline injection time.
- Moreover by a dedicated wire DSI can read reducer temperature.
- Control of pressure on injectors rail allows the **"ℰ"** ECU to switch automatically to GASOLINE when the pressure goes under a pre-set limit (low gas in the tank) and the engine cannot be supplied by gas.

RAIL

RAIL is a rigid duct to make injectors installation easier .

Configuration :

- GAS inlet for hoses with internal diameter of 12 mm ;
- Nozzles for hoses with internal diameter of 7 mm for injectors connection;
- There are 3 different models of Romano RAIL: 3 outputs – 4 outputs – 5 outputs.

INJECTORS (Romano Fast2)

Romano injectors are electromechanical devices which, controlled by ECU, decide the right quantity of gas (LPG or CNG) to supply the engine.
To better fit all engine types Romano manufactures injectors with different nozzles size as per the following list :

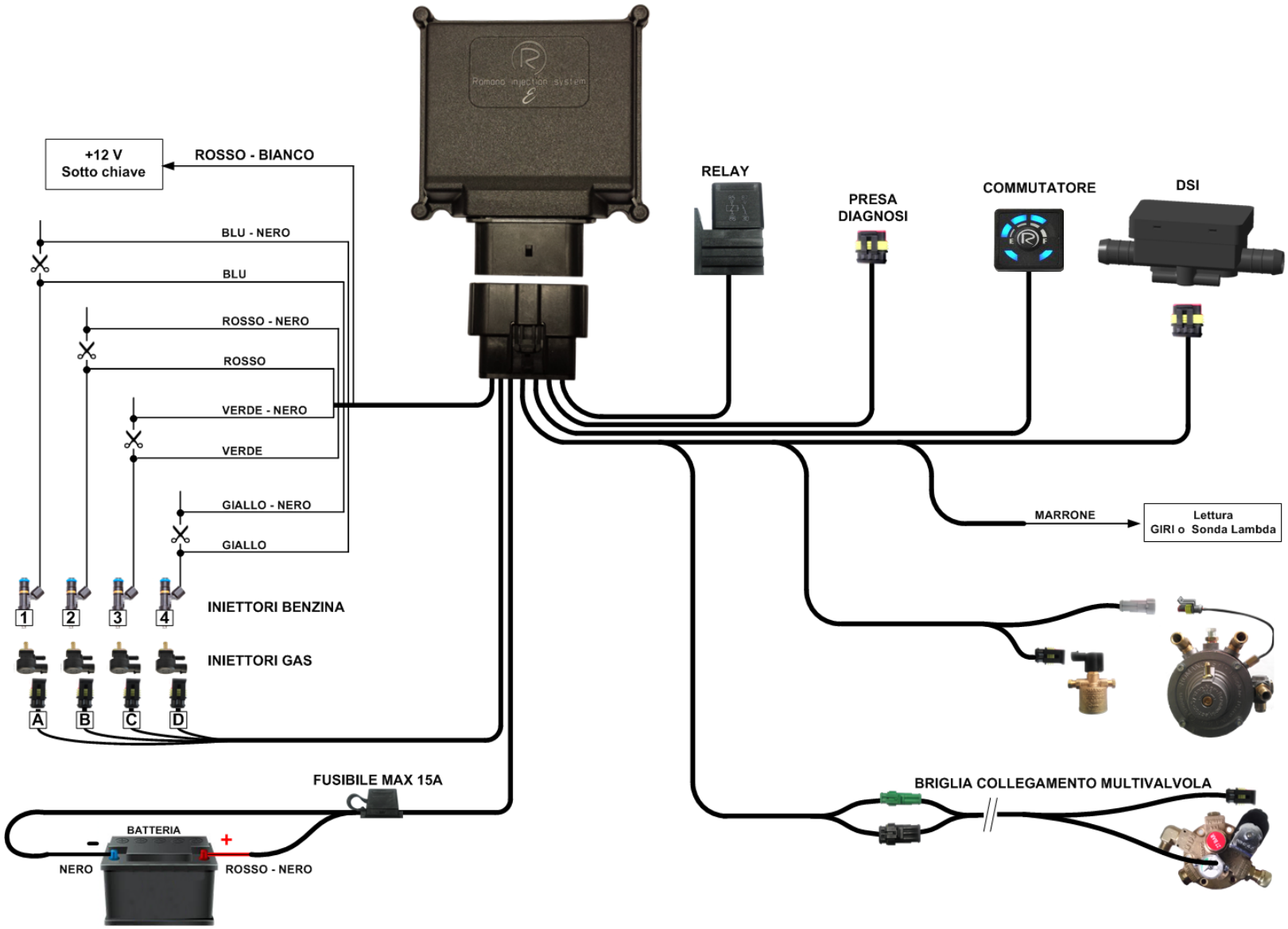
- Ø 1.4 mm
- Ø 1.6 mm
- Ø 1.8 mm
- Ø 2.0 mm
- Ø 2.2 mm
- Ø 2.4 mm
- Ø 2.8 mm
- Ø 3.0 mm
- Ø 3.2 mm

Characteristic of 'ℰ' ECU

ECU with hardware PATENTED	***NEW*** **the new hardware allows the communication among all devices such as switch and DSI on a dedicated digital line**
Fuel type	LPG / CNG
Number of cylinders	2 cylinders – 3 cylinders – 4 cylinders
Autocalibration	***NEW*** Automatic adjustment of map and working pressure of reducer.
Gasoline Injectors Emulator	To interrupt the negative of gasoline injectors you have to use the coloured and black-striped wires. Please during installation make sure to follow the connecting direction of wires.
LPG/CNG reducer pressure	***NEW*** Software with automatic adjustment of working pressure of LPG/CNG reducer
RPM signal	***NEW*** Through a dedicated wire DSI can read and understand RPM or, optionally, during calibration this wire can be used to read lambda probe signal. In this case **"ℰ" ECU** will calculate RPM from injection time.
RPM signal intensity	***NEW*** In special circumstancies when RPM signal has very low voltage, if BROWN wire is connected, it is not necessary to install any amplifier and multiplier of external signal .
GAS / GASOLINE management	***NEW*** New algorithms to control gasoline supplies at idle and high speed. User-friendly software with a new design very easy to use.
Diagnosis	ECU diagnosis is able to detect the following problems: presence of gas injectorstori and short circuit; presence of switch; presence DSI
Injections Sequence	***NEW*** New algorithm to control the advanced injections sequence (phasing wheel). Even when the advanced injection sequence is functioning, it is possible to manage the partial or total fuel contributions.
REC Function	***NEW*** Possibility of functioning parameters storage at any time
WIRING HARNESSES	***NEW*** **"ℰ" ECU connector on 20 pins** ***NEW*** Power relay is located in an apposite box outside the ECU. Dedicated output provided with connector for GAS electrovalves. All devices such as timing advance or other emulators needing Gas control, should be cponnected to these wires. Gasoline injectors cut-off with free wires, **"ℰ"** ECU is provided with coloured and BLACK-striped wires, during installation please make sure of right direction of connection.
NEW **Temperature control and mangement by DSI**	Reducer Temperature – GAS Temperature (Sensors 4K7 and 2K2) Automatic adjustment of GAS carburation according to the detected temperature values.
NEW **Gas pressure control and management by DSI**	Automatic switch to gasoline when Gas pressure is low. Automatic adjustment of gas carburation according to the detected pressure values.
Engine control	Turbo – Valvetronic – Start and Stop

ECU Characteristics of '*e*' ECU	
Short injections control	Short injections control (extra injections) by appropriate slider
NEW **Lambda sensors control**	Reading of Lambda sensor
Injectors Test	Possibility to check the right combination gas injectors /gasoline injectors
LANGUAGES control	ECU software is multilingual
Vehicle Assembly Diagrams	The software includes assembly diagram of the vehicles.
GUIDE	Inside the software you can always find and consult - even when off-line - the following files: • Installer Manual; • AIS sotfware Manual; • End-ser Manual (printable)
SWITCH	New design
ECU	Plastic box with protection level IP67
DSI (Digital Sensor Interface)	Plastic box with protection level IP67
Software design	The control software is completely customizable

ECU Characteristics of '*e*' ECU	
Supplied voltage	*Battery voltage (8 ÷ 16V)*
Working Temperature	*- 40°C ÷ 125 °C*
Idle speed current absorption	*Stand-by mode Iqs<1µA*
Injectors GAS outlets	*From 2 ÷ 4 injectors – Imax 6 A continuous for each cylinder with maximum battery voltage 16V*
Electrovalves outlets	*Pmax Tot. 130W; Imax 9,6 A (reducers outlet + tanks outlet)*
Level Sensors	*Standard ROMANO for LPG and CNG – CUSTOM– 0 ÷ 90 Ohm- Linear active Sensors 0 ÷ 5V*
MAP sensor (DSI)	*Standard ROMANO*
Reducer temperature Sensor	*Standard ROMANO 4.7 KΩ / 2.2 KΩ*
Gas Temperature Sensor	*Standard ROMANO 4.7 KΩ / 2.2 KΩ*
Lambda sensors	*0 ÷ 1 V*
ECU homologations	E24 *E10R – 03 0831* | E24 *67R – 01 0020* | E24 *110R – 00 0044*
Switch homologations	E24 *E10R – 03 0830*
MAP homologations (DSI)	E24 *E10R – 03 0832* | E24 *67R – 01 0019* | E24 *110R – 00 0043*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Sotto chiave
ROSSO - BIANCO
BLU - NERO
BLU
ROSSO - NERO
ROSSO
VERDE - NERO
VERDE
GIALLO - NERO
GIALLO
1
2
3
4
INIETTORI BENZINA
A
B
C
D
INIETTORI GAS
FUSIBILE MAX 15A
BATTERIA
-
+
NERO
ROSSO - NERO
RELAY
PRESA DIAGNOSI
COMMUTATORE
DSI
MARRONE
Lettura GIRI o Sonda Lambda
BRIGLIA COLLEGAMENTO MULTIVALVOLA

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