LA SEMAFORICA

TRAFFIC CONTROLLERS

LA SEMAFORICA srl
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CARTESIO

Highest Processing Power Interactive Traffic Controllers

La Semaforica's Cartesio Traffic Controller met the latest transportation industry standard, which incorporates the Linux open architecture operating system.
It has been developed and built in compliance to standards of EN 50556:2011-02 and it is supplied with CE Certification.

KEY FEATURES

- Based on a multiprocessor structure, and it is made up by a central control 32bit 1 GHz ARM Cortex-A8 processor that provides highest processing power on the market and by a series of remote microprocessors for the manage¬ment of inputs and outputs.
- Modular Eurocard boards (100 mm x 160 mm) lodged in a rack 19" 3/6U with polarized connectors according to DIN 41612,
- Provided with a Revolutionary large 7-Inches color Touch TFT LCD display, in order to make the interface with end users easy and intuitive.
- Signal Output cards with triac outputs for 230 or 42 VAC with full monitoring of voltage and currents on all outputs.
- Each card controls two signal groups.
- Cartesio has compact size and modern styling, allowing it to easily fit in tight cabinet space requirements.

KEY BENEFITS

- 1 GHz ARM Cortex-A8 processor that provides highest processing power on the market
- Revolutionary large 7-Inches color TFT LCD display
- Touch-screen display for intuitive graphical programming
- Easy to Read, Even in Direct Sunlight, Cartesio comes standard with the Industry's largest, environmentally hardened, highest-resolution, brightest, color touch screen.
- Wi-fi connection available
- Bluetooth connection available for remote control trough Tablet or Smartphone
- Linux, open architecture real-time multi-tasking operating system
- Alternative Web browser-based user Interface allows remote programming and status observation

KEY FUNCTIONS

- Flashing
- All red
- Manual with remote control
- Automatic with fixed times
- Synchronized - Linked or internal timer
- GPS Timing function
- Actuated by the traffic flow with extension and/or cancellation of traffic phases
- Light off features
- Fully adaptive according to traffic data collected
- Priority system for public or emergency vehicles
- Automatic change between summer time/daylight time
- Monitoring of all connected lamps
- Collection and storage of traffic data with volumetric and classification standards, collected through inductive loops, microwave, magnetic, video technology
- Using TCP/IP or 3G modem it can be directly connected to many different control and monitoring systems.
- Remote bluetooth control by Tablet or smartphone
- European industry standard

CONTROLS AND SAFETY

With reference to standards of EN 50556:2011-02, the traffic control¬ler foresees a series of redundant control circuits on different hardware so as to give a complete security on all outputs.

- All colour and green/green conflicts
- Tresholds times for all signal states
- Signal sequences
- Lamp load for red, amber and green
- "INTERGREEN MATRIX": control of inter-time among green lights as function of minimum times of ignition, and a progam-mable compatibility matrix.
- "PROGRAM ERROR": check of installation running program and correct times programmed "CURRENT CHECK": control of a single lamp output.
- "Check of wrongly switched-off lights": control of electrocuted loads.
- "Check of wrongly switched-on lights": control of short-circuit cables.
- Internal detailed log with indication of temperature and voltage

TECHNICAL DETAILS

- Equipped for 64 signal groups
- Up to 128 digital inputs
- Up to 64 digital outputs
- 64 independent programs selectable
- Detection and classification of traffic data
- Connections via 2G / 3G / 4G, Bluetooth, Wifi, Ethernet
- Fully Adaptive traffic with dynamic plan generation
- Standard Power 230 Vac
- 42Vac ELV Available, Safety Power
- Dimming Function Available, Energy Saving
- App available for Android or Apple devices
- Software Open multi-languages
- Centralization with TMacs System
- Centralization with SIGMA System (Elsag)
- Centralization with SPOT/UTOPIA System (Swarco Mizar)
- For control and supervision Cartesio has interfaces to many different control and monitoring systems.
- Internal web-interface

Core

- Sitara™ ARM® Cortex®-A8 32-Bit @ 1-GHz
- NEON™ SIMD Coprocessor
- 32KB of L1 Instruction and 32KB of Data Cache With Single-Error Detection (Parity)
- 256KB of L2 Cache With Error Correcting Code (ECC)
- 176KB of On-Chip Boot ROM
- 64KB of Dedicated RAM
- 64 KB On-Chip Memory (Shared L3 RAM)
- OS: Linux kernel ver. 3.8

Memories

- SDRAM Memory 512 MB 800 MHz DDR3L
- Flash eMMC 4 GB 8 bit
- MicroSD Slot

Interfaces

- Serial ports 1XRS485, 3X RS232
- USB HS USB 2.0 Client Port, LS/FS/HS USB 2.0 Host Port
- I2C Bus for sensor
- Real time clock Battery backed real time clock ± 5 ppm precision
- LAN Ethernet 10/100
- GPRS, 3G, 4G Optional
- Bluetooth, WiFi Optional
- Hardened touchscreen display to withstand harsh envi-ronmental conditions

SOFTWARE KEY FUNCTIONS

- Highest Interactivity and Access to Functionality
- Cartesio Touch software provides a full-color graphic interface with touch-screen capabilities for immediate menu selection and programming data entry. Allowing touch gestures to select yes/no, select enable/disable, and pull-down list selections provides intuitive interaction with controller functions. The screen can also be swiped to quickly advance to another application or window, making traffic management programming and access to signal controller functions the easiest in the industry.
- Combine with any European Standard Compliant Hardware or Software
- Cartesio is designed to meet the latest transportation industry standard, which incorporates the Linux open architecture operating system.
- Easy Access to Controller Data
- Cartesio software can be updated, signal-timing databases copied, or traffic controller logs transferred from a USB memory stick or a SD card. No laptop required.
- Easy Programming
- Built on the LA SEMAFORICA RSC traffic controller framework, Cartesio's traffic control algorithms are field-proven for over ten years.
- 64 traffic plans
- parameters for programming of local and central co-ordination.
- SW architecture for Android, IOS, Windows, Linux Systems with the same approach
- Cable-free linking trough GPS clock.
- One controller can control up to four independent intersections
- The logic is signal group controlled with a full conflict matrix between all groups.
- Traffic counting and classification.
- Built-in bus priority functions.
- Built-in train priority functions.

AVAILABLE VERSIONS

C

Signal groups: up to 64
Loop detectors: up to 64
Digital Inputs: up to 64
Communication Interface: RS232; Ethernet (optional)
Bluetooth (optional); 2G/3G/4G (optional); Wi-Fi (optional)
Supply voltage: 42/230 VAC
Ambient temperature: -40, +80°C

S

Signal groups: up to 64
Loop detectors: up to 128
Digital Inputs: up to 256
Communication Interface: Ethernet; USB/serial
Bluetooth (optional); 2G/3G/4G (optional); Wi-Fi (optional)
Supply voltage: 42/230 VAC
Ambient temperature: -40, +80°C

Accessories

LCD-80: HMI with LCD Display alphanumerical 80 characters (available for C version)

Touch: HMI with Touch-screen display 7" (available for S version)

RSC

Centralizable Traffic Controller

CE Certification obtained Acc. to EN:50556:2011-02

RSC centralizable traffic controller is a modular system developed by La Semaforica for meeting any requirement of traffic management, of any nature and complexity.
It has been developed and built in compliance to standards of UNI EN: 50556:2011-02 and it is supplied with CE Certification.

GENERAL CHARACTERISTICS

It is based on a multiprocessor structure, and it is made up by a central control unit that can be extended to an industrial PC 32 bit and by a series of remote microprocessors for the management of inputs and outputs.
It is formed by modular Eurocard boards (100 mm x 160 mm) lodged in a rack 19" 3/6U with polarized connectors according to DIN 41612, and provided with a front panel with a wide LCD display 80 characters, in order to make the interface with end users easy and intuitive.

TECHNICAL FEATURES

- Equipped for 32 signal groups (upgradble to 42)
- Max load for each lamp output 800 W
- 32 digital inputs (upgradble to 80)
- 32 digital outputs (optional)
- 16 independent programs selectable by LCD panel, remote control or with internal weekly charts
- 2 serial ports RS 232 (upgradble to 4 RS 232, 1 Ethernet port, 2 USB and 1 RS 485)
- Detection and classification of traffic data (32 inputs on 8 length classes and 8 speed classes)
- Centralization with TMacs System
- Centralization with PASPA System
- Centralization with SIGMA System (Elsag)
- Centralization with SPOT/UTOPIA System (Mizar)
- Connections via GPRS, leased lined
- Fully Adaptive traffic with dynamic plan generation
- Standard Power 230 Vac
- 42Vac ELV Available, Safety Power
- Dimming Function Available, Energy Saving
- Software Open multilanguages

MAIN FUNCTIONS

- Flashing
- All red
- Manual with remote control
- Automatic with fixed times
- Synchronized - Linked or internal timer
- GPS Timing function
- Actuated by the traffic flow with extension and/or cancellation of traffic phases
- Light off features
- Dynamic generation of traffic plan, according to traffic data collected
- Priority system for public or emergency vehicles
- Automatic change between summer time/daylight time
- Monitoring of all connected lamps
- Collection and storage of traffic data with volumetric and classification standards, collected through inductive loops and/or microwave technology
- Centralization with dynamic plan selection or phase progress

- Telecontrol with automatic sending of SMS or faxes, as soon as breakdowns on traffic controller arise
- Insertion of plan through internal weekly chart
- Insertion of plan on special dates with yearly calendar
- Automatic storage of damages, state exchange
- Degraded functioning with management algorithms, alarm event
- Algorithms for management priority tramways
- 80 characters display with vision of internal temperatures of cabinet, instantaneous power and power supply

CONTROLS AND SAFETY

With reference to standards of EN 12675, the traffic controller foresees a series of redundant control circuits on different hardware so as to give a complete security on all outputs.
In particular, the traffic controller is provided with the following controls:

- "CONFLICT GREENS": checking of incopatibility of two green lights simultaneously switched-on.
- "INTERGREEN MATRIX": control of inter-time a mong green lights as function of minimum times of ignition, and a progammable compatibility matrix.
- "PROGRAM ERROR": check of installation running program and that times programmed are correct.
- "CURRENT CHECK": control of a single lamp connected in parallel with other lamps.
- "Check of wrongly switched-off lights": control of electrocuted loads.
- "Check of wrongly switched-on lights": control of short-circuit cables.

TRAFFIC PLANS SETTING

Traffic controller programming is made through a special software developed by La Semaforica for PC or Mac in Windows® or Linux Operative System, which has an intuitive design to facilitate the configuration of any signaled junction.

Many parameters can be set directly on the controller, thanks to the keyboard and the LCD monitor. Maximum greens, detector configuration, are among the parameters that can be set.

MODULARITY

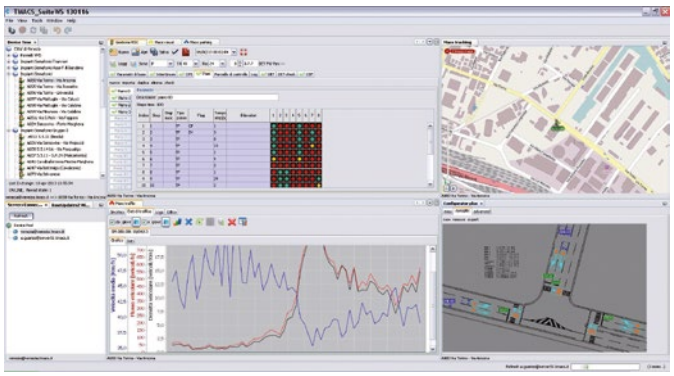
The modular structure of our RSC controller allow it to be configured for any kind of intersection and makes it simpler to fix in case of failure. The main components are:

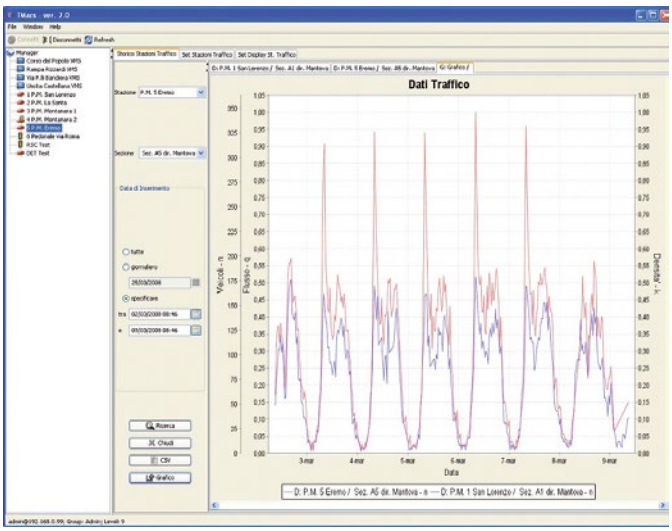
- Power Supply board: It provides power supply to the electronic circuitry of all boards and has an emergency flashing device that put the installation on flashing mode, even if CPU board is not working.
- CPU Board: It manages the traffic controller, the firmware is located here and it stores all configurations and set traffic plans.
- All data are recorded in an EEPROM support. The board can be extended with industrial PC platform with standard PC104: this integration allows the communications between traffic controller and any other system present on the installation.
- Detection board: it interfaces with vehicular detectors in order to collect and store traffic data. Data are available for a statistics use or directly for the dynamic control of phases.
- OUTPUT board: it is the interface between CPU and traffic lights. Each one has 6 lamp outputs and can control 2 signal groups.
- TA board: it runs as a support for OUT board, checking the power absorption of each output, detecting the burning out of each lamp.

TRAFFIC DATA ACQUISITION

RSC can be set up as a station to collect and process traffic data. In particular, besides normal functioning as traffic controller, the system is able to manage up to 32 inputs for vehicular detection. The data classification is based on length and speed parameters, and all incoming data are stored following eight classes of length and eight classes of speed.

Through a specific software, it is possible to configure, manage and download the archives.
All traffic data are stored at regular intervals of time, which can be set from a minimum of 1 minutes up to Two hours.
The operation software allows to export the whole archive in a chart form, compatible with MS Excel.





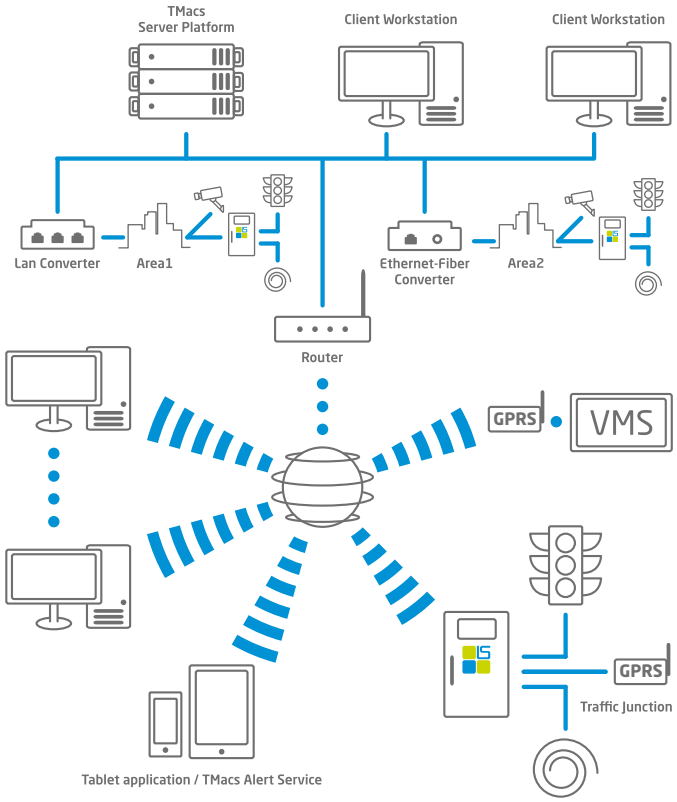
FULLY ADAPTIVE FUNCTION (CDF)

Calculation of best Green times on any traffic lane according to measured flow and fluency noticed. It can certainly be integrated with the normal actuated functioning. Using both of these adjustments together brings to a perfect management of the intersection. RSC traffic controller is able to determine and adjust in realtime the cycle times to real requirements of traffic. The dynamic generation of plan, with reference to time change of program, allows to modify the program referring to a real request from traffic and not to a statistic theoretical calculation. It is possible to realize a network of traffic controllers all operating in dynamic generation of plan.

TECHNICAL DETAILS	
Basic sizes (signal groups)	8,16,24,32
Loop detectors	8,16,32
Video detectors	Traficon
Voltage	230 Vac±15% 42 Vac±15%
Ambient temperature	-40 - +80°C
Load per output	Max 800 Va
I/O interfaces	12V, 100 mA
Cabinet (large)	900x1100x350mm
Cabinet (small)	600x1100x350mm
Indoor Rack	19" 3U (8 sg) 19" 6U (16sg-24sg) 19" 9U (32sg)
Communication	RS 232, Ethernet
System connections	TMacs - Utopia
Certifications	EN-50566 EN-50293

CENTRALIZED FUNCTIONING

RSC can be used in MANY Centralization Systems with the following functioning mode: choosing a traffic plan with phase progress, or in synchronized systems.
The Central System developed by La Semaforica allows to choose among different operative modes. Traffic junctions are linked to one or more geographic areas, and they can be selected through a showed menu; different arms of the menu can represent either a single junction or a junctions network, containing all single junctions that can be selected independently.
The architecture of a typical Centralization System is shown in the following scheme.



LS300

Traffic Controller

Traffic controller LS300 is a microprocessor control system with 16 lamp outputs and 8 programmable digital inputs.
The interface "man-machine" has been carefully developed, providing LS300 with a wide LCD display with 80 characters, so that it always gives a clear and intuitive indication of way of working; it supplies the monitoring and recording of temperature, power voltage and power consumption of the installation in real time, which are essential information in case of irregularities or breakdowns.
LS300 has been wholly manufactured with solid components, according to all CE standards, in particular it complies the requirements of EN:50556:2011-02..

OPERATIVE FUNCTIONS

- flashing
- all red
- manual with control through pushbutton or radio remote control
- automatic with fixed times
- synchronized
- actuated by the traffic with cancelled and/or extended phases
- preferential phase to public or emergency means of transport
- automatic change between summer time / daylight time
- monitoring of power voltage and the current flow of each lamp
- connected to verify and indicate possible failures
- remote control with automatic sending of messages via modem in case breakdowns occur

GENERAL CHARACTERISTICS

Traffic controller mod. LS300 has been produced for controlling vehicular and/or pedestrian traffic, both in an independent and in a centralized system. The traffic controller is able to record information concerning the traffic and to assure in any moment the control and the transmission of data to involved authorities.

TECHNICAL FEATURES

- Multiboard structure for an easy maintenance.
- 12 lamp outputs all checked by current flow so as to indicate a possible lack of charge or increasing charge
- 4 auxiliary outputs to be set up as lamp, relay output
- 8 digital and programmable inputs
- 8 independent programs with different structures and times, selectable from LCD panel, remote control or from internal weekly tables that can be programmed RS232 through PC
- 1 serial port RS232
- Completely programmable ON-SITE.
- Entry password that allows to change installation times also from LCD panel
- Maximum load for each output 800W
- Centralizable with GSM/GPRS technology
- Also available in LS312 version with 12 Vcc power for traffic light system with photovoltaic panel
- Software language Italian/English

CONTROL AND SAFETY

With reference to UNI EN 12675 norm, the traffic controller assures a series of cyclic control circuits and on Hardware that have been differentiate in order to give a complete security on all outputs.
In particular the traffic controller is provided with the following controls:

- "Conflicting Greens": check of switching on of green lights, following a programmable matrix;
- "Intergreen": control of inter-time among green lights, following a programmable matrix;
- "Lamps burnt out": voltage control on all the outputs of the traffic controller
- "Program error": verify the installation program and that times programmed are exact
- "Current control": check of current flow on all the lamps present on the installation

The intervention of one of the controls causes a state of alarm that, according to the seriousness, puts the installation in "flashing mode" or just indicates, through display or GSM modem, the failure to the personnel in charge of maintenance service.

LS300 is also provided with a register of events ("Black box") where it stores the occurrence of any alarm or failure, recording date and time of the event, temperature and voltage supply, state of traffic controller, active program in that moment. Traffic controller programs and the black box are recorded on different memories, both EEPROM type.

SETTING UP OF TRAFFIC PLANS

The configuration software has been studied for technicians/installators and it has been developed in Windows® operating system. If new plans are needed, these can be developed while the controller is operating, without having to switch of the signals.
It is possible to test the program viewing it on video before downloading it through serial connection to controller.
Moreover, it is possible to download different plans to a controller without stopping its functioning; this can be done through entrance procedure protected by password, in order to guarantee the access only by authorized personnel.

APPLICATIONS

Traffic controller LS300 is flexible and easy to use and it is mostly recommended in the following situations:

- Crossroads with 4 streets with or without pedestrian crossing, with 2, 3 or 4 phases
- T junctions
- Pedestrian crossing with or without speed control devices
- Alternate one-way street
- Access control in tunnels

CENTRALIZATION ON TMACS PLATFORM

LS300 is Centralizable on TMacs Platform.

POWERED BY TMacs

TECHNICAL DETAILs	
Basic sizes (signal groups)	4
Loop detectors	4,8
Video detectors	Traficon
Voltage	230 V ac±15% 12 V dc
Ambient temperature	-40 - +80°C
Load per output	Max 800 Va
I/O interfaces	12V, 100 mA
Cabinet (large)	600x1100x350mm
Cabinet (small)	320x940x290mm
Communication	RS 232
System connections	TMacs
Certifications	EN-50566 EN-50293

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