



Supervision and energy management software

Synergy

Applications



Supervision for industry, shopping malls

- Quality control of power grid supply
- Consumption accounting for cost centres
- Monitoring of machinery/production lines
- Operation monitoring of motors
- Operation monitoring of generating sets
- Monitoring of power factor correction installations
- Monitoring of process/environmental data (values of pressure, flow rate, temperature, ...).



Supervision for chains of stores

- Monitoring of energy consumption
- Installation diagnostics
- Consumption report for cost centres.



Supervision of photovoltaic installations

- Energy monitoring
 - Generated
 - Consumed
 - In-Out.



Supervision of waterworks and wells

- Quality control of power grid supply
- Energy accounting
- Operation monitoring of pumps
- Operation monitoring of generating sets
- Monitoring of process/environmental data (values of pressure, flow rate, temperature, ...)
- Monitoring of remote wells.

Synergy is a valid software to sustain the activities indicated by the standard EN ISO 50001 "Energy management systems. Requirements with guidance for use".

Synergy

Increasing energy efficiency means using only the power required (reducing consumption), using energy when it costs less (optimise consumption in tariff time slots, increase renewable energy consumption and so on) and improving energy quality (reduction of harmonics, power surges, ...).

Therefore, the first step to take is the monitoring and analysis of your power consumption. How much energy do you consume? When and how do you consume it? What is the state of your machinery and equipment? Are you promptly informed about malfunctions?

Synergy is a supervision and energy management **web-based** software that provides for the monitoring and control of the electrical installation, in a simple and efficient way. In addition to electrical quantities, it allows to check all environmental and process information (operating status, alarms, etc.), acquired from LOVATO Electric products, equipped with communication port, and thereby to carry out commands and parameterising.

Functionality

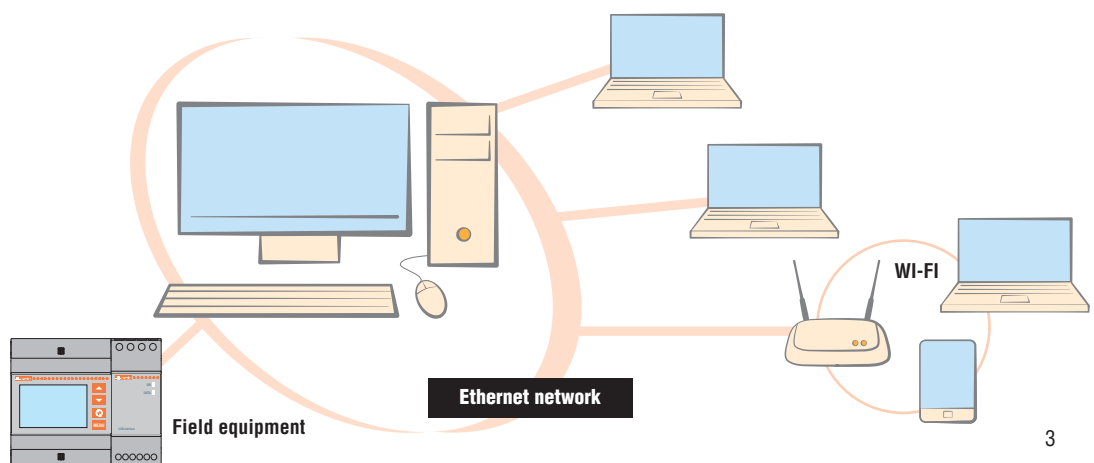
- Serial communication via Ethernet or modem with all devices in the field
- Database of instantaneous values
- Graphic pages
- Datalog files
- Energy consumption reports
- Charts
- Alarms
- Energy quality analysis
- Field equipment parameterising
- Access level management.



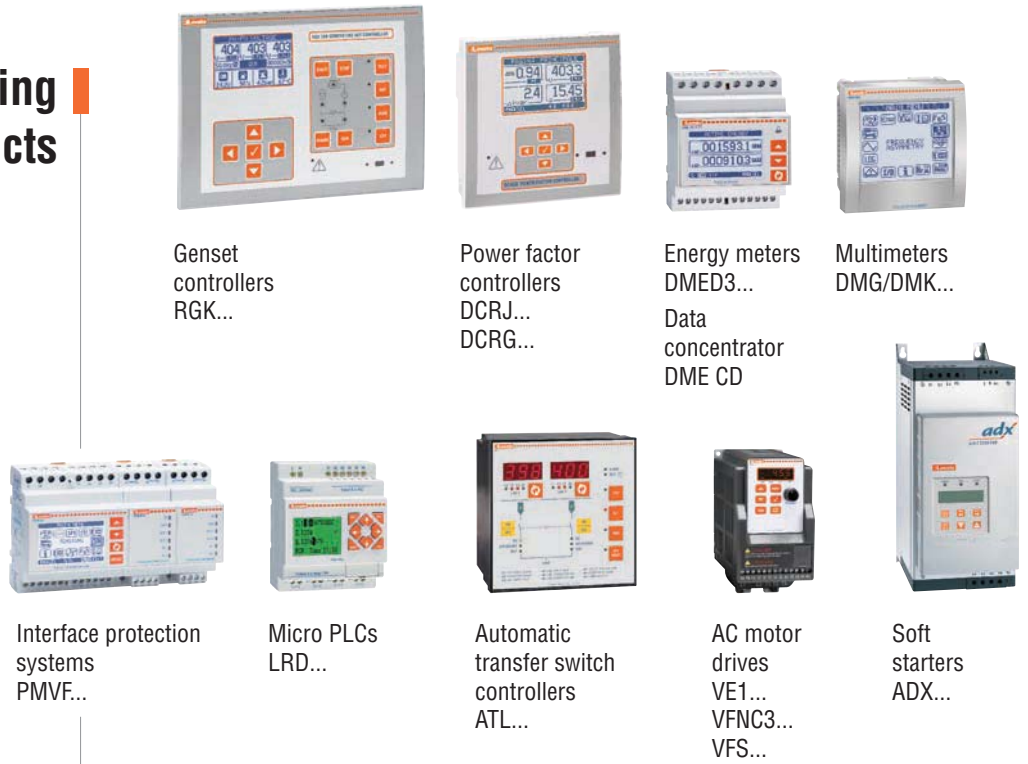
Server-multiclient system

Synergy structure and applications are based on **MS (Microsoft) SQL Relational Database** management system (RDBMS).

Synergy consulting (Client) is made through popular programs for Internet browsing that are available across different platforms and operating systems. These features allow **Synergy** to be a highly versatile system, simultaneously accessible to a large number of users/workstations, via intranets, VPN or Internet.



Interfacing products



Genset controllers
RGK...

Power factor controllers
DCRJ...
DCRG...

Energy meters
DMED3...
Data concentrator
DME CD

Multimeters
DMG/DMK...

Interface protection systems
PMVF...

Micro PLCs
LRD...

Automatic transfer switch controllers
ATL...

AC motor drives
VE1...
VFNC3...
VFS...

Soft starters
ADX...

The up-to-date list of LOVATO Electric devices interfaceable with **Synergy** software is available at the following address: www.lovatoelectric.com/Synergy_gb.htm.

System requirements

Supported operating system

- MS Windows XP SP3
- Windows Vista
- Windows 7 32/64-bit
- Windows server 2003
- Windows server 2008.

Supported browser

- MS IExplorer 9 64-bit
- MS IExplorer 10
- Google Chrome
- Apple Safari
- Mozilla FireFox
- Opera.

PC/Server hardware requirements

- Dual core CPU, 2GHz
- 2GHz of RAM
- 60GB hard disk (hard disk partition or volume depends on how much data you intend to record)
- SVGA 1024x768 16-bit pixels
- Type and number of communication ports based on use, be they Ethernet, RS485 serial, RS232 serial or modem.

Configuration

simple, guided, intuitive

Synergy programming does not require any particular computer knowledge since specific configuring instruments have been developed to guide through the configuration of product networks, graphic pages, datalog reports and charts, in a simple and intuitive way.

Languages

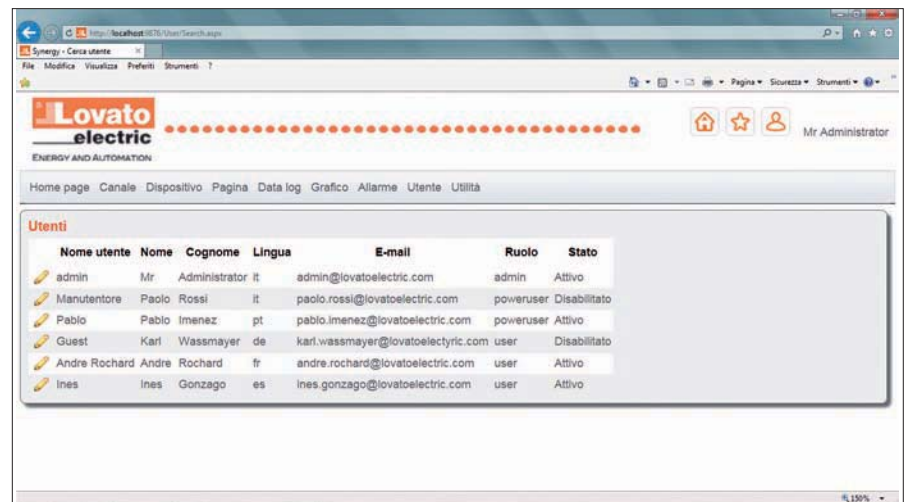
Synergy is available in the following languages: English, Italian, Spanish, French, Polish and Russian. The up-to-date list of available languages can be consulted at this address: www.LovatoElectric.com/Synergy_gb.htm

Access levels

Synergy allows access to a large number of users with different access levels and authorisations.

Three access levels are available:

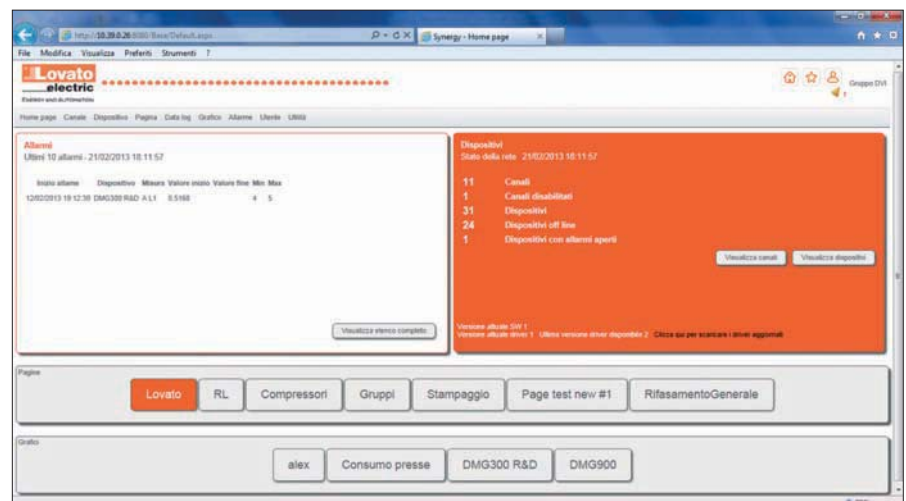
- Administrator: Complete access to all functions
- Power users: Viewing of a limited number of field devices, predefined by the administrator, with possible creating or changing of graphic pages, datalog reports and relative export and change of device setup.
- Users: Viewing of a limited number of devices, predefined by the administrator, and the relative pages.



Synergy home page

Main diagnostic data is concentrated in a single page to allow quick spotting of abnormal conditions of the entire system under control.

- List of last 10 alarms
- Status summary of communication channels and of devices
- Link to main graphic pages and preferred charts.



Example of local system architecture

Synergy software

SERVER Client 1



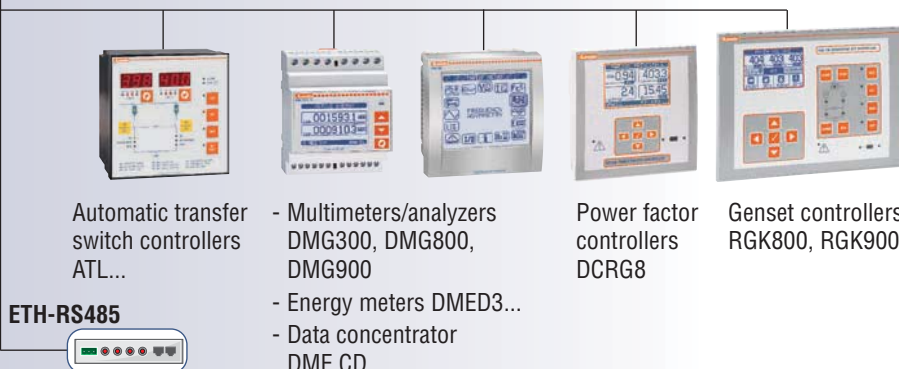
Telephone modem



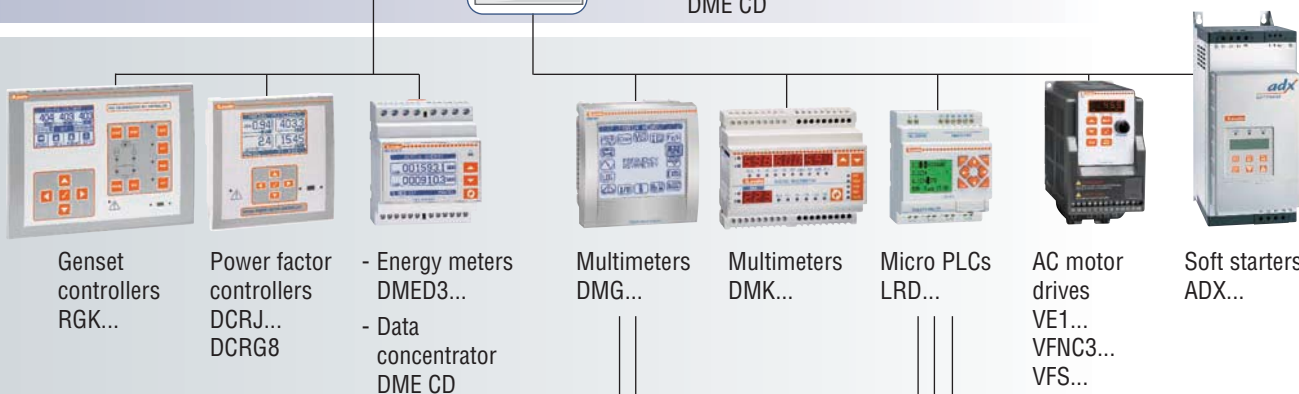
GSM-GPRS NETWORK (Modbus-ASCII)

- Multimeters DMG900
- Genset controllers RGK800, RGK900
- Power factor controllers DCRG8

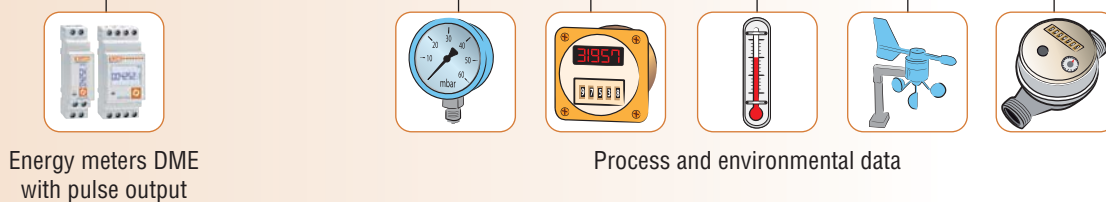
Ethernet
Modbus-RTU, Modbus-TCP/IP



Field bus RS485
Modbus-RTU



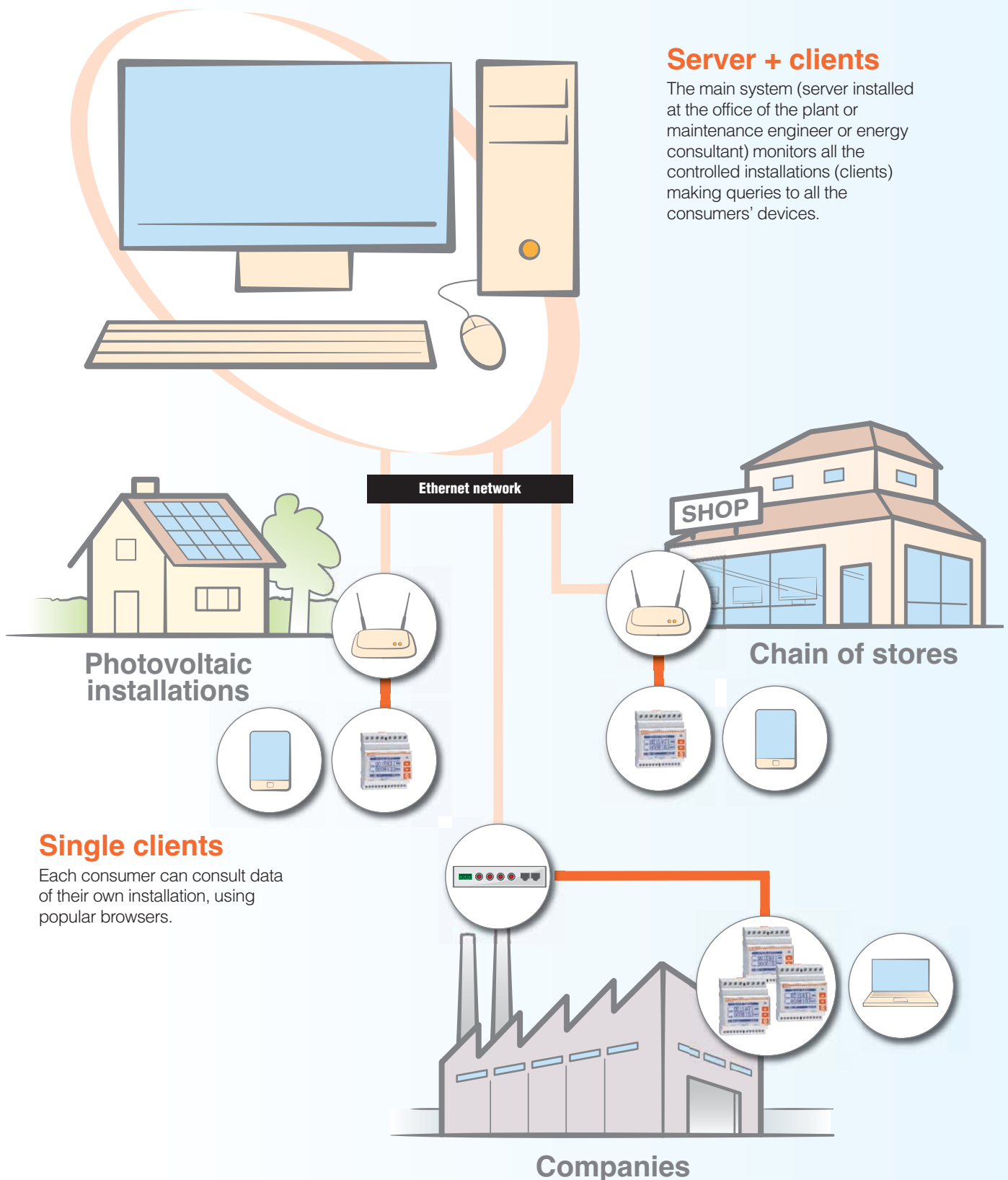
Field signals
Digital / Analog



Example of system architecture for many remote installations

Server + clients

The main system (server installed at the office of the plant or maintenance engineer or energy consultant) monitors all the controlled installations (clients) making queries to all the consumers' devices.



Single clients

Each consumer can consult data of their own installation, using popular browsers.

Communication networks/channels

Synergy allows to interface LOVATO Electric devices only. It simultaneously manages different communication channels with independent configuration for protocol, speed rate, etc. Channels are to be intended as one for each different TCP/IP address and every other communication port RS232, RS485, etc. In addition to wired connections of devices through wired networks (RS232, RS485 and

Ethernet), Synergy also permits the management of analog and GSM/GPRS modems. Available communication protocols are Modbus-RTU, Modbus-ASCII and Modbus-TCP/IP. LOVATO Electric devices, directly connected to an Ethernet network, can be predisposed to also handle **dynamic TCP/IP addresses**.

Id	Stato	Descrizione	Indirizzo IP	Porta	Seriale	Velocità	Formato	Parità	Stop bit	Protocollo Modbus	Numero di telefono	Ultimo Indirizzo IP
75	Abilitato	R&D 2° piano	172.24.1.10	1005						RTU		
76	Abilitato	Berzi_1	10.39.0.142	4001						RTU		
77	Abilitato	Berzi_2	10.39.0.144	4001						RTU		
78	Abilitato	Berzi_3	10.39.0.139	4001						RTU		
79	Abilitato	Berzi_4	10.39.0.90	4001						RTU		
80	Abilitato	DTALocale1			COM1	38400	8	None	1	RTU		
81	Abilitato	DTALocale2			COM1	38400	8	None	1	RTU		
82	Abilitato	DTA_Gruppi_1		1001						TCP		10.39.2.148
83	Abilitato	DTA_Gruppi_2		1002						RTU		10.39.1.60
84	Abilitato	DTA_Gruppi_3		2000						ASCII		10.39.2.166
85	Disabilitato	Stampaggio	10.39.0.199	4001						RTU		

Management of interfaced devices

Each device can also be identified by a customised description of the electrical utility/application to which it makes reference to.

Using the specific control menu, it is possible to verify if it is correctly communicating and when the last measurement was done.

Synergy can query about exclusive data required by datalog files on a

regular basis to optimise network data traffic as well as for other eventual information contained in the graphic page viewed in that moment.

With Synergy, internal device parameters can be possibly changed or saved on hard disk and retrieved later on for quick configuration duplication in other devices.

The left screenshot shows the 'Dispositivo' table with columns: Id, Stato, Ultima lettura, Errore ultima lettura, and Descrizione. It lists various devices like 'R&D GE gruppo frigor', 'R&D GE UPS', 'R&D GE LIMS', 'S&D Seccobatt', 'Amministrazione GE generale', 'Officina BT Generale', 'DTA_DMG370', 'DTA_DMG380', 'DTA_DMG390', 'DTA_DMG380_RLTD', 'DTA_DMG380_BASSO', 'RCA385', 'Prensa_47', 'Prensa_11', and 'Prensa_32'.

The right screenshot shows the 'Dispositivo - Parametri' configuration page for 'DMG390 R&D'. It includes a table for parameters:

Codice parametro	Parametro	Data ultima lettura	Valore	UM
P01.01	Potenza TA	12/02/2013 18:43:41	80	A
P01.02	Secondario TA	12/02/2013 18:43:41	5A	A
P01.03	Tensione nominale	12/02/2013 18:43:41	51	V
P01.04	Ultrazvuk TV	12/02/2013 18:43:41	OFF	
P01.05	Potenza TV	12/02/2013 18:43:41	100	V
P01.06	Secondario TV	12/02/2013 18:43:41	100	V
P01.07	Tipo di collegamento		L1,L2,L3-N	

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Graphic pages

Synergy allows to create an unlimited number of pages, to include static images and dynamic indicators of various types and easily configure them.

Therefore, the user can create pages with installation overall view, synoptic and/or topographic representations of the electrical network and pages of the

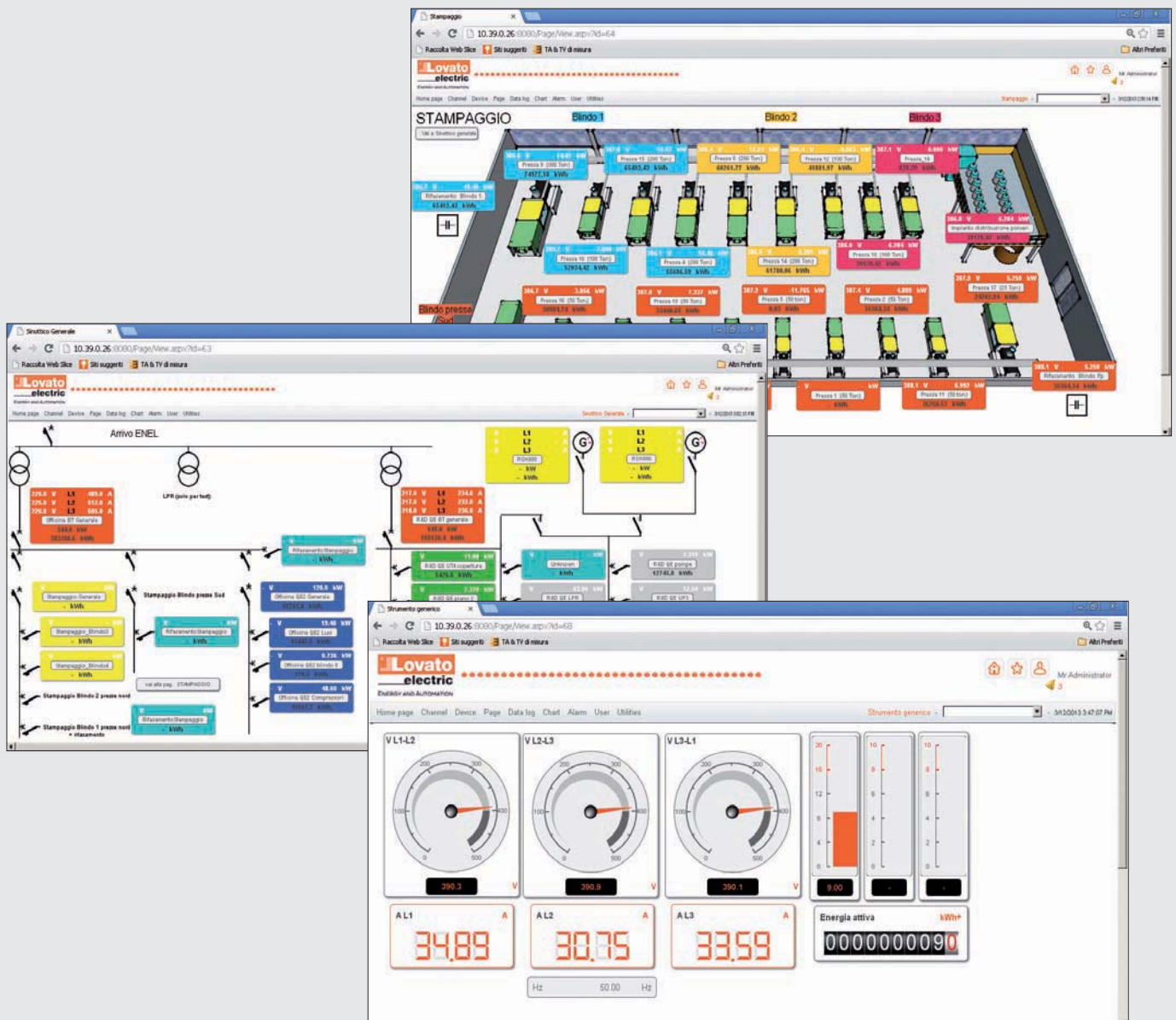
single electrical lines and/or applications with all detailed information.

By using pushbuttons, commands can be sent to the installations, if obviously foreseen in the field devices.

Page configuration permits to also interactively browse among these same pages.

The dynamic objects available are:

- Analog instruments at 90° and 270°
- Digital instrumentation
- Digital instrumentation with vertical or horizontal bar graphs
- 10-digit hour counter
- Simple label or with dynamic image
- Multi-measurement panel
- Chart of single measurements
- Harmonic status bar graph.

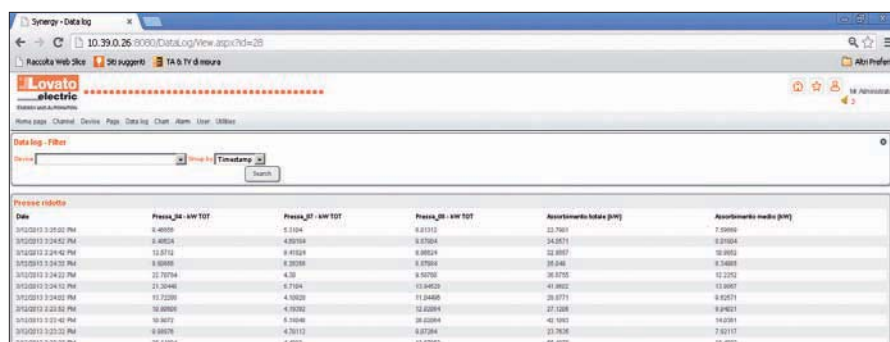


Datalog files

Synergy allows to record data read on field devices in different datalog files (unlimited number), each with freely user-customisable configuration. Therefore, it is possible to gather different information per time sampling (e.g. electric power or gas consumption counts every hour; average active power and current values every 15 minutes and active power and current values every 10 seconds, ...), per each single electric line or grouped together per department or production bay. The recorded measurements by devices can be used as parameters for **mathematical functions** to permit additional calculations or information elaborations not readily or not even available of the installation, for instance

the sum of consumption for a certain area so the cost of electricity can be calculated. Automatic export with customisable rate (daily, weekly or monthly) and standard Excel or text format can be defined for each file. The generated files are saved on hard disk and sent by email / FTP wherever required.

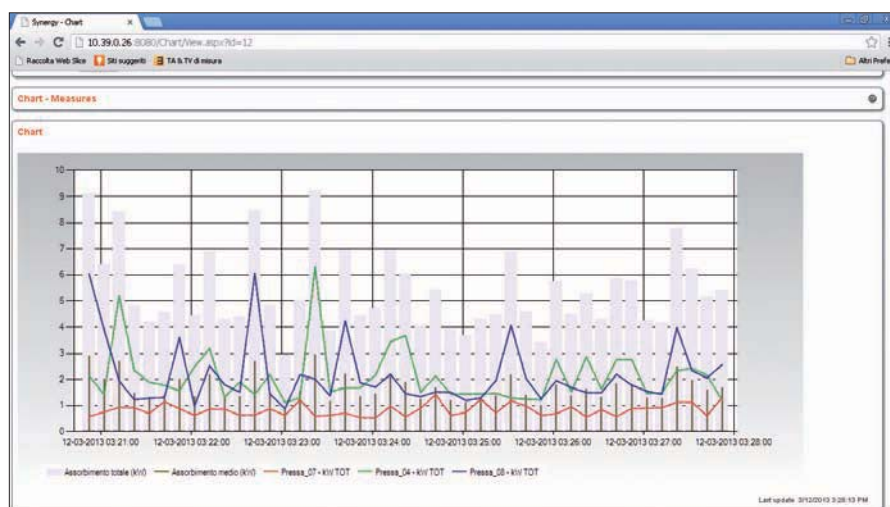
In the case of data networks with potential reliability problems, **separate data storage modules** are available for data logging, to fit exclusively on devices that are expandable with the EXM1030 or EXP1030 unit. **Synergy** will provide for **automatic recovery** of stored data when network connection is restored.



Date	Press_04 - kW TOT	Press_07 - kW TOT	Press_08 - kW TOT	Assorbimento totale (kWh)	Assorbimento medio (kWh)
12/03/2013 3:05:00 PM	8.48059	8.3104	8.01312	23.7601	7.59000
12/03/2013 3:04:00 PM	8.48524	8.29159	8.07504	24.0571	8.01924
12/03/2013 3:03:00 PM	12.5712	8.45259	8.0829	22.8057	10.4033
12/03/2013 3:02:00 PM	8.50889	8.32288	8.07904	26.346	8.54888
12/03/2013 3:01:00 PM	22.70794	4.39	8.50708	36.8725	12.2912
12/03/2013 3:00:00 PM	21.20448	8.7164	10.84528	40.7662	13.5887
12/03/2013 2:59:00 PM	11.72280	4.10020	11.24488	26.8771	8.9571
12/03/2013 2:58:00 PM	10.80928	4.39282	12.62084	27.5208	8.84627
12/03/2013 2:57:00 PM	10.8072	4.31688	10.62084	40.1993	14.0661
12/03/2013 2:56:00 PM	8.38679	4.76112	8.27284	23.7624	7.92117
12/03/2013 2:55:00 PM	20.11084	4.4802	12.87582	55.4078	18.4882

Charts

Data recorded in datalog files can also be viewed in charts.



Alarms

Data stored in datalog files can be used even to elaborate **controls** with regards to the correct operation of the installations. Eventual conditions to keep monitored can be linked with **alarms**, that are recorded in a specific

alarm list, highlighted in the **Synergy** headline and conveniently described in the homepage. The same alarms can be transformed into **commands** and transmitted to the devices for an automatic control of the installation.

How to order

Setup software

- Order code SYN 1 SW 00

The setup software is the same for all LOVATO Electric products. It is used for parameter setting and data logger configuration and includes a 60-day demo version of the remote control supervision function (measurements, monitoring, control and web server). Download at www.lovatoelectric.com/Synergy_gb.htm

Enable licence for remote control supervision function of one device

- Order code SYN 1 SW 10

Enable licence of the supervision function (measurements, monitoring, control and web server) including enabling for one device (RG series generator controllers excluded).

- Order code SYN 1 SW 11

Enable licence of the supervision function (measurements, monitoring, control and web server) including enabling for one RG series generator controller.

Enable licence for remote control supervision function of additional devices

- Order code SYN 1 SW 20

Enable licence of supervision function for five additional devices (RG series generator controllers excluded).

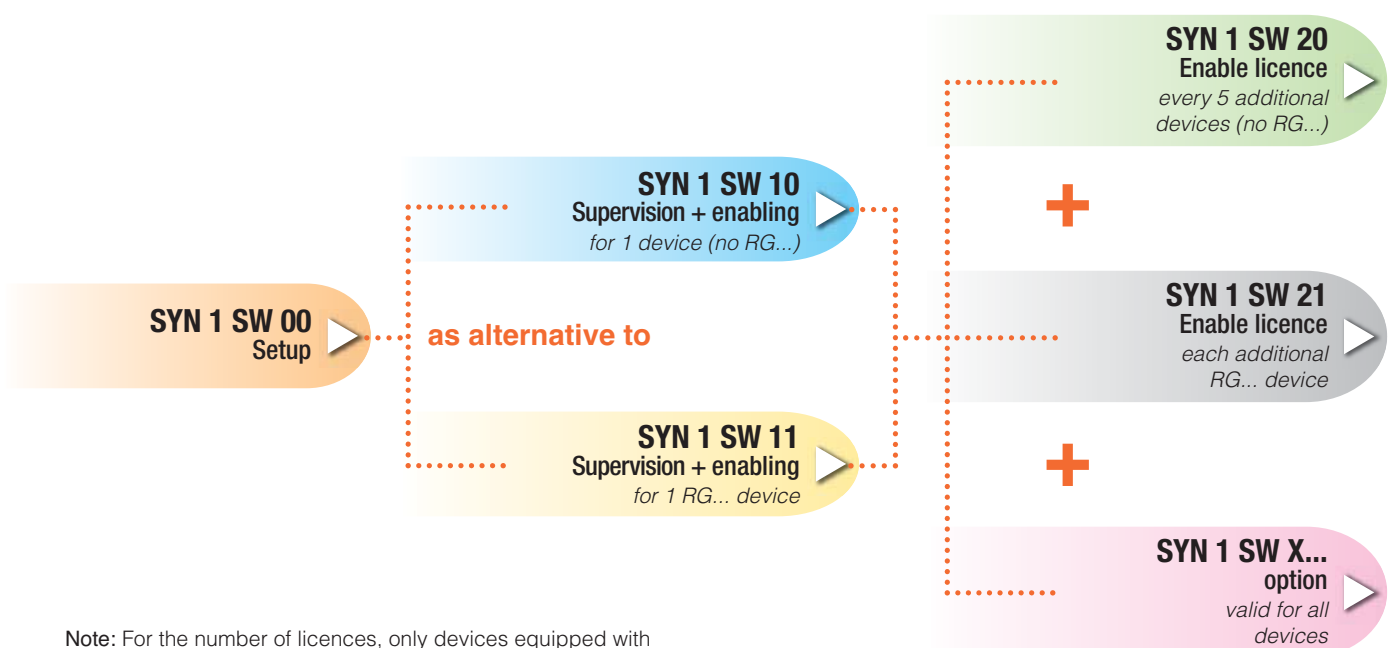
- Order code SYN 1 SW 21

Enable licence of supervision function for one additional RG series generator controller.

Complementary licence

- Order code SYN 1 SW X00

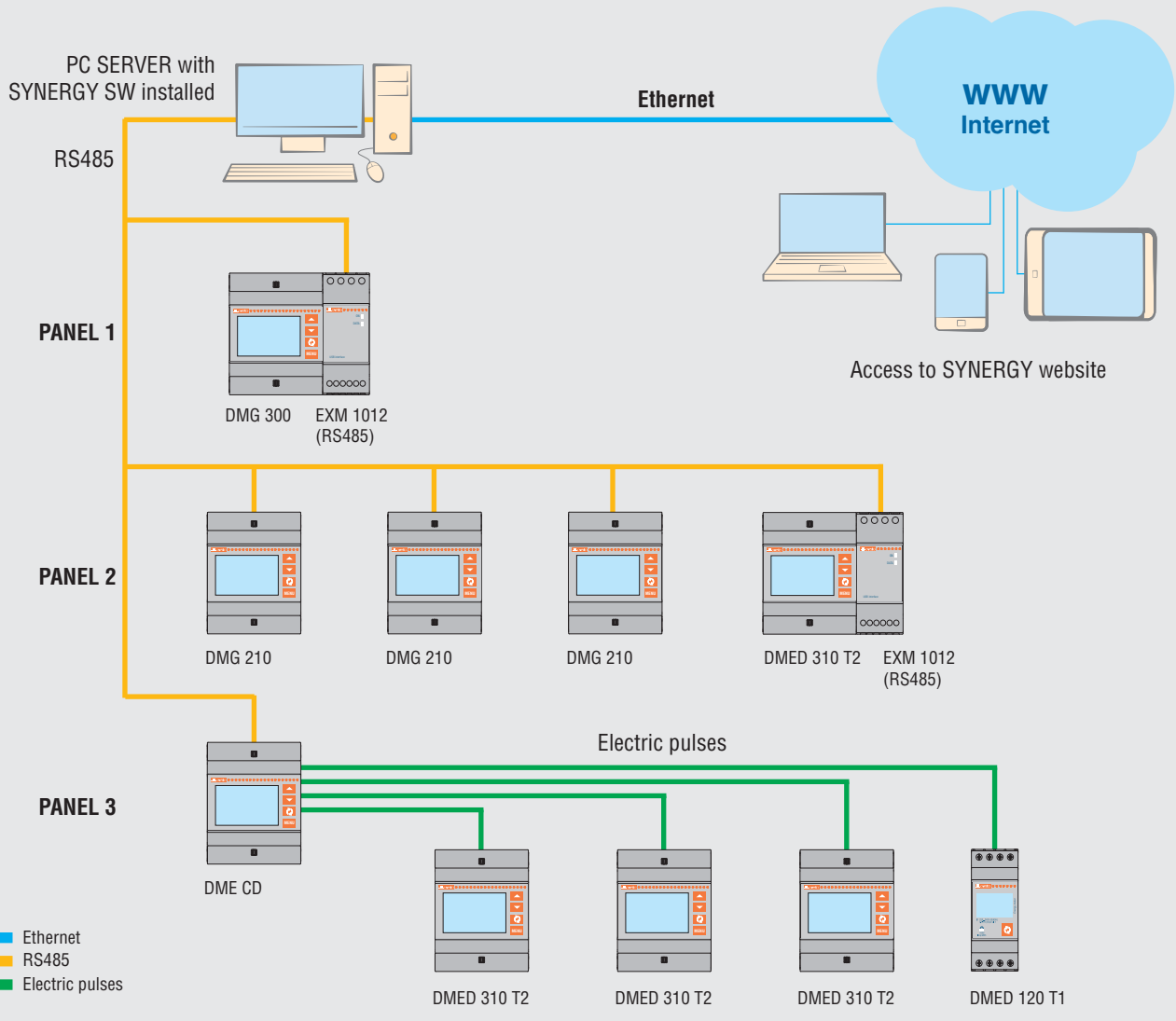
Enable licence for sending emails and FTP for all LOVATO Electric devices.



Note: For the number of licences, only devices equipped with communication port can be considered.

Example 1 RS485 network, Modbus-RTU protocol

Network of multimeters/power analyzers, three-phase energy meters and a data concentrator that receives electric pulses from single/three-phase energy meters. Total of 6 network nodes monitored.



Devices installed

LOVATO ord. code	Q.ty	Description
Panel 1		
DMG 300	1	Modular digital multimeter
EXM 1012	1	RS485 opto-isolated expansion module
Panel 2		
DMG 210	3	Modular digital multimeter with RS485
DMED 310 T2	1	3-phase digital energy meter 5A with 2 prog. outputs
EXM 1012	1	RS485 opto-isolated expansion module
Panel 3		
DME CD	1	Data concentrator for DME...
DMED 310 T2	3	3-phase digital energy meter 5A with 2 prog. outputs
DMED 120 T1	1	1-phase digital energy meter 63A with 2 prog. outputs

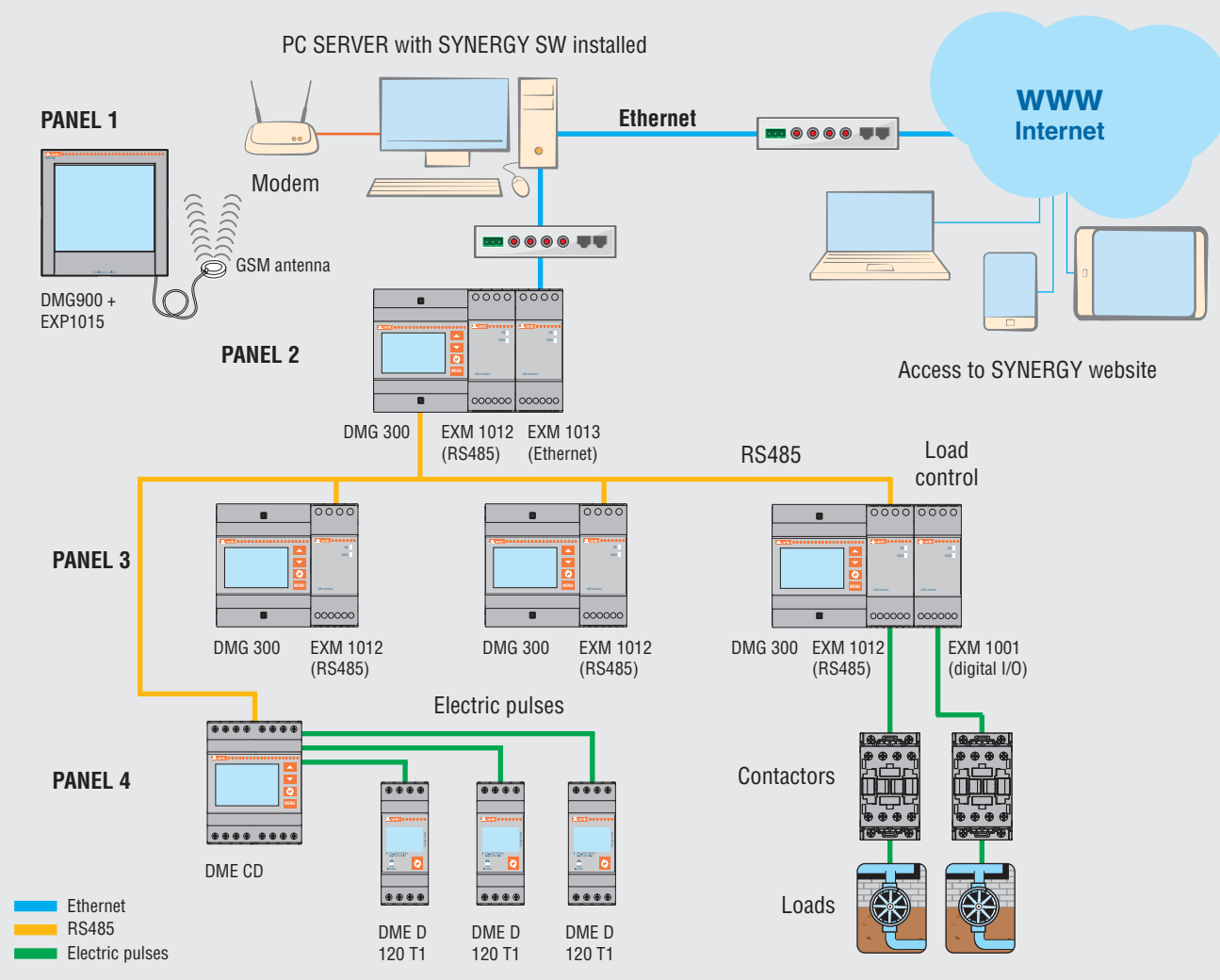
Software/licences to purchase

Number of monitored nodes is 6.

LOVATO ord. code	Q.ty	Description
SYN1 SW 00	1	Setup software
SYN1 SW 10	1	Supervision licence + enable for n°1 device
SYN1 SW 20	1	Supervision licence + enable for n°5 extra devices

Example 2 Mixed Ethernet/RS485 and modem network Modbus-RTU and ASCII protocols

Network of multimeters/power analyzers and a data concentrator that receives electric pulses from single-phase energy meters. Total of 6 network nodes monitored with load control (statusi/commands).



Devices installed

LOVATO ord. code	Q.ty	Description
Panel 1		
DMG 900	1	Flush-mount 96x96mm digital power analyzer
EXP 1015	1	GSM-GPRS expansion module
Panel 2		
DMG 300	1	Modular digital multimeter
EXM 1012	1	RS485 opto-isolated expansion module
EXM 1013	1	Ethernet opto-isolated expansion module
Panel 3		
DMG 300	3	Modular digital multimeter
EXM 1012	3	RS485 opto-isolated expansion module
EXM 1001	1	2 input and 2 output expansion module
Panel 4		
DME CD	1	Data concentrator for DME...
DMED 120 T1	3	1-phase digital energy meter 63A with 2 prog. outputs

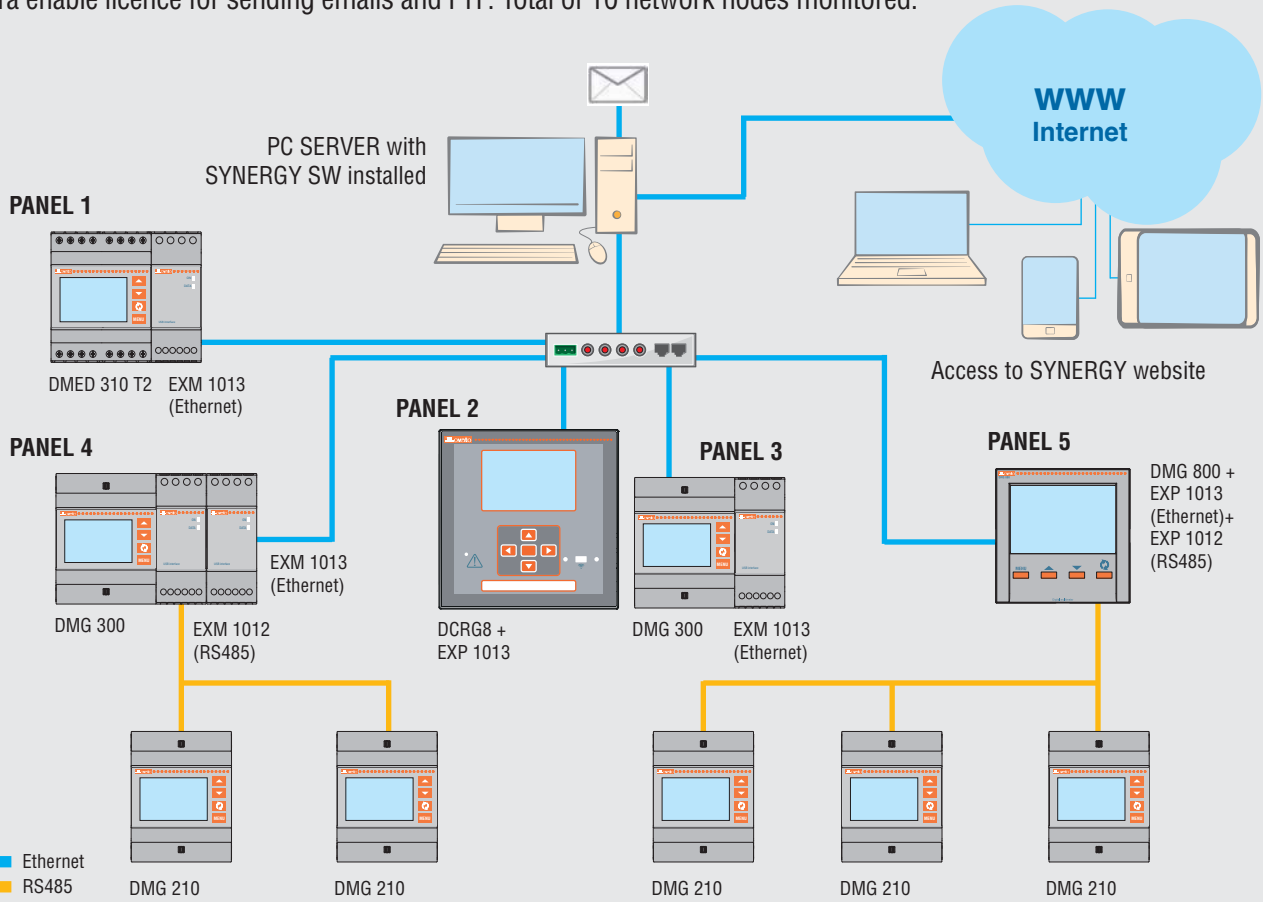
Software/licences to purchase

Number of monitored nodes is 6.

LOVATO ord. code	Q.ty	Description
SYN1 SW 00	1	Setup software
SYN1 SW 10	1	Supervision licence + enable for n°1 device
SYN1 SW 20	1	Supervision licence + enable for n°5 extra devices

Example 3 Mixed Ethernet/RS485 networks, Modbus-TCP and RTU protocols

Network of multimeters/power analyzers, power factor controllers and energy meters. Extra enable licence for sending emails and FTP. Total of 10 network nodes monitored.



Devices installed

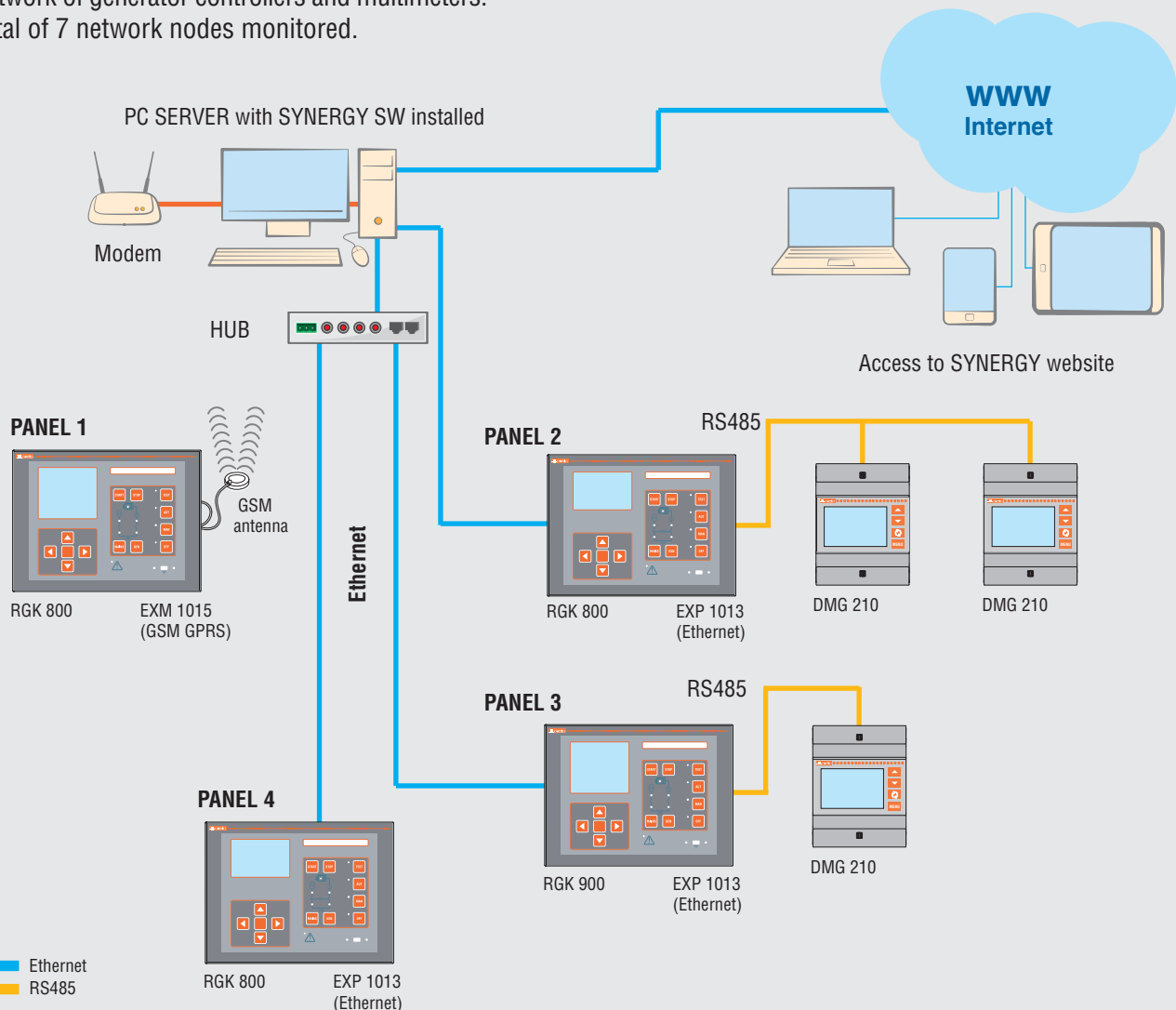
LOVATO ord. code	Q.ty	Description
Panel 1		
DMED 310 T2	1	3-phase digital energy meter 5A with 2 prog. outputs
EXM 1013	1	Ethernet opto-isolated expansion module
Panel 2		
DCRG 8	1	Power factor controller
EXP 1013	1	Ethernet opto-isolated expansion module
Panel 3		
DMG 300	1	Modular digital multimeter
EXM 1013	1	Ethernet opto-isolated expansion module
Quadro 4		
DMG 300	1	Modular digital multimeter
EXM1013	1	Ethernet opto-isolated expansion module
EXM 1012	1	RS485 opto-isolated expansion module
DMG 210	2	Modular digital multimeter with RS485
Quadro 5		
DMG 800	1	Flush-mount 96x96mm digital multimeter
EXP 1013	1	Ethernet opto-isolated expansion module
EXP 1012	1	RS485 opto-isolated expansion module
DMG 210	3	Modular digital multimeter with RS485

Software/licences to purchase
 Number of monitored nodes is 10.
 In addition, control of logged data email transmission.

LOVATO ord. code	Q.ty	Description
SYN1 SW 00	1	Setup software
SYN1 SW 10	1	Supervision licence + enable for n°1 device
SYN1 SW 20	2	Supervision licence + enable for n°5 extra devices
SYN1 SWX 01	1	Enable licence for sending emails and FTP

Example 4 Mixed Ethernet/RS485 and modem networks, Modbus TCP-RTU-ASCII protocols

Network of generator controllers and multimeters.
Total of 7 network nodes monitored.



Devices installed

LOVATO ord. code	Q.ty	Description
Quadro 1		
RGK 800	1	Generator controller with AMF
EXP 1015	1	GSM-GPRS expansion module
Quadro 2		
RGK 800	1	Generator controller with AMF
EXP 1013	1	Ethernet opto-isolated expansion module
DMG 210	2	Modular digital multimeter with RS485
Quadro 3		
RGK 900	1	Mains-generator paralleling controller
EXP 1013	1	Ethernet opto-isolated expansion module
DMG 210	1	Modular digital multimeter with RS485
Quadro 4		
RGK 800	1	Generator controller with AMF
EXP 1013	1	Ethernet opto-isolated expansion module

Software/licences to purchase

Number of monitored RGK nodes is 4.
Number of monitored DMG nodes is 3.

LOVATO ord. code	Q.ty	Description
SYN1 SW 00	1	Setup software
SYN1 SW 11	1	Supervision licence + enable for n°1 RGK device
SYN1 SW 21	3	Supervision licence + enable for n°1 extra RGK device
SYN1 SW 20	1	Supervision licence + enable for n°5 extra devices

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The products described in this publication are subject to be revised or improved at any moment. Catalogue descriptions and details, such as technical and operational data, drawings, diagrams and instructions, etc., do not have any contractual value. In addition, products should be installed and used by qualified personnel and in compliance with the regulations in force for electrical systems in order to avoid damages and safety hazards.



ENERGY AND AUTOMATION

www.LovatoElectric.com

LOVATO ELECTRIC S.P.A.

VIA DON E. MAZZA, 12 - 24020 GORLE (BERGAMO) ITALY

Tel. +39 035 4282111 Fax +39 035 4282200

Email: info@LovatoElectric.com

Sales Department: Tel. +39 035 4282354 - Fax +39 035 4282400

Follow us on



LOVATO Electric offices in the world

United Kingdom

LOVATO ELECTRIC LTD
Tel. +44 8458 110023
www.Lovato.co.uk

Czech Republic

LOVATO ELECTRIC S.R.O.
Tel. +420 226 203203
www.LovatoElectric.cz

Germany

LOVATO ELECTRIC GmbH
Tel. +49 7243 7669370
www.LovatoElectric.de

USA

LOVATO ELECTRIC INC
Tel. +1 757 5454700
www.LovatoUsa.com

Spain

LOVATO ELECTRIC S.L.U.
Tel. +34 93 7812016
www.LovatoElectric.es

Canada

LOVATO ELECTRIC CORP.
Tel. +1 450 6819200
www.Lovato.ca

Poland

LOVATO ELECTRIC SP. Z O.O.
Tel. +48 71 7979010
www.LovatoElectric.pl

United Arab Emirates

LOVATO ELECTRIC ME FZE
Tel. +971 4 3712713
www.LovatoElectric.ae

Turkey

LOVATO ELEKTRİK LTD
Tel. +90 216 5401426-27
www.LovatoElectric.com.tr