# OVERVIEW AUTOMATION SERVICES

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### An Introduction to Automation

Automation refers to the software developed to acquire measurements, monitor sensors, automatically calibrate instruments, control equipment and analyze data comparing test results to standards.

The Automation resources available at the Carugate lab consist of commercial equipment exploited to create automated setups or customized hardware, designed and manufactured to fulfill specific needs.

Several essential instruments are combined in one compact device with an intuitive software interface. Fixed or Portable, and easy to connect, the automation rack can be used to increase efficiency and users can take advantage of the combination of its modules to create new applications.

Portable plug-and-play equipment allows a variety of applications: to analyze harmonics, monitor power quality, on-fields measurements and customized solutions.



#### AUTOMATION SERVICES

# **DEVELOPED BY UL,** TAILORED TO MEET YOUR NEEDS

Developed with the needs of UL clients in mind, highly specialized hardware and expertly designed software applications are complimented by a highly focused team of engineers at the Carugate Laboratory.

This makes Carugate an ideal location to realize hardware and software automation systems, starting from customer requirements. These may include data acquisition, analysis, control and reports generation on all the physical quantities handled by the laboratory (thermal, electrical and mechanical).

Automation staff can also provide training on management of developed software for the purpose of product certification and according to international standards and regulations related to production and validation of software.



#### SERVICES OFFERED

- Technical Support
- Installation and Setup
- Maintenance
- Application Support
- Hardware Support
- Calibration
- Training



## Software Available

The software available in the Carugate laboratory has been developed and refined by expert engineers, adapted to meet the specific needs of the modern manufacturing industry.

- **CLOO1 Oven Validation for Ball Pressure Test:** Verifies that the ball pressure test oven parameters are in tolerance according to the standard IEC 60216-4-1. This software can save weeks for oven calibration each year.
- VI018 Data Logger: A multi-test platform to run independent tests with different scanning lists and times. Thanks to Client-Server architecture, it can acquire from several connected devices and allow user to remotely connect and monitor running tests.
- **ED009 Measure Report:** This software application allows data elaboration and analysis with the possibility to generate reports.
- **VI009 Tracking Analyzer:** VI009 Tracking Analyzer conducts Tracking tests according to IEC60112 and ASTM D-3638 standards.
- **ED007 Tracking analyzer Editor:** Together with VI019 Tracking Analyzer, ED007 Tracking analyzer Editor can revise data and generate automatic Reports.
- **VI010 Profile Detector:** Together with an electronic microscope, this can be used to judge multiple types of test through visual analysis. Examples: Ball pressure Test (IEC60112), measurement of insulation distances.
- VI023 Event and timing Handler: This application creates automatic cycles for testing. Cycles can be set to a timeframe or based on parameters measured by other virtual instruments. This is part of UL-LAB suite.
- **DR003 Environmental Condition Monitor:** An application which monitors and saves environmental conditions from OMEGA climatic units (temperature, humidity and pressure).

- **PR007 Omega History and Metrics:** PR007 Omega History and Metrics: Evaluates environmental data and shows the trend of ambient temperature, humidity and pressure. It is possible to group data by days, weeks or months.
- DR009 Flammable Gas Analyzer: This software has been created to carry out tests on equipment that uses flammable gas according to EN 60335-1 standard, related product standards EN 60335-2-24 and EN 60335-2-89 and UL standard UL 471.
- VI019 Power Meter: The Power Meter application was designed to support a range of custom acquisition hardware types: RACK, VIHM Voltage Inter Harmonic Meter, CIHM Current Inter Harmonic Meter, 3V30 3 Channels Analog Input, 3PQA 3 Phase Power Quality Analyser. It is a multifunction instrument to measure all the parameters displayed by a traditional power meter.





- VI020 Inter harmonic Analyzer: The Inter Harmonics Analyzer was designed to support a range of custom acquisition hardware types: RACK, VIHM Voltage Inter Harmonic Meter, CIHM Current Inter Harmonic Meter, 3V30 3 Channels Analog Input, 3PQA 3 Phase Power Quality Analyser. It performs harmonics and inter-harmonics analysis, as detailed in IEC 61000-4-7 standard.
- **VI021Power Quality Analyzer:** Together with the dedicated hardware 3PQA, this software instrument analyses the quality of power supply, according to UL procedure 00-LC-P0025, 00-OP-C0036 and CTL procedure CTL-OP 110, in order to verify if laboratory supply sources meet mandatory requirements.
- VI004 Sound and Vibration and ED004 Sound and Vibration Report: This virtual instrument is a double function instrument: it can acquire signals from microphones or accelerometers and carry out measure according to different standards.
- **GE004 Harmonics and Flicker Generator and VI026 Flickermeter:** Software designed to verify the performance of the measurement system according to EN/IEC 61000-3-2 harmonics and EN/IEC 61000-3-3 flicker standards.
- **CL008 IEC 61000-4-13 Test Validation:** Software that verifies power source and disturbance signals during the harmonic and inter-harmonic immunity test according to IEC61000-4-13.
- **CL005 Voltage Inter-Harmonic Meter:** This is a software program that can be used with VIHM (Voltage Inter-Harmonic Meter) as a reference instrument for voltage inter-harmonics measurements.
- **CL005a Current Inter-Harmonic Meter:** A software program that can be used with CIHM (Current Inter-Harmonic Meter) as a reference instrument for current inter-harmonics measurements.

### Custom Software Development

Software can be developed according to client specifications, fully tailored and related to many areas including (but not limited to) Instrument driver development, software for report generation, data analysis and judgment. Contact us for a consultation to your specific requirements.

## Test Equipment

Alongside the cutting edge software available in Carugate, we have highly specified and fully calibrated test equipment ready for use.

- HW888 Automatic data Acquisition System (Rack): Easy to connect, the Rack can be used to increase efficiency and take advantage of the combination of its modules to create new applications. It can comprise three-phase wattmeter, Harmonic and Inter-Harmonics analyser, Timer modules, Digital Multimeter and temperature Data Logger. One size fits all.
- **HW009 3PQA Power Quality Analyzer:** The Three Phase Power Quality Analyzer is a portable device that must be used in conjunction with a computer provided with the required software: VI021 Power Quality Analyzer. It allows three independent phase measurements.
- HW006 VIHM Voltage Inter-Harmonic Meter: VIHM is a 3-channels selective voltmeter able to measure RMS voltage value of a maximum of 10 inter-harmonics sinusoidal signals overlapped to main supply. It works in the time domain (band pass filter) and provides a great level of accuracy.
- HW007 CIHM Current Inter-Harmonics Meter: CIHM is a 4-channels selective ammeter able to measure RMS current value of a maximum of 10 inter-harmonics sinusoidal signals overlapped to main supply. It works in the time domain (band pass filter) and measures with very high accuracy.

### Test Equipment for Rent

The following test equipment can be rented with related software applications:

- AUT HW 001 Temperature Data Logger for oven validation
- AUT HW 002 Grid for oven validation
- AUT HW 005 4G10 4 Channels Signal Generator
- AUT HW 006 VIHM Voltage Inter-harmonic Meter
- AUT HW 007 CIHM Current
  Inter-harmonic Meter
- AUT HW 008 3V30 3 Channels Analog Input
- AUT HW 009 3PQA Three Phase Power Quality Analyzer
- AUT HW 888 Rack (contact us to understand the available models)







# Training and Services

### Training

The Automation team delivers training on the following topics: Software Validation (code TRA001) and TRA002 Software Production Guide (code TRA002). It is possible to require a final test to verify the competency acquired (Certificate with 2 years validity for UL).

### Services

Automation team offers consultancy services for software validation, a process that needs to be done onsite with the client.

- SRV 001 On site validation of software sold
- SRV 002 On site validation of commercial software

Contact us for an initial consultation to find out how UL's automation services can meet your specific needs.



### About the Carugate Laboratory

UL's Laboratory in Carugate, established in 1984 as SICUR CONTROL, has been part of the UL family since 2003.

The lab space covers an area of about 1700 square meters spread over two buildings. A large team of engineers and technicians are on hand, dedicated to different sectors: electrical safety, electromagnetic compatibility, performance, calibration services and automation.

Carugate Laboratory has been operating for about 30 years in the electrical sector, obtaining the following accreditations: CBTL, ACCREDIA (Accreditation number 1363), OSHA, IAS.



#### THIS LOCATION PROVIDES TESTING AND CERTIFICATION SERVICES IN THE FOLLOWING AREAS:

**INTERNATIONAL MARKET ACCESS** household appliances and related components. Thanks to the above mentioned accreditations, this laboratory is able to issue test reports and certificates under the IECEE CB scheme (HOUS and CONT) and ILAC-ACCREDIA reports recognized within the European Accreditation and worldwide.

**INVERTER:** Thanks to more than 10 years of experience and continuous updating of the scope of accreditations, Carugate Laboratory is now able to test and certify high power photovoltaic inverters, wind inverters and other types of inverters in accordance with low Voltage and EMC European Directives. We can also carry out these tests at customers' premises. The lab is also specialized and accredited for the tests required by several countries in Europe, Asia and Australia according to international, European and local standards and rules.

**EMC:** Testing for the following areas: household appliances, lighting, medical and hi-tech equipment, laboratory instrumentation, ISM (industrial, scientific and medical) and standards for commercial and industrial environments with the possibility of issuing CE reports, CB reports under the IECEE scheme (EMC) and ILAC - ACCREDIA reports recognized within the European Accreditation. **PERFORMANCE AND SPECIAL TESTS:** measurement of human exposure to vibration (hand/arm or whole body transmitted) and special tests (thermal, acoustic, EMC, dimensional, safety, etc.); custom specifications required by clients.

**TESTS ACCORDING TO UL STANDARDS:** to obtain UL and cUL mark (USA and Canada) for most product categories. For more detail see the Laboratory Capabilities Catalog and the Laboratory Services Catalog

**CALIBRATION SERVICES:** along with standard calibration offerings, UL Italy Calibration Center can assist you with calibration services tailored to your specific needs.

**AUTOMATION SERVICES:** Project management, design, fabrication, programming, installation, projects start-up, operating support.

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