Orion AC Control System

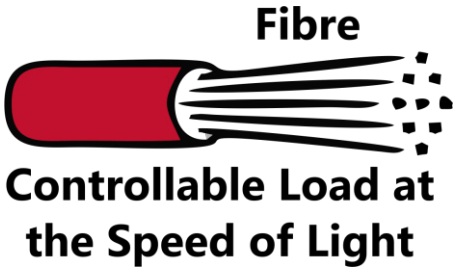
Orion is the latest control technology used by *Crestchic's* range of AC loadbanks. It comprises two parts, the first being a high-performance microprocessor-based industrial control system. This is housed within the loadbank enclosure and is responsible for the supervisory operation and monitoring of the loadbank resources, and the real-time acquisition of measurement data from the loadbank instrumentation unit. The second part of Orion is the operator interface. This is provided by either a *Crestchic* LC80 rugged touchscreen tablet or a standard PC computer. Both of which run the *Microsoft*® Windows® operating system.

The *Crestchic* Orion PC software is fully Windows compatible and will run with either the 32-bit or 64-bit version of Windows 7, 8 and 10. As a Windows application, Orion utilises the familiar "point-and-click" environment of that ubiquitous platform which significantly reduces the time required for an operator to become proficient in using the loadbank. In addition, this allows the advanced features of the control system to be easily accessible. These include the graphical display of transient performance at load-change measured from the generator being tested, recording of instrumentation data to the PC hard drive during load tests, and the storage of multiple user-defined loading-profiles that can be uploaded to the loadbank to accommodate different testing scenarios.

Orion loadbanks are built around *Crestchic's* newest hardware, the Nova platform. This uses bespoke state-of-the-art electronic control modules, specifically designed for loadbank operation. Communications between each Orion loadbank and their controller employs network technology to provide fast, high-bandwidth data transfer capabilities. This gives a vast performance increase compared with existing systems, leading to a similar rise in the reliability of a loadbank installation.

The advantages of using network infrastructure are further multiplied by the selection of optical fibre cabling to provide connectivity throughout the system.

The most obvious of these is the total immunity to electrical noise. This make Orion loadbanks the natural choice for sites with unforgiving environments where communications over conventional copper cabling would be detrimentally affected.



Further, the optical fibre cables connecting Orion loadbanks can be run alongside load cables without any consequences due to pickup of switching spikes or inductive interference. Even load cables carrying voltages at MV levels will cause no problems.

The final advantage of optical fibre is that greater distances between loadbank(s) and their controller can be achieved, with cable runs of over 500 metres possible without the need for signal boosting.

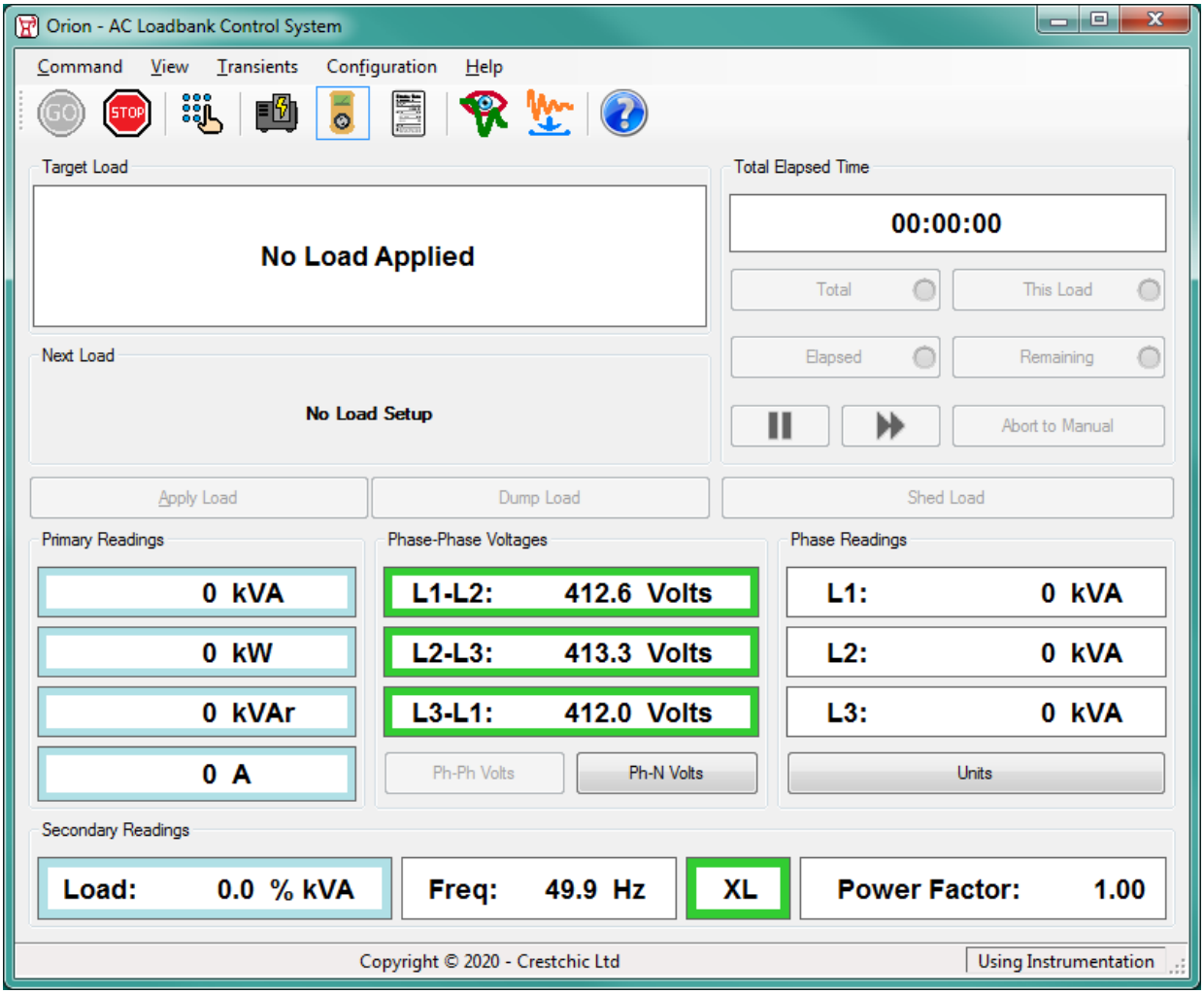
Loadbank Features

Crestchic loadbanks fitted with the Orion control system offer the following features and benefits:

- AC loadbank control system for resistive/reactive or resistive-only operation
- Individual or multiple loadbank operation from a single controller
- System extendible to control up to 15 loadbanks with proportional load-sharing
- Typical load resolution of 1kW/1kVAr across the loadbank range
- Load-step synchronisation mechanism produces clean load switching, both within a single loadbank and across multiple units
- Load entry in kVA, kW or Amps at power factors from zero to unity
- True r.m.s. 3-phase instrumentation with high speed data sampling to an accuracy of better than 0.5%
- Display of Ph-Ph or Ph-N voltages with kVA, KW and currents, both per phase and totalled
- Twenty user-definable preset loads stored in non-volatile memory
- Motor-Test facility for marine usage
- Automatic sequencing by the loadbank of load profiles prepared from the preset loads by the user
- Transient response data for voltage and frequency recorded at each load-change. This is output to the PC/LC80 for graphical display and storage
- Test results report stored to PC hard disk
- Uploading of previously saved load profiles from the PC/LC80 hard disk

Instrumentation

The Orion control system utilises the *Crestchic* ACI500 Instrumentation module. This high-performance unit is specifically designed for AC power measurements. It provides 20 channels of data measured in real-time. The readings for each channel are calculated every AC cycle, thus producing the best possible true r.m.s. dataset for a periodic waveform. The ACI500 has an accuracy of better than 0.5%, even when working with AC waveforms having a Crest factor as high as 12.

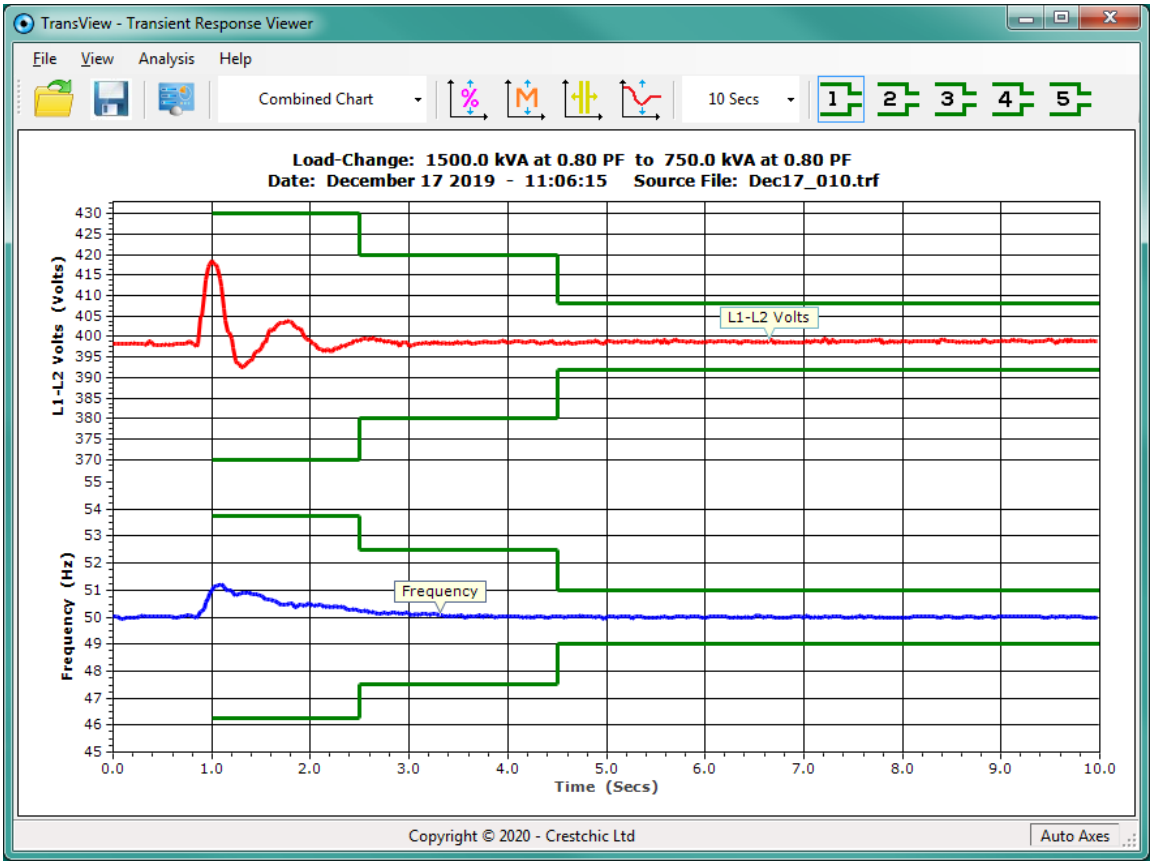


Transient Response

As each load-change is executed by the loadbank the Orion software will record the excursions of voltage and frequency produced by the power source being tested. This r.m.s. data is sampled from the ACI500 instrumentation module every cycle producing numerous data points every second for each parameter. The sampling will continue at this rate for up to 15 seconds after a load-change. Once all the data is acquired, at the touch of a single button, it can be downloaded to the PC for storage and analysis.

To display the voltage and frequency response curves the *Crestchic* TransView application is utilised. This program integrates seamlessly with Orion and will be launched whenever data from a load transition is sent to the PC. This provides an instant graphical display of the generator's response to the load-change. The voltage and frequency traces can be viewed separately, or as a combined graph to show the relationship between the two parameters during the load-change.

In addition, any of five user-defined performance envelopes can be overlaid onto the chart to give visual confirmation that the generator's output behaviour is within specification. The chart image can also be saved (as a JPEG, PNG, GIF or bitmap image) for inclusion within a generator test report by the user. An example of the TransView display, including the performance envelopes, is reproduced below.



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