

Harmonics, Flicker and Power Quality

ProfLine 2100

- Key EUT electrical parameters updated continuously
- User selectable test limits
- Start and stop flicker tests with a single mouse click
- User selectable test parameters and data display options

In many countries, particularly members of the European Union, compliance with EMC directives is now mandated by law. Schaffner's ProfLine 2100 is a family of powerful, cost-effective, compliance test solutions to help you meet your EMC responsibilities now and into the future.

Schaffner's ProfLine 2100 family offers highly cost-effective solutions in a wide range of useful powers, from 1250VA up to 30kVA. The high peak current ac source is designed for demanding non-linear load applications such as white goods, air conditioners and other products with inductive or capacitive loads.

1250VA and 3kVA systems are ideal for manufacturers of a wide range of domestic, office and computer equipment, including disc drives, brown goods, ink-jet printers and so on.

5kVA and 15kVA 1-phase systems simplify testing of many white goods, power tools and larger computer peripherals

1- or 3-phase configurations up to 30kVA meet manufacturers' needs for star and delta harmonic and flicker compliance testing of major plant, such as compressors, air conditioners, machine tools, etc.

At the heart of ProfLine 2100 is an IEC-compliant power analyser providing detailed voltage and current harmonics data. DSP-based 500kHz, no-gap/no-overlap data acquisition combined with a powerful FFT analysis software ensures flexibility to fully meet the new 10 and 12 cycle and inter-harmonics testing requirements of amendment 14 to IEC 61000-3-2, and the revised IEC 61000-4-7, whilst still allowing testing to the older 16 cycle regime if required. Direct PC bus access ensures higher data throughput than found in most single box IEEE-488-based test systems. Streaming real-time data storage allows problems to be replayed and analysed in complete confidence, speeding fault detection.

EUT voltage and power are monitored continuously. Distortion, current harmonics and EUT power consumption are checked against IEC class limits for pass/fail detection and dynamic class C and D test limit calculation.

CCN1000

ProfLine 2100's advanced coupling unit provides quick and easy single cable connection between ac source outputs and EUT, plus the required isolation and signal conditioning. Precision, no-burden, active Hall-effect current transformers ensure accurate current sensing over 4A, 16A and 40A ranges with 200A peak capability for maximum resolution. Anti-aliasing filters on all channels eliminate unwanted frequency components from the results.



The EUT can be plugged into the front panel-mounted, European-style outlet, the optional multiple country-specific outlet strip, or wired to a rear panel-mounted terminal block.

Harmonic tests

All IEC harmonics tests can be accessed from ProfLine 2100's single control and data display window on the PC. Both quasi-stationary and transitory (fluctuating) harmonics tests can be set up and run quickly and easily. The operator is presented with a simple screen that shows the type of test to be run and the test duration. Voltage and current/time domain waveform displays are updated in real time during the test. All power analyser parameters for the EUT can be easily called up and displayed. The harmonics window displays instantaneous current harmonics and a line marking the applicable test limits. A clear pass/fail indication is provided. Any conditions occurring during the test that may affect the test results can be displayed, such as total harmonic distortion of the ac source voltage.

Flicker made easy

Flicker tests use a similar user interface to the harmonics module, making it instantly familiar to the user. Set-up is minimal and test runs can be started quickly. During each test run, graphical displays of various parameters as a function of time, are updated continuously while another part of the display shows IEC 61000-3-3 test-related parameters. Both short term and long term flicker are calculated and a clear pass/fail indication is provided.

Embedded in the ProfLine 2100 software is an IEC 61000-4-15 compliant single/three channel flicker meter for 1- and 3-phase applications. All ProfLine 2100 configurations can use both simulated and real IEC 725-compliant programmable output impedances to perform flicker measurements.

Test Reports and Data Logging

Reports can be printed at the end of each test to support CE approval or for inclusion in a Technical File. Results can include voltage and current waveform graphs, current harmonic spectrum and class limits, and a complete flicker test analysis. Graphs can be printed, or stored in ASCII format on disc along with timing waveform data for use in detailed reporting or further analysis using applications such as Excel.

A unique test file viewer utility is included with the ProfLine 2100 system allowing frame-by-frame playback of test data files for detailed analysis of EUT behaviour.

Hardware and Software Flexibility

ProfLine 2100 has the hardware and software flexibility to test beyond IEC 61000-3-2 and IEC 61000-3-3. NSG 1007-3 and NSG 1007-5 ac sources - used in all ProfLine 2100s except the ProfLine 2101 - offer arbitrary waveform generation which can be used for pre and full compliance testing to a wide variety of IEC 61000-4-X conducted immunity tests.

IEC 61000-4-11: Voltage Dips and Interruptions

Pre-compliance tests for voltage dips can be set up quickly on ProfLine 2100. The operator can select the type of test, its duration, the nominal test voltage and frequency. Buttons are provided for Test Run and Test Abort.

Integrating the optional NSG 2200 ac/dc switching unit extends the test capability, enabling fast switching, voltage dips/drop-outs and high inrush currents to be handled as specified in full compliance testing to IEC 61000-4-11.

The EUT load current is measured continuously during the test run to help diagnose unit failures. Test parameters can be changed as required to accommodate different test levels referred to by product standard committees.



IEC 61000-4-13: Immunity to Harmonics and Interharmonics

ProfLine 2100's built-in sweep generator provides full compliance testing to IEC 61000-4-13. Simple operator commands program this digitally controlled generator to superimpose harmonics and inter-harmonics up to the 40th (2400Hz) on the ac source output which itself can be programmed for flat top and overswing waveforms using the built-in arbitrary waveform generator. The system digitizer captures and identifies EUT resonance points for on-screen display and inclusion in a detailed test report.

IEC 61000-4-14: Voltage Fluctuations

The operator can select the type of test to be run - level 1 or 2 - and the nominal test voltage and frequency. All voltage fluctuation test parameters can be customized by the user, ensuring ProfLine 2100 not only meets the standard when it is ratified but also to protect your investment. The EUT load current is measured continuously during testing to help diagnose unit failures.

IEC 61000-4-28: Frequency Variations

ProfLine 2100 provides three specified and one user-defined test levels as standard, with the amount of frequency variation differing for each test level. Test parameters for duration and frequency deviation can be customised, enabling ProfLine 2100 to meet this standard, when it is ratified, thereby protecting your investment. The EUT load current is measured continuously during the test to help the operator identify unit failures.

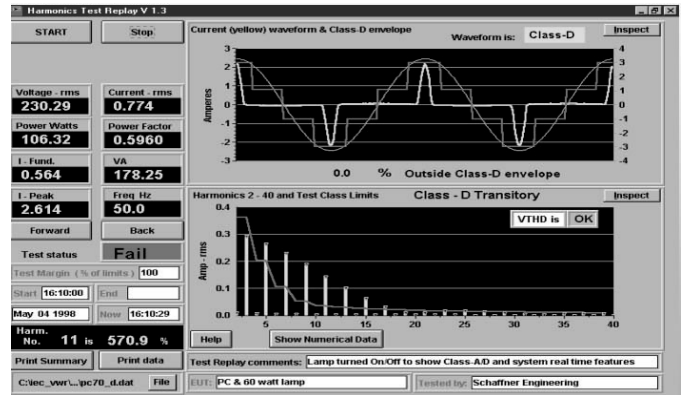
IEC 61000-4-8: Power Frequency Magnetic Fields

Selecting either a standard or special magnetic coil option equips ProfLine 2100 for IEC 61000-4-8 compliance testing up to level 4, field strength 1000A/m. Simply identify the coil type to the software driver, set the ac source level and click. The system takes care of the rest.

Continuous automatic adjustment of the coil load current maintains a uniform magnetic field for the EUT. Test parameters can be changed as required to accommodate any different test levels referred to by product standard committees.

IEC 61000-4-17: Ripple on dc Input Power Port

ProfLine 2100 is ready for this standard. The system's built-in arbitrary waveform editing ability allows the user to draw custom waveshapes, including 'sinusoid-linear', to meet this draft standard's requirements. NSG 1007-5's standard dc specification of 0-300V, 2.5kVA, and up to 16A, has the ability to meet most test requirements; higher power configurations provide up to 7.5kVA and 50A capability.



Configurations

ProfLine 2101	1-phase 1250VA system for IEC 61000-3-2, -3 ac input 86-240V, 50/60Hz
ProfLine 2103	1-phase 3kVA system for IEC 61000-3-2, -3 and IEC 61000-4-13, -14 and -28, pre-compliance for IEC 61000-4-11, ac input 187-264V, 50/60Hz
ProfLine 2105-208	1-phase 5kVA system for IEC 61000-3-2, -3 and IEC 61000-4-13, -14 and -28, pre-compliance for IEC 61000-4-11, ac input 208V nominal, 3-phase
ProfLine 2105-400	1-phase 5kVA system for IEC 61000-3-2, -3 and IEC 61000-4-13, -14 and -28, pre-compliance for IEC 61000-4-11, ac input 400V nominal, 3-phase
ProfLine 2115-208	3-phase 15kVA system for IEC 61000-3-2, -3 and IEC 61000-4-13, -14 and -28, pre-compliance for IEC 61000-4-11, ac input 208V nominal, 3-phase
ProfLine 2115-400	3-phase 15kVA system for IEC 61000-3-2, -3 and IEC 61000-4-13, -14 and -28, pre-compliance for IEC 61000-4-11, ac input 400V nominal, 3-phase
ProfLine 2130-208	3-phase 30kVA system for IEC 61000-3-2, -3 and IEC 61000-4-13, -14 and -28, pre-compliance for IEC 61000-4-11, ac input 208V nominal, 3-phase
ProfLine 2130-400	3-phase 30kVA system for IEC 61000-3-2, -3 and IEC 61000-4-13, -14 and -28, pre-compliance for IEC 61000-4-11, ac input 400V nominal, 3-phase

Major options

WIN 2120	Windows software package for IEC 61000-4-8, -11 and -29
INA 2170	Standard square 1m x 1m 300A/metre magnetic coil for IEC 61000-4-8
INA 2171	Special square 1m x 1m 1000A/metre magnetic coil for IEC 61000-4-8
NSG 2200-1	1-phase ac/dc switch for IEC 61000-4-11
NSG 2200-3	3-phase ac/dc switch for IEC 61000-4-11
INA 2162	1/3-phase mode change-over switch for NSG 1007-15
INA 2151	IEC 725-compliant lumped impedance for 1-phase tests (fitted as standard in ProfLine 2101 systems)
INA 2152	IEC 725-compliant lumped impedance for 1-phase tests for Japan (not available for ProfLine 2101 systems)
INA 2154	IEC 725-compliant lumped impedance for 3-phase tests
INA 2155	IEC 725-compliant lumped impedance for 3-phase tests for Japan

ProfLine 2100 provides full compliance testing for:

- IEC 61000-3-2 Harmonic current measurements
- IEC 61000-3-3 Flicker measurements
- IEC 61000-4-13 Immunity to harmonics and interharmonics [draft]
- IEC 61000-4-14 Repetitive voltage variations
- IEC 61000-4-28 Frequency variations
- As well as pre-compliance testing for:
- IEC 61000-4-11 Voltage dips and variations, and short interruptions

Options enable full compliance testing capabilities for:

- IEC 61000-4-8 Immunity to power frequency magnetic fields
- IEC 61000-4-11 Voltage dips and variations, and short interruptions
- IEC 61000-4-17 Ripple on DC input power port [draft]