



EMC Standards Test System for IEC/EN 61000-3-X

Constant further development of REGATRON's product portfolio is opening up new important areas of application. REGATRON offers an EMC test system based on the proven TC.ACS grid simulator extended by the EMC standards test package and the TC.FLK flicker impedance network. TC.FLK accurately implements the internationally agreed reference source impedance for low voltage supply networks and thus this system enables complete tests according to IEC/EN 61000-3-2, IEC/EN 61000-3-12, IEC/EN 61000-3-3, and IEC/EN 61000-3-11 standards. Furthermore it allows easy switching between the test impedances Z_{ref} and Z_{test} and thus leads to minimal EMC test work without further calculations.

The relevant IEC/EN 61000-3-X tests in brief

- **IEC/EN 61000-3-2:2014**
Limits for harmonic current emissions for equipment with rated input current ≤ 16 A per phase.
- **IEC/EN 61000-3-3:2013**
Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
- **IEC/EN 61000-3-11:2000**
Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems. Equipment with rated current ≤ 75 A and subject to conditional connection.
- **IEC/EN 61000-3-12:2011**
Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤ 75 A per phase.

System components

Voltage V_{rms} (L-N)	Power kVA	Current A_{rms}	Frequency Hz	Order Code
TC.ACS				
3x 0...305	30	43	0...1000	TC.ACS.30.528.4WR.S
3x 0...305	50	75	0...1000	TC.ACS.50.528.4WR.HC
TC.FLK				
3x 0...305		75	50/60	TC.FLK75.2WR.S
Power analyzer				
For emission measurements, evaluation, and reporting				

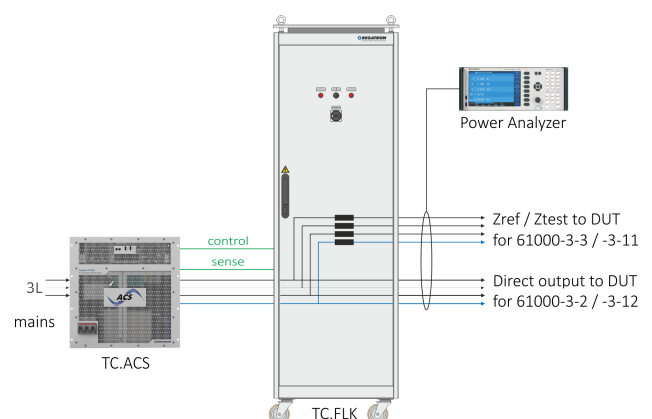


Figure 1: System principle for EMC testing according IEC/EN 61000-3-X

REGATRON offers a turnkey test environment for standard tests according to IEC/EN 61000-3-X EMC regulations, based on the proven regenerative 3-phase power supply TC.ACS.

The basic solution includes a TC.ACS device with a sense and a digital I/O card, the software interface ACSControl with an additional EMC standards software package for IEC/EN 61000-3-X, the flicker impedance network TC.FLK, and, on request, a suitable power analyzer to evaluate the results.

Key Features

- **Impedance Selection:** Switch between the Z_{ref} (reference impedance) and Z_{test} (test impedance) configurations based on your testing requirements. This flexibility ensures fast and flexible testing according to both IEC 61000-3-3 and -3-11 without the need of rewiring to another impedance network.
- **Precise and stable:** While TC.ACS provides the clear sinusoidal waveform in EMC mode, the TC.FLK flicker impedance network is designed and tested to remain within the tolerance limits of the impedance values specified by the standards even under continuous load with up to 75 Arms on each phase. Furthermore, TC.FLK offers the possibility of having the resistance values adjusted during the calibration work at the factory.
- **Simple integration:** TC.ACS and TC.FLK seamlessly integrate with your test facility to perform accurate and repeatable evaluations of your equipment's voltage fluctuations and flicker using a suitable power analyzer.
- **Versatile Connectivity:** Integrate TC.FLK into your existing EMC testing setup with TC.ACS. Its versatile connectivity options ensure a seamless integration process.
- **Smart Design:** Engineered with technical foresight, TC.FLK features a robust and durable design that ensures consistent performance over time. This resilience means longevity and provides your lab with a reliable test tool for years to come.

TC.ACS

The multi-level inverter technology of TC.ACS together with a remarkably high switching frequency and digital closed-loop control enables a nearly perfect sinusoidal voltage as requested by IEC/EN 61000-3-2, IEC/EN 61000-3-12, IEC/EN 61000-3-3, and IEC/EN 61000-3-11.

Besides the specific use for EMC emission testing, the great benefit of the TC.ACS solution is the wide use in different applications.

- Full 4 quadrant regenerative Grid Simulator for inverter and on-board charger (OBC) testing
- Self-contained RLC load mode for various load and anti-islanding testings
- Synchronized power mode with $S/\cos(\varphi)$ or P/Q
- Full 4 quadrant high-speed amplifier for versatile use in P-HIL applications
- EMC testing also according IEC/EN 61000-4-X
- Application range from a few kVAs scalable up to 2000+ kVA power systems
- Powerful application software ACSControl for flexible use in the laboratory with comprehensive API and optional CAN interface for integration into an automated test rig

For further information, please refer to the related datasheets:

- DS_TC.ACS.30.528.4WR.S.LC_EN_...
- DS_TC.ACS.50.528.4WR.HC.LC_EN_...

Software ACSControl / Standards Option

While any standard grid voltage waveform can be programmed manually, for those listed in IEC/EN 61000-3-X, the standards test option of ACSControl sets TC.ACS in a special EMC mode for an even clearer voltage waveform and a high-speed sense operation. This makes ACSControl a complete software environment that provides intuitive and overall control of the TC.ACS.

Accurate Reporting

Depending on the chosen power analyzer product, comprehensive test reports can be generated effortlessly to demonstrate compliance with the specific EMC regulations.

TC.FLK

The TC.FLK for IEC/EN 61000-3-x standard tests provides both the Z_{ref} and Z_{test} impedance values that are required for the tests according to the IEC/EN 61000-3-3 and the IEC/EN 61000-3-11 standards in a single cabinet on castors. The values are designed and factory tested to stay within the tolerances under continuous full load operation which exceeds the 2 hours requested by the standard for P_{It} .

Besides the ability to switch between Z_{ref} and Z_{test} without rewiring, an additional output socket allows a direct connection to the TC.ACS voltage source for testing current harmonics in accordance to the IEC/EN 61000-3-2 and -3-12 standards without the hassle to rewire the sensors.



Figure 2: TC.FLK, front and back with interfaces

For further information about the TC.FLK unit, please refer to the related datasheet:

DS_TC.FLK75.2WR.S_EN_YYMMDD

This product is developed, produced, and tested according to ISO 9001 by REGATRON

For detailed technical information, contact your local sales partner or REGATRON.

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All product specifications and information contained herein are subject to change without notice.

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Class: Public

System Capability

The IEC/EN 61000-3-X standard test solution is available as single TC.ACS and TC.FLK units or, even more convenient, it comes fully integrated into 19" cabinets with various options.

- Mobile solution with AC cable and connectors
- Increased emergency stop reliability supporting performance level PL c / PL e according to EN ISO 13849
- For all standard tests which do not require a TC.FLK, TC.FLK provides a bypass socket to minimize reconfiguring work
- Turn-key cabinet solution including a power analyzer at the customer's choice or project-specific system integration according to customer's specification
- TC.ACS is liquid or air cooled, TC.FLK is air cooled