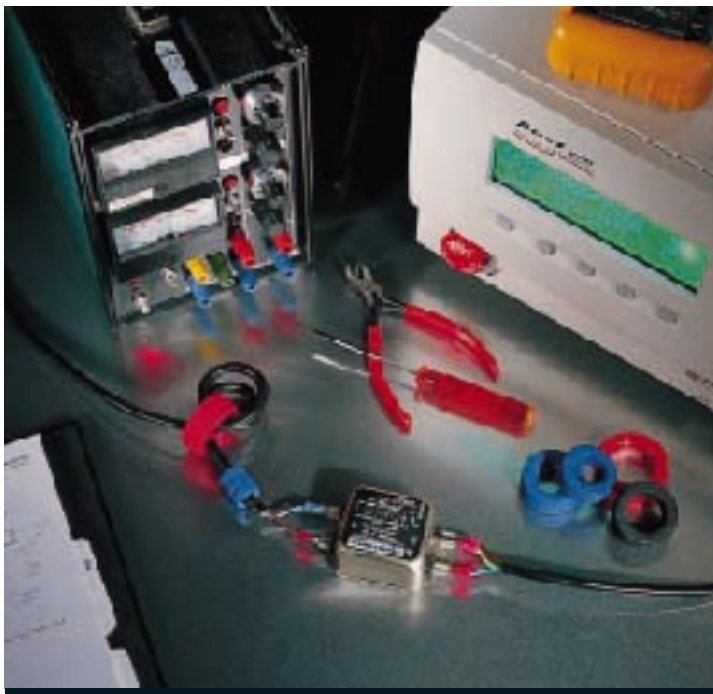
BESTplus / BESTemc



# BESTplus / BESTemc

conducted immunity test system



SCHAFFNER

Your number one name for EMC

# The need to test

**The need to test electronic equipment for electromagnetic compatibility - in the development lab and on the production floor - is now widely recognized as essential for quality assurance. Not only are the financial service and repair implications of not doing so too great to risk, but the manufacturer's reputation is at stake.**

By their very nature, electromagnetic interference phenomena occur sporadically, making faults caused by insufficient protection difficult to detect.

The European EMC Directive makes the manufacturer directly responsible. Commercially available equipment must not only generate no electromagnetic interference itself, but must also be largely immune to such influences. Through the implementation of these laws, EMC testing has assumed legal aspects pertaining to product liability. Other countries are on the way to introducing similar regulations.

## The BEST family

With the right equipment, the EMC tests most important for product quality can be carried out in any electronics laboratory. Self-certification - as required by the law - is then little more than a matter of logging the results.

Schaffner has created the BEST family of instruments to meet this need, cost-effectively. Compliance testing with BEST not only ensures electromagnetic compatibility to the required standards, but also guarantees EMC product quality.

BEST is a range of compact bench instruments that incorporates all six EMC pulse test procedures in a single housing. The instruments incorporate all you need to test and certify your products, in your own laboratory and with minimal effort.

Test parameters are user-adjustable within wide limits and offer generous test margins, so that BEST is also ideal for product analysis, or for checking compliance with in-house EMC quality standards.

- **Future proof**

*BEST already meets foreseeable future standards. Interfaces are designed for future expansion.*

- **Cost-effective**

*BEST is designed to suit the needs - and the budget - of the smaller manufacturer. In larger laboratories, it helps to relieve pressure on other high-end installations.*

- **An all-in-one solution**

*BEST is an ideal compact, portable test rig for on-site investigations.*

## Burst

Burst, or fast transient, pulses are high frequency packets of spikes that occur during switching operations on power lines and which spread throughout the supply network. Modern electronic devices running at ever faster speeds are vulnerable, particularly if the PCB layout is poor. They tend to react by functioning incorrectly and/or losing data.

***BEST*** *checks interference immunity by injecting standard-calibrated burst pulses on to power supply and data lines, and provides functions to identify weak points.*

## ESD

Electrostatic discharges are familiar as, for example, a small spark that occurs when a charged person touches a conductive object. The effect is harmless to the human body, but can be damaging to microprocessors and logic circuitry.

***BEST*** *includes an ergonomically styled 'pistol' for the simulation of electrostatic discharges. Like the other test pulses generated by BEST, test parameters are set up and results are automatically recorded on the bench-top unit.*

## Surge

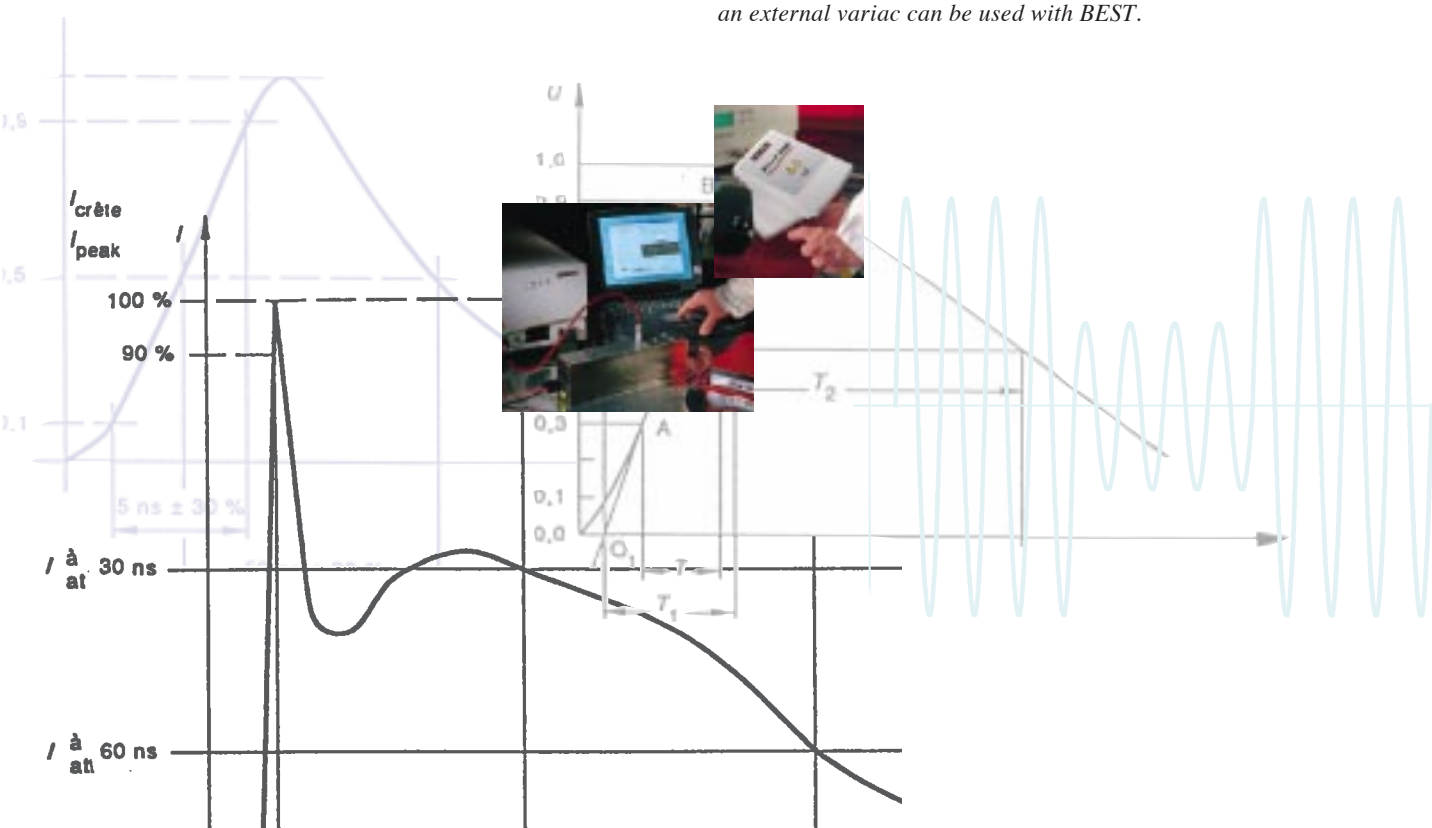
Surge pulses take the form of low frequency disturbances which contain considerable energy. They occur in power supply networks as a result of a lightning strike or when a heavy load is switched off, for example. Input circuits and power supplies for electronic instruments are particularly at risk from being over-driven or over-loaded.

***BEST*** *checks the equipment being tested with these energy-rich pulses in a safe, controlled procedure. Safety connectors and well-designed interlock circuits protect the operator.*

## Transient

Transient power variations occur in the mains supply as, voltage interruptions or dips, for example. In keeping with the best engineering practice, and to conform with European EMC regulations, items of equipment must behave reasonably in the face of such disruptions.

***BEST*** *needs no ancillary equipment to perform these tests. Standard test conditions are pre-programmed, and functional limits are easily determined by simply entering particular test values. For more demanding test scenarios, an external variac can be used with BEST.*



## Best*plus*

**BEST*plus* meets the test specifications of the Generic Standard. The system is upgradeable to meet the higher specification pulse voltage functions of the Basic Standards, at any time.**

## Best*emc*

**BEST*emc* includes the full range of higher specification pulse voltage functions according to the Basic Standards.**

If the instruments and systems to be tested contain magnetically sensitive components then their susceptibility to disruption caused by mains frequency or pulsed-magnetic fields must be checked.

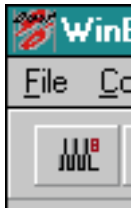
*Two standard magnetic field antennae each with a corresponding constant current source suitable for testing to the generic standards, are offered as options for BEST. Antennae to other dimensions can be supplied on request. All these options are supplied complete with fully integrated firmware and control software.*




### Accessories and options

All the models in the BEST range come complete with a comprehensive set of accessories as standard, including everything necessary to set up a standard test rig on the laboratory bench, or in the field.

Powerful PC control software, also supplied as standard, features an intuitive multi-lingual Windows interface, test sequencing and cataloging capabilities, and an automatic test report generator.




## A complete test system

All the functions of the BEST system - including real-time test functions and safety features - are microprocessor controlled. Self-test routines check that the generators are operating properly, and that calibration values are correct.

The BEST front panel gives a continuous LC-display of the current parameter settings, system status and test-in-progress status. Language is user selectable.


Test parameters for the Generic Standards are pre-programmed, and can be simply called up at the touch of a button. Custom test parameters can be keyed in, and stored to be used again at any time.

Tests can also be controlled via a PC, using the standard multi-lingual software supplied, to give access to a wide range of additional test management functions. Standard test parameters are pre-programmed, custom test specifications can be created, and tests can be combined into complete test sequences, which can be saved and re-used at any time. Test reports suitable for the Technical File and / or quality assurance purposes are generated automatically.

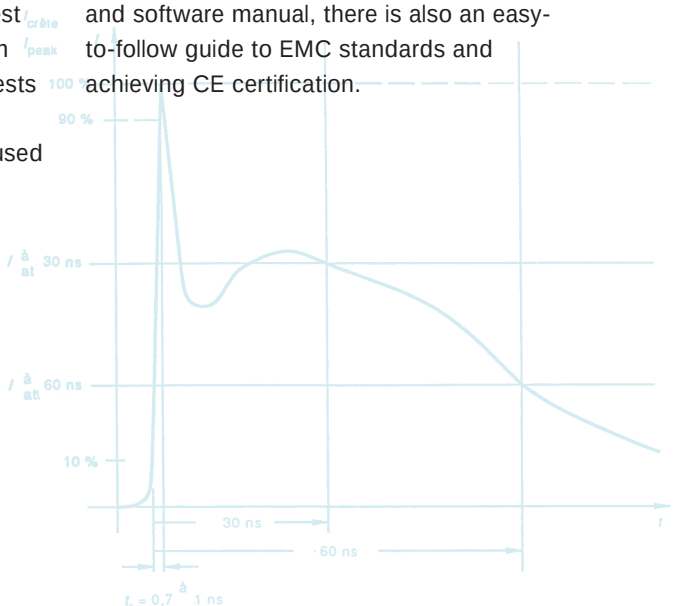
## A new test concept

The BEST concept is designed to make in-house testing - for product optimization, quality assurance, and compliance testing - and the process of CE certification, as simple as possible. That is why every BEST test system comes complete with a comprehensive set of accessories, including ground reference mat, capacitive coupling clamp, insulating spacers, resistors, earth cable and much more. You can be sure you have all you need to complete the test process, without any of the bother of sourcing components separately.

Interfaces are incorporated so that the system can be expanded at a later date, for three-phase testing, for example. Combined three-phase coupling networks for burst and surge, and coupling devices for data lines are available.

The BEST multi-lingual report generator allows test reports to be printed in English, French, German or Spanish.

In addition to the comprehensive hardware and software manual, there is also an easy-to-follow guide to EMC standards and achieving CE certification.



# A reliable test partner

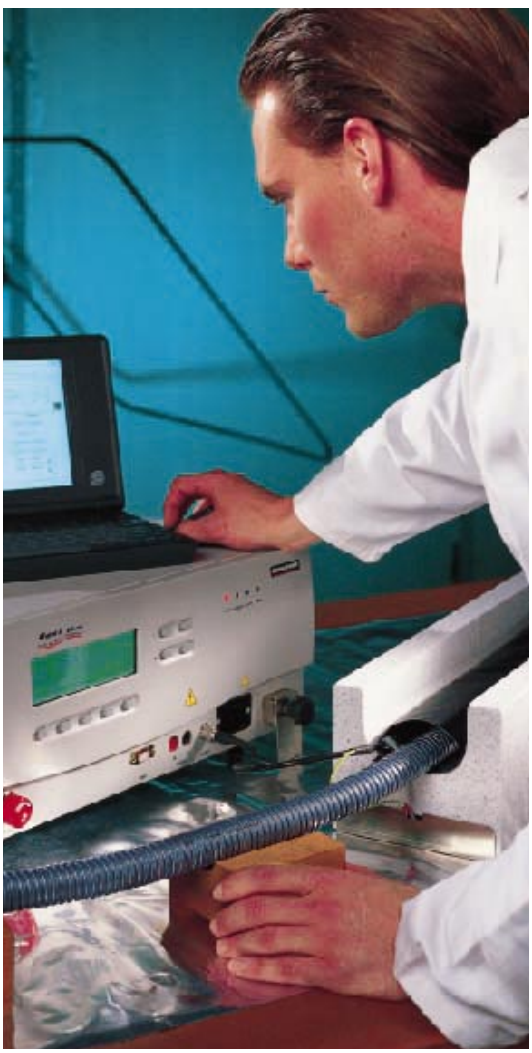




**Schaffner's manufacturing operations are certified to the ISO 9000 quality standard, with tight control over all procedures from material procurement to final test.**

A world-renowned certificated calibration service, and world-wide network of EMC test and measurement laboratories demonstrate the company's technical competence in the field of test and measurement. An consultancy service offering free advice to customers on all aspects of EMC standards and testing, including help with confirming which standards apply to a particular product, is available from your local Schaffner office, or via the Schaffner web site at

**www.schaffner.com**



**Generic standards:**

| | |
|---|---|
| EN 50082-1 | Generic immunity standard - part 1: residential, commercial and light industry |
| EN 50082-2 | Generic immunity standard - part 2: industrial environment |

**Product standards:**

| | |
|---|---|
| EN 50090 | Home and building electronic systems (HBES) |
| EN 50130 | Alarm systems including fire, intruder and personal alarms |
| EN 55011 | Industrial scientific and medical (ISM) equipment (CISPR 11) |
| EN 55103 | Professional audio, video, audio-visual and entertainment lighting control apparatus |
| EN 55104 | Household appliances, tools and similar apparatus |
| EN 60601 | Medical electrical equipment |
| EN 60945 | Maritime navigation and radio communication equipment and systems |
| EN 60947 | Low voltage switchgear and control gear |
| EN 61131 | Programmable controllers |
| EN 61800 | Adjustable speed electrical power drive systems |

## TECHNICAL DATA

| Burst | Pulse form | Pulse amplitude | Pulse frequency | Polarity | Pulses/burst | Burst period | Coupling |
|---|---|---|---|---|---|---|---|
| **BEST*plus*** | 5/50ns | 200 - 2200V | 1 - 100kHz | pos/neg | 1 - 75 | 100ms - 99s | L→Ref.GND<br>N→Ref.GND<br>PE→Ref.GND<br>L+N→Ref.GND<br>Coupling clamp |
| **BEST*emc*** | | 200 - 4400V | | | | | |

EUT supply: 250V/16Aac, 65V/10Adc.

| Surge | Pulse form | Pulse amplitude | Impedance | Polarity | Pulse repetition | Coupling |
|---|---|---|---|---|---|---|
| **BEST*plus*** | 1.2/50µs<br>(open-circuit)<br>8/20µs<br>(short-circuit) | 200 - 2200V | 2/12Ω | pos/neg | 10s min.<br>600s max. | L→N<br>L→PE / N→PE<br>L+N→PE |
| **BEST*emc*** | | 200 - 4400V | | | | |

EUT supply: 250V/16Aac, 65V/10Adc.

| ESD | Discharge voltage | Pulse rise-time | Network | Polarity | Pulse repetition | |
|---|---|---|---|---|---|---|
| **BEST*plus*** | 8.8kV (air)<br>6.6kV (contact) | 0.7 - 1ns | 150pF/330Ω | pos/neg | Single pulse<br>repetitive up<br>to 25Hz | Pre-settable<br>counter<br>Remote triggering |
| **BEST*emc*** | 16.5kV (air)<br>9kV (contact) | | | | | |

| Power quality | Mains drop-out | Voltage dip | Phase angle | Power up current |
|---|---|---|---|---|
| **BEST*plus***<br>**BEST*emc*** | 10ms - 5s | 70%Vn for 10ms - 5s<br>40%Vn for 10ms - 5s | 0 - 359º | 500A |

EUT supply: 250V/16Aac, 65V/10Adc. Interface for optional external variac.

**Magnetic field coil options for:**

**BEST*plus***
**BEST*emc***

| | Power line magnetic fields | Pulsed magnetic fields | | Dimensions |
|---|---|---|---|---|
| **INA 711** | Field strength 0.1 to 4A/m<br>Frequency 40 to 70Hz | Field strength: | 100 to 1100A/m with BEST*plus*<br>100 to 2200A/m with BEST*emc* | 1m x 1m, adjustable in all planes |
| **INA 712** | Field strength 0.1 to 40A/m<br>Frequency 40 to 70Hz | Field strength: | 100 to 1100A/m with BEST*plus*<br>100 to 2200 A/m with BEST*emc* | 1m x 1m, adjustable in all planes |

Three-phase extension for
**BEST*plus***
**BEST*emc***

| | |
|---|---|
| **CDN 135** | Three phase coupling unit for burst and surge with automatic control from the BEST unit<br>Power rating: 3 x 440Vac, 50/60Hz, 25A continuous, 30A for 0.5 hour |

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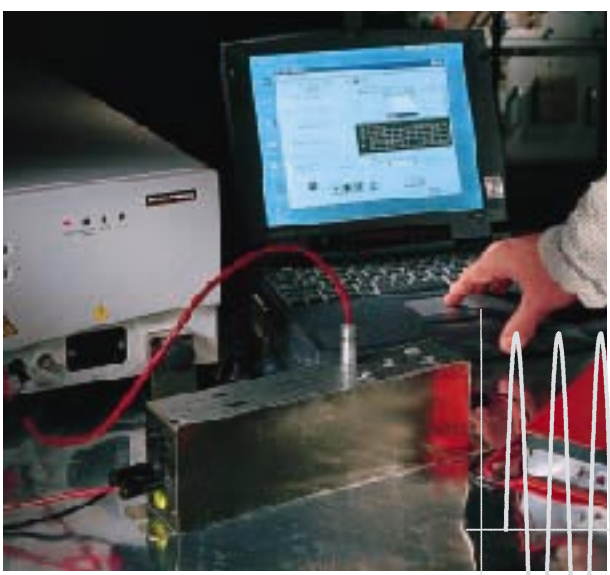
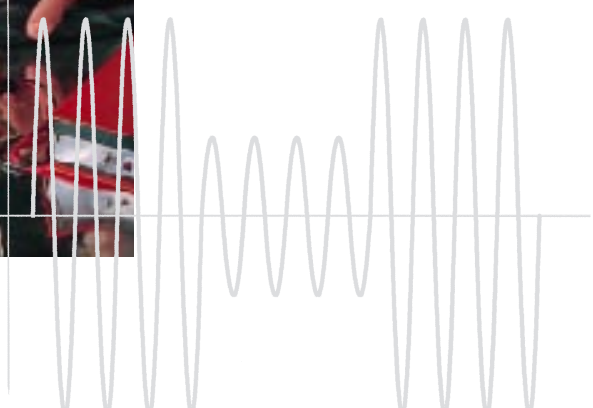
# Ordering information

| | |
|---|---|
| BEST*plus* - 1 | Complete package with burst and surge generators up to 2.2kV, power transient generator, ESD gun for 6.6 / 8.8kV, WINDOWS software, ground plane, data-line coupling clamp, interface for external variac, test literature, instruction manual and accessories |
| BEST*plus* - 2 | As above but without ESD gun |
| BEST*emc* - 1 | Complete package with burst and surge generators up to 4.4kV, power transient generator, ESD gun for 9 / 16.5kV, WINDOWS software, ground plane, data-line coupling clamp, interface for external variac, test literature, instruction manual and accessories |
| BEST*emc* - 2 | As above but without ESD gun |
| INA 711 | Magnetic field coil option for power magnetic fields to 4A/m and pulsed magnetic fields to 1100A/m with BEST*plus* or 2200A/m with BEST*emc* |
| INA 712 | Magnetic field coil option for power magnetic fields to 40A/m and pulsed magnetic fields to 1100 A/m with BEST*plus* or 2200A/m with BEST*emc* |
| INA 715 | Upgrade option for BEST*plus*, burst and surge to 4.4kV, ESD to 9 / 16.5kV |
| CDN 135 | Three-phase extension unit for burst and surge |





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Certified ISO 9001 supplier

Schaffner is an ISO-registered company. Its products are designed and manufactured under the strict quality requirements of the ISO 9001 standard