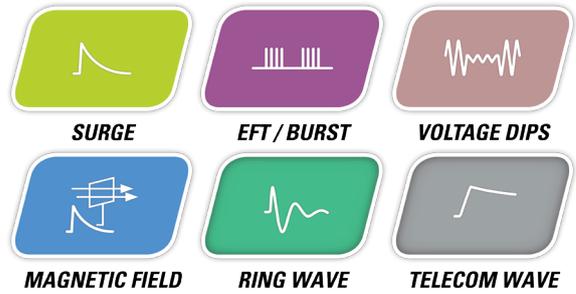




**axos**

# EXPANDABLE TEST SYSTEMS



**HAEFELY**

Current and voltage – our passion



## AXOS SERIES

Welcome to the unique design and concept of modularity designed by HAEFELY.

HAEFELY is recognizing an increasing interest in testing departments to configure the required functions in compact immunity test systems more flexible than ever. For that reason HAEFELY designed a unique concept of modularity which eviscerates large additional investments for customers in the future.

Moreover, constantly reduced product development times call for powerful, easy-to-operate and ready-to-use conducted immunity test systems which can be expanded in a multitude of different test applications. Customer requirements, particularly in the telecommunications and industrial electronics sector, emphasize a test system's accuracy and modularity, thus clearly

pointing to easy to expand T&M equipment that is favourably priced and suitable for most of industries.

The AXOS series has been tailored to exactly meet these requirements, offering special cost advantages for T&M applications in the development, production and servicing of telecommunications, components as well as safety and industrial electronics.

All AXOS test systems come equipped with all the hardware needed for instant upgrades by only entering optional key codes into the licence code manager of the unit. After entering the key code(s) the additional test functionalities like Surge Combination Wave, Ring Wave, Telecom Wave, EFT/Burst or Voltage Dips and Interrupts become available immediately. No direct intervention has to be done by the user at all.

**axos<sup>8</sup>**



**axos<sup>5</sup>**



## APPLICATIONS

Take benefit from the most modern and easy to use conducted immunity test system ever built. Welcome to the AXOS series.

### INDOOR APPLICATIONS

DOMESTIC	INDUSTRIAL	MEDICAL	IT
White Goods	Robotics	Monitoring	Computers
Brown Goods	Welding Machines	Scanning	Printers
Household	Packing Machines	Analysing	Modems
Lightning Devices	Production Lines	Pumps	Hubs
Portable Tools	Laboratory Equipment	Implants	Phones
Home Automation	-	-	Servers

### OUTDOOR APPLICATIONS

RENEWABLE ENERGY	TELECOM	TRANSPORTATION	DEFENCE
Solar Panels	Outdoor Lines	Automotive	Component Testing
Windmills	Repeater	Motorcycles	Communications
Turbines	Switching Stations	Trucks	Vehicles
Inverters	Data Concentrators	Electric Vehicles	Aircrafts
Infrastructure	Telecommunication Centers	Charging Stations	Satellites

**EMC IS ALL ABOUT STANDARDS.  
HAEFELY COVERS THEM IN JUST ONE SINGLE BOX.**

## STANDARDS

THE STANDARDS - Are you really familiar with all of them? Whether people talk about generic standards or product specific standards, stipulated by law or demanded from the manufacturer: HAEFELY has integrated many of them.



**SURGE**

### IEC/EN 61000-4-5 Surge Combination Wave 1.2/50µs...8/20µs

Surge events can be generated by lightning phenomena, switching transients or the activation of protection devices in the power distribution system. A surge itself is influenced by the propagation path taken so that impulses from the same event may have different forms depending upon where a measurement is taken. Combination Wave Generators (CWG) simulate a surge event in power lines close to or within buildings. Mostly the disturbances are tolerable because they are single events.



**EFT / BURST**

### IEC/EN 61000-4-4 Electric Fast Transients, EFT/Burst

Industrial measurement and control equipment nearly always use conventional control units containing relays or other electro-mechanical switching devices. Fluorescent lamp ballast units, insufficiently suppressed motors (hair dryers, vacuum cleaners, drills, etc.) are found everywhere in the public power supply. All of these are primarily inductive loads which generate interference when switched on or off. EFT events, can cause microprocessor units to malfunction or reset, with corresponding disruption to normal operation.



**VOLTAGE DIPS**

### IEC/EN 61000-4-11 Voltage Dips and Interrupts

Voltage failures occur following switching operations, short-circuits, response of fuses and when running up heavy loads. The quality of the electrical power supply is increasingly becoming a central topic of discussion. The interference sources in the mains, caused by electronic power control with non-linear components e.g. thyristors are used more frequently in domestic appliances such as hotplates, heating units, washing machines, television sets, economy lamps, PCs and industrial systems with speed-controlled drives.



**MAGNETIC FIELD**

### IEC/EN 61000-4-9 Pulsed Magnetic Field

Under normal operating conditions, an AC current generates a steady magnetic field so that equipment, such as monitors, close to AC power lines could suffer interference. Under fault conditions, a sudden high current level can result in a short duration magnetic field. Lightning strokes or short circuit fault currents in the power network can generate high level short duration magnetic fields.



**RING WAVE**

### IEC/EN 61000-4-12 Ring Wave / IEEE C62.41

Ring waves are used to simulate lightning or switching effects in domestic single or three phase supplies within an adequately protected building. The waveform has similar characteristics in both open and short circuit conditions. The ring wave is characterized as a bipolar damped oscillating wave.



**TELECOM WAVE**

### IEC/EN 61000-4-5 Telecom Wave 10/700µs / ITU K.20, K.21, K.44, K.45

Telecommunication networks and lines are often disposed to lightning strikes and their associated effects. All telecommunication systems linked with lines installed outdoors therefore require a reliable protection which needs to be tested.

## SOFTWARE

### REPORTING SOFTWARE

The reporting software creates automatically a test report. The main header can be adjusted with the individual company logo or any other text required. The data input can either be supplied directly via the remote control software or when saving the data on a USB drive. Furthermore, the data can be used from the sequence mode menu directly and the report gets generated. Detailed information will be provided with the reporting software tool itself. The reporting software is compatible with Windows 7 and Windows 10 (32- and 64-bit).

### REMOTE CONTROL SOFTWARE

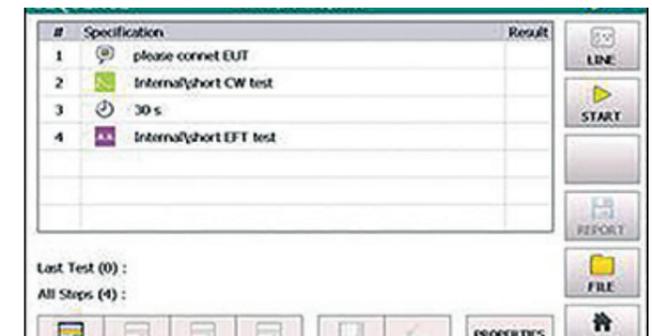
The optionally available remote control software simply enables the user to remote control the AXOS<sup>5</sup> and AXOS<sup>8</sup> by using a remote device like a standard PC, Tablet or Smartphone. The connection can either be established by putting in a ethernet cable "point to point" or via wifi network (a separate access point will be required).



## SEQUENCER

### LINKING TEST TO FORM A SEQUENCE

Individual tests stored on the PC or in the AXOS<sup>5</sup> / AXOS<sup>8</sup> itself can be combined to form a complex and fully automated test sequence. This feature enables Surge, EFT/Burst, Voltage Dips, Ring Wave and Telecom Wave tests to be linked and run in a continuous sequence. The already pre-installed IEC and generic standards make programming easier than ever before.





## AXOS<sup>5</sup> EXPANDABLE TEST SYSTEM

The AXOS<sup>5</sup> expandable test system integrates all of the best features of several standalone test systems into one single economic solution.

It can be individually combined either with 5 kV Surge Combination Wave, 5 kV EFT/Burst, Dips & Interrupts, along with an integrated single-phase coupling / decoupling network. This allows quick and completely automated testing to the most common IEC, EN, ANSI, IEEE and UL standards.

The AXOS<sup>5</sup> can either be operated via front panel by large colour graphic interface or remotely from the PC. The easy to use menu together with the availability of predefined test routines for different standards makes testing easy and reliable, even for less frequently users.

Numerous additional functions such as external start/stop function allows easy integration of the test system also in customer specific test environments.

All the test parameters can be varied in a broad range wide above the requirements of the standards. Together with the ability of changing test parameters during test, AXOS<sup>5</sup> is not only the ideal product for compliance and pre-compliance testing, it is useful for monitoring & debugging function during design phase as well.

A wide range of cost-efficient and user friendly coupling / decoupling networks for power lines as well as for symmetrical and asymmetrical data- and signal lines are available as options.

## STANDARDS

- IEC/EN 61000-4-4 EFT / Burst Ed. 2&3
- IEC/EN 61000-4-5 Surge E. 2&3 (1.2/50µs... 8/20µs )
- IEC/EN 61000-4-9 Magnetic Field
- IEC/EN 61000-4-11 AC Dips and Interrupts
- IEC/EN 61000-4-29 DC Dips and Interrupts
- IEC/EN 61000-6-1 Generic Residential
- IEC/EN 61000-6-2 Generic Industrial
- IEC/EN 60335-1 Household
- IEC/EN 60601-1 Medical
- IEC/EN 60950
- EN 55024

## APPLICATIONS

- Compliance & pre-compliance testing of electrical products
- CE marking
- Product development and debugging
- Compliance testing of telecom and wireless devices
- Overtesting

## FEATURES AND BENEFITS

- Easy to operate with manual and automated test modes, software assisted test preparation, pre-defined test routines and visual aided test setups
- Economic & Efficient
- Touch screen guarantees reduction of time and effort - Experience and know-how at a reasonable price
- Safe and reliable operation by using safety interlock, warning lamp and emergency stop functions
- Voltage and current monitoring of surge impulses and EUT power provides valuable feedback to the test engineer
- Automatic generation of test report, including test parameters, test setup and test result

## AXOS<sup>5</sup> EXPANDABLE TEST SYSTEM



AXOS<sup>5</sup>  
Compact Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(1)</sup>  
IEC/EN 61000-4-29<sup>(3)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(2)</sup>



AXOS<sup>5</sup>  
Surge Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(1)</sup>  
IEC/EN 61000-4-29<sup>(3)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(2)</sup>



AXOS<sup>5</sup>  
EFT/Burst Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(1)</sup>  
IEC/EN 61000-4-29<sup>(3)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(2)</sup>



AXOS<sup>5</sup>  
Dips Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(1)</sup>  
IEC/EN 61000-4-29<sup>(3)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(2)</sup>

- Activated by default
- Optionally available by activation via key code

<sup>(1)</sup> External voltage dips transformer „DIP 116“ required  
<sup>(2)</sup> Additional antenna coil „MSURGE-A“ required  
<sup>(3)</sup> Additional DC source required



## AXOS<sup>8</sup> EXPANDABLE TEST SYSTEM

The AXOS<sup>8</sup> expandable test system integrates all of the best features of several stand alone test systems into one single economic solution.

It can be individually combined either with 7 kV Surge Combination Wave, 7 kV Ring Wave, 7 kV Telecom Wave\*, 5 kV EFT/Burst or Dips & Interrupts, along with an integrated single phase coupling / decoupling network. This allows quick and completely automated testing to the most common IEC, EN, ANSI, ITU, IEEE and UL standards.

The AXOS<sup>8</sup> can either be operated via front panel by large colour graphic interface or remotely from the PC. The easy to use menu together with the availability of predefined test routines for different standards makes testing easy and reliable,

even for less frequently users. Numerous additional functions such as external start/stop function allows easy integration of the test system also in customer specific test environments.

All the test parameters can be varied in a broad range wide above the requirements of the standards. Together with the ability of changing test parameters during test, AXOS<sup>8</sup> is not only the ideal product for compliance and pre-compliance testing, it is useful for monitoring & debugging function during design phase as well.

A wide range of cost-efficient and user friendly coupling / decoupling networks for power lines as well as for symmetrical and asymmetrical data- and signal lines are available as options.

## STANDARDS

- IEC/EN 61000-4-4 EFT / Burst Ed. 2&3
- IEC/EN 61000-4-5 Surge E. 2&3 (1.2/50µs... 8/20µs)
- IEC/EN 61000-4-5 Surge (10/700µs)
- IEC/EN 61000-4-9 Magnetic Field
- IEC/EN 61000-4-11 AC Dips and Interrupts
- IEC/EN 61000-4-12 Ring Wave
- IEC/EN 61000-4-29 DC Dips and Interrupts
- IEC/EN 61000-6-1 Generic Residential
- IEC/EN 61000-6-2 Generic Industrial
- IEC/EN 60335-1 Household
- IEC/EN 60601-1 Medical
- IEC/EN 60950
- EN 55024
- IEEE C62.41
- ITU K.20, K.21, K.44, K.45

\*For Axos<sup>8</sup> with "TW 8" module

## APPLICATIONS

- Compliance and pre-compliance testing of electrical products
- CE marking
- Product development and debugging
- Compliance testing of telecom and wireless devices
- Overtesting

## FEATURES AND BENEFITS

- Easy to operate with manual and automated test modes, software assisted test preparation, pre-defined test routines and visual aided test setups
- Economic & Efficient
- Touch screen guarantees reduction of time and effort - Experience and know-how at a reasonable price
- Safe and reliable operation by using safety interlock, warning lamp and emergency stop functions
- Voltage and current monitoring of surge impulses and EUT power provides valuable feedback to the test engineer
- Automatic generation of test report, including test parameters, test setup and test result

## AXOS<sup>8</sup> EXPANDABLE TEST SYSTEM



AXOS<sup>8</sup>  
Compact Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
Telecom Wave 10/700µs<sup>(1)</sup>  
IEC/EN 61000-4-5 & ITU  
Ring Wave  
IEEE C62.41  
IEC EN 61000-4-12  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(2)</sup>  
IEC/EN 61000-4-29<sup>(4)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(3)</sup>



AXOS<sup>8</sup>  
EFT/Burst Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
Telecom Wave 10/700µs<sup>(1)</sup>  
IEC/EN 61000-4-5 & ITU  
Ring Wave  
IEEE C62.41  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(2)</sup>  
IEC/EN 61000-4-29<sup>(4)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(3)</sup>

- Activated by default
- Optionally available by activation via key code



AXOS<sup>8</sup>  
Surge Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
Telecom Wave 10/700µs<sup>(1)</sup>  
IEC/EN 61000-4-5 & ITU  
Ring Wave  
IEEE C62.41  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(2)</sup>  
IEC/EN 61000-4-29<sup>(4)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(3)</sup>



AXOS<sup>8</sup>  
Dips Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
Telecom Wave 10/700µs<sup>(1)</sup>  
IEC/EN 61000-4-5 & ITU  
Ring Wave  
IEEE C62.41  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(2)</sup>  
IEC/EN 61000-4-29<sup>(4)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(3)</sup>

- <sup>(1)</sup> In combination with external Telecom Wave Modul "TW 8"
- <sup>(2)</sup> External voltage dips transformer "DIP 116" required
- <sup>(3)</sup> Additional antenna coil "MSURGE-A" required
- <sup>(4)</sup> Additional DC source required



AXOS<sup>8</sup>  
Ring Wave Test System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
Telecom Wave 10/700µs<sup>(1)</sup>  
IEC/EN 61000-4-5 & ITU  
Ring Wave  
IEEE C62.41  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(2)</sup>  
IEC/EN 61000-4-29<sup>(4)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(3)</sup>



AXOS<sup>8</sup>  
Telecom Wave System

Surge 1.2/50µs...8/20µs  
IEC/EN 61000-4-5  
Telecom Wave 10/700µs<sup>(1)</sup>  
IEC/EN 61000-4-5 & ITU  
Ring Wave  
IEEE C62.41  
EFT/Burst  
IEC/EN 61000-4-4  
Voltage Dips  
IEC/EN 61000-4-11<sup>(2)</sup>  
IEC/EN 61000-4-29<sup>(4)</sup>  
Magnetic Field  
IEC/EN 61000-4-9<sup>(3)</sup>

## STANDARD PACKAGE

### AXOS<sup>5</sup>

Compact Immunity  
Surge  
EFT/Burst  
Voltage Dips

### AXOS<sup>8</sup>

Compact Immunity  
Surge  
EFT/Burst  
Voltage Dips  
Ring Wave  
Telecom Wave

### INCLUDED ACCESSORIES

- Mains Cable
- User Manual
- Calibration certificate
- Telecom Wave Modul "TW 8" 10/70µs\*
- Automatic dips single phase transf. "DIP 116"\*\*\*

\*Only with AXOS<sup>8</sup> Telecom Wave Test System  
\*\*Only with AXOS<sup>8</sup> Dips Test System

## BASIC AXOS SPECIFICATIONS

### GENERAL DATA

	AXOS <sup>5</sup>	AXOS <sup>8</sup>
Control Power	85 V - 264 V; 50/60Hz	
Dimensions (W x H x D)	19"/4U (45 x 18 x 49 cm)	22"/6U (45 x 27 x 50 cm)
Weight	25 kg	30 kg
Display	7" touch-screen	

### IEC / EN 61000-4-4 EDITION 3 EFT / BURST

Output Voltage	0.2 – 5.0 kV ±10% at coaxial output	
Rise Time	5 ns ±30%	
Impulse duration	50 ns ±30% at 50 Ohm 50 ns –15 +100 ns at 1000 Ohm	
Burst Mode	Normal, continuous, real, random	

### IEC / EN 61000-4-5 EDITION 3 SURGE COMBINATION WAVE

Output Voltage	0.2 – 5.0 kV ±10%	0.2 – 7.0 kV ±10%
Voltage Rise Time / Impulse duration	1.2 µs ±30% / 50 µs ±20%	
Output Current	0.1 – 2.5 kA ±10%	0.1 – 3.5 kA ±10%
Current Rise Time / Impulse Duration	8 µs ±20% / 20 µs ±20%	

### IEC / EN 61000-4-5 Telecom Wave / ITU K.20, K.21, K.44, K.45 (external TW 8 module)

Output voltage	-	0.2 - 7.0 kV ± 10%
Front time OCV / Decay Time OCV	-	10 µs ± 30% / 700 µs ± 20%
Front time SCC	-	5 µs ± 20%

### IEC / EN 61000-4-11 EDITION 3 AND IEC / EN 61000-4-29 DIPS & INTERRUPTS

Max. voltage	264 V AC/DC	
Max. current	16 A AC/DC continuous 20 A for 5 s , 23 A for 3 s , 40 A for 3 s , > 500 A inrush current	

### IEC / EN 61000-4-12 EDITION 3 AND ANSI / IEEE C62.41 RING WAVE

Max. voltage	-	0.2 - 7.0 kV ± 10%
Frequency	-	100 kHz
Rise time OC	-	0.5 µs ± 30%
Rise time SC	-	0.2 µs ... 1 µs

For complete technical specifications please consult the device datasheet available at [www.haefely.com](http://www.haefely.com)

## BASIC AXOS SPECIFICATIONS

FP-EFT 32M	3-Phase CDN EFT/Burst 32 A / 690 V
FP-EFT 100M2	3-Phase CDN EFT/Burst 100 A / 690 V
FP-COMB 32	3-Phase CDN for Surge, Ring Wave, EFT/Burst 32A / 480 V
FP-COMB63/690-1	3-Phase CDN for Surge, EFT/Burst, RW, 63 A / 690 V
FP-SURGE 100M2	3-Phase CDN Surge 100A / 690 V
PCD 121	Symmetrical Data & Control Line Coupler
PCD 126A	Asymmetrical Data & Control Line Coupler
DEC 5	Symmetrical Data & Control Line Decoupler
DEC 6	Symmetrical Data & Control Line Decoupler
DEC 7	Asymmetrical Data & Control Line Decoupler
DIP 116	Automatic Dips Transformer 16 A 40/70/80%
IP4B	Capacitive Coupling Clamp for EFT/Burst
MSURGE-A	Magnetic Field Test IEC / EN 61000-4-9
VTM 15000	Isolation Test 1.2/50 us up to 10 kV
VTM 15000/05	Isolation Test 1.2/50 us up to 10 kV / 0.5J
PDP 8000	Differential Probe 1000:1 for Surge
CP 101	Current Probe Model for Surge
ES	External Emergency Stop Switch P12
WL	External Warning Lamp P12
TW 8	Telecom Wave Modul 10/700µs
Calibration	Accredited Calibration AXOS according to ISO/IEC 17025

### KEY CODES

Surge Key Code	Key Code for Surge extension AXOS
EFT/Burst Key Code	Key Code for EFT/Burst extension AXOS
Ring Wave Key code	Key Code for Ring Wave extension AXOS
Dips Key Code	Key Code for Voltage Dips extension AXOS

### REMOTE CONTROL AND SOFTWARE

Remote Control	Remote Control Software for AXOS
Report Software	Reporting Software for AXOS

## ADDED SERVICES

- Pre- & After Sales Support
- Application Support
- Commissioning
- Warranty Extension
- Calibration (accredited & factory)
- Training and Seminars
- Rental units



SERVICES





[www.contractoressentials.com.au](http://www.contractoressentials.com.au)  
[www.tmg.com.au](http://www.tmg.com.au)

**Head Office**  
**TMG Test Equipment**  
**231 Osbourne Avenue,**  
**Clayton South**  
**Victoria 3169**  
**1800-680-680**

This document has been drawn up with the utmost care. We cannot, however, guarantee that it is entirely complete, correct or up-to-date. Subject to change without notice.

V2311



**HAEFELY**

Current and voltage – our passion

HV

HIGH VOLTAGE

IN

INSTRUMENT

EM

EMC

  
reliable.  
precision.