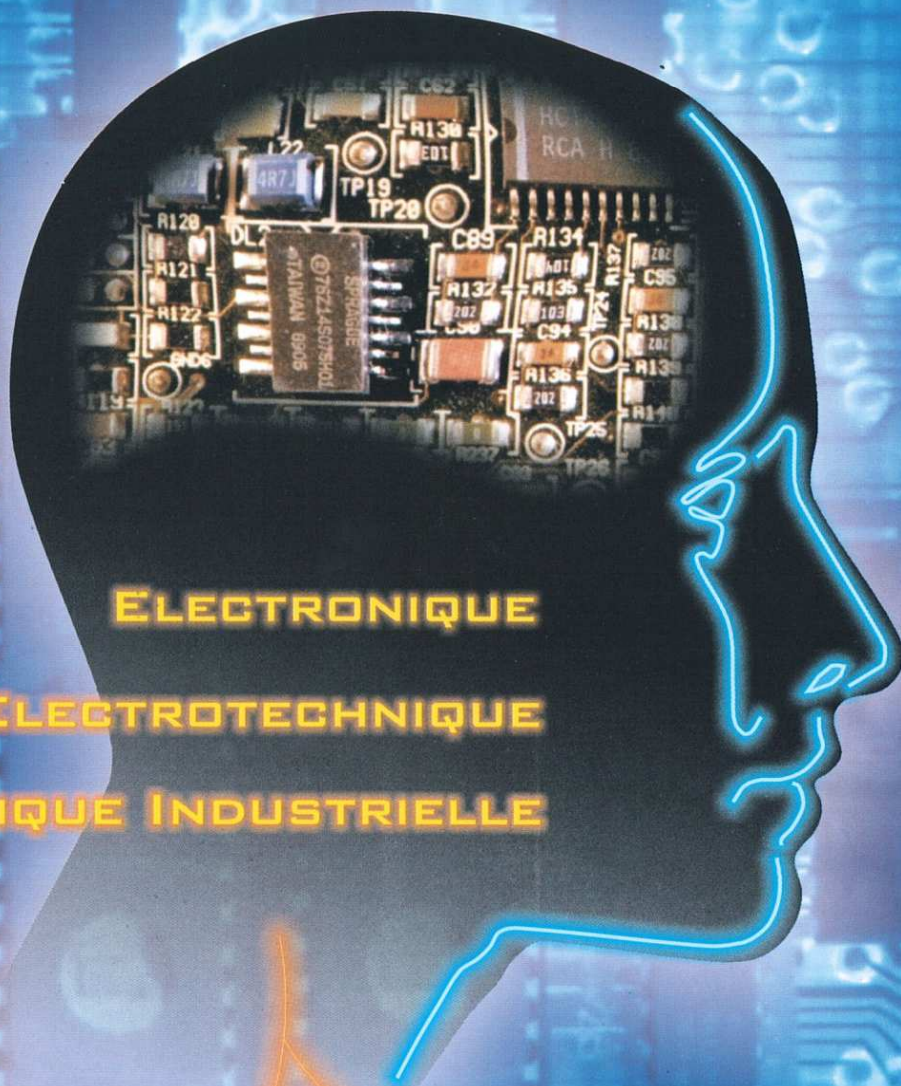


COTEL

Entre nous, le courant passe



ELECTRONIQUE

ELECTROTECHNIQUE

INFORMATIQUE INDUSTRIELLE

English

Catalogue 2010 Edition Nr : 2

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Portable test Systems for protection relays and electrical equipment

• MANUFACTURE & SALES

Test systems, portable current and voltage generators, of modular design.

• INJECT ! MEASURE ! VERIFY...

The reliability and quality of an electrical supply network is obtained by systematic monitoring operations :

- testing protection relays, circuit breakers...
- testing sectionners...
- testing batteries...

Thanks to our range of rugged, reliable and easy to use equipment, **COTEL** covers all the needs of maintenance professionnels.

• From DESIGN to MANUFACTURE

COTEL's design office is available to you. Our technicians and engineers are trained in :

- new technologies,
- protection techniques,
- the latest EMC and safety standards...

Together we can study the feasibility of the product best suited to your needs.

• PRODUCT RANGE...

- Protection circuit verification
- Battery monitoring
- Voltage and Current amplifiers
- Measurement.



A French company, founded in 1989, **COTEL** is now the premier national supplier of test systems for checking protection elements in HV, MV and LV electrical networks.

PRIMARY MILESTONES

1989	company creation and start of the analog product activity.
1993	first sales of the VISUBAT range of no-disconnect battery monitors.
1994	company move to BAILLEUL on a plot of 2200 M ²
1998	first sales of the HEXAN digital test systems.
2004	ISO 9001 certification.
2006	Numerical display and control of the primary and secondary test set

PRIMARY ACTIVITY

The main activities of **COTEL** are the design, development and sales of test systems and software intended for the regular checking of the elements of the protection circuits for HV, MV and LV electrical networks. The field of activity extends equally to the dc supplies, whether regulated or not, and dc /ac converters, load resistor banks, discharge banks and battery monitors which do not require disconnection.

RESOURCES

COTEL products are designed and developed by an engineering team using the latest software tools and with mastery of the latest signal analysis and power electronics technologies.

THE MARKETS

The manufacturers, installers and the main producers, as well as the biggest consumers, of electric power have faith in our capabilities. The sectors of activity of our main customers are the following :

- Electrical energy distribution
- Electrical protection system manufacturers
- Installers and assemblers
- Monitoring authorities
- The chemical and refining industries.

COMPANY STRONG POINTS

1) A policy of Quality based on :

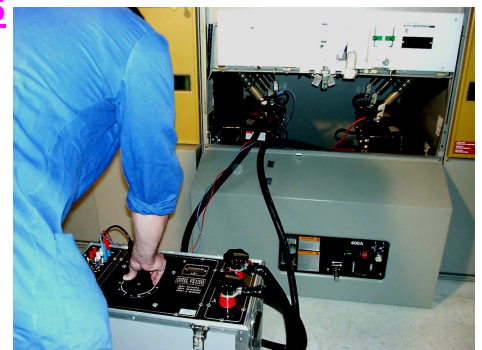
- Responding to the client's requirement.
- A rigorous selection of suppliers.
- High performance management software tools.

2) A strong sales activity based on :

- quality products and services
- meeting delivery dates.
- competitive pricing

3) A complete product range :

- Primary injection systems with the designations **VE 300**, **VE1200**, **VE2000**, **MCF 500**.
- Secondary injection systems with the designations **MG 50**, **SMARTCASE**, **HEXAN** et **POWHEX**.
- Timing equipment with the designations **CP 1** and **CP 4**.
- Battery monitoring systems of the **VISUBAT** range and the **BD** for use with discharge banks.
- Voltage and Current ac/dc generators intended for checking measurement instruments in the context of use with calibration instruments, sold with the designation **MULTICAL**.



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**1200 A Max
750 VA**

New

- **High current test set up to 1200A**
- 2 outputs with high current **3V(1200A) et 6V(500A)**
- Low ranges to inject current up to **32A**
- Injection set **compact and rugged**
- **True RMS measurement**
- Voltage generator up to **120Vac**
- Measurement of **ratio and direction of current transformer**

OVERVIEW

- Flight Case enclosure
- Dimensions : **390 x 310 x 300 mm**
- Weight : **21 kg.**

SPECIFICATIONS

Power supply :

- **230V 50/60 Hz**

Nominal power : **750 VA.**

Protections :

- Power supply and generator by circuit breakers and electronic control.

Generators :

One AC current generator with voltage function depending on load.

Current generator : 5 ranges

Output 3V : 500A/50s ; 750A/20s ; 1100A/10s

Output 6V : 250A/50s ; 500A/15s

Output 25A with maximum voltage 24V

Output 2.5A 9VA

Voltage output 120V / 5A

These specifications vary as a function of the section of the cables used, the resistance of the contacts and the heating of the generator in the test set. Additionally, for correct operation it is necessary to keep the instrument on standby for a period that is at least as long as the injection period.

Cables used : 2 cables length 2m section 95 mm²



DIGITAL DISPLAY

The new control enables recording of the trip time, threshold, and CT ratio in an internal FLASH memory. These data can be downloaded to a computer with windows® XP/2000/VISTA. The data connections are **USB** and **RS232**.

Internal ammeter :

- 2 ranges **0-120 A** and **120-1200 A** with automatic selection
- Precision : 1%

Time measurement :

- Internal START/STOP trigger
- External START/STOP trigger
- free of voltage contact or AC/DC **12 to 250 V**
- precision : 0.02 % +-1ms
- range measurement : 9999.999

Options

- integrated ammeter to measure the ratio and direction of a current transformer : **MCF500-Aext**
- Set of cables
- Software to edit test reports and data records : **MCF-ACQ**

VE 300-N

Primary injection set

900 VA
1000A

Single-phase test set for high currents. The easy to use and rugged **VE 300-N** is particularly adapted to primary testing : transformer ratios, auxiliaries, bushings, circuit breakers, over-current relays, etc.

The **VE300-N** has a built-in digital measurement and control module. The latest version has a big graphical display for easy reading of the TRMS current and to control the injection.

OVERVIEW

- Flight Case,
- Size : **450 x 310 x 445 mm**,
- Weight \pm 33 kg.

SPECIFICATIONS

Power supply :

- **230 Vac, 50/60 Hz.**

Protection :

Supply and generator by circuit breakers and electronic control.

Generator :

Single generator configured for current with four ranges :

1A, 15A, 150A/6V and 300A/3V

The output current can be adjusted up to
150A/15mn, 300A/20s and 600A/3s
on 3V output
300A/15mn, 600A/20s and 1000A/3s
on 3V output

DIGITAL DISPLAY

The new control enables recording of trip time, threshold and CT ratio in an internal FLASH memory. These data can be downloaded to a computer with windows® XP/2000/VISTA. The data connexions are **USB** and **RS232**.



Internal ammeter :

- 2 ranges **0-100 A** and **100-1000 A** with automatic selection
- Precision : 1%.

External ammeter :

- 2 ranges **0-1A** and **1-10A**
- Precision : 0.5 %
- The external ammeter has a dedicated menu to measure the ratio and phase shift of a Current Transformer.

Time measurement :

- Internal START/STOP trigger
- External START.STOP trigger
- free of voltage contact or AC/DC **12 to 250 V**
- precision : 0.02 % +-1ms
- range measurement : 9999.999 s

Options

- Software to edit test reports and record data : **MCF-ACQ**

Set of cables :

VE300-CA-3M-PIN 2x 3m section 95 mm² with clamp

VE 1200-N Primary injection set

2000A
3000VA

Single-phase test set for high currents. The easy to use and rugged **VE 1200-N** is particularly adapted to primary testing : transformer ratios, auxiliaries, bushings, circuit breakers, over-current relays, etc.

The **VE1200-N** has a built-in digital measurement and control module. The latest version has a big graphical display for easy reading of the TRMS current and control of the injection.

OVERVIEW

- Flight Case with wheels,
- Size : **570 x 310 x 510 mm**,
- Weight \pm 52 kg.

SPECIFICATIONS

Power supply :

- **230 Vac 50/60 Hz.**

Protection :

Supply and generator by circuit breakers and electronic control.

Generator :

Single generator configured for current three ranges : **1A, 15A and 2000A.**

The output current can be adjusted to

650A for 15 minutes
1000A for 5 mn
2000A for 30 seconds.

DIGITAL DISPLAY

The new control enables recording of trip time, threshold and CT ratio in an internal FLASH memory. These data can be downloaded to a computer with windows® XP/2000/VISTA. The data connexions are **USB** and **RS232**.



Internal ammeter :

- 2 ranges **0-200 A** and **200-2000 A** with automatic selection
- Precision : 1%.

External ammeter :

- 2 ranges **0-1A** and **1-10A**
- Precision : 0.5 %
- The external ammeter has a dedicated menu for measuring the ratio and phase shift of a Current Transformer.

Time measurement :

- Internal START/STOP trigger
- External START.STOP trigger
- free of voltage contact or AC/DC **12 to 250 V**
- precision : 0.02 % \pm 1ms
- range measurement : 9999.999 s

Options

- Software to edit test reports and record data : **MCF-ACQ**

Set of cables :

VE1200-CA-3M-ETRI 2x 3m section 190 mm² with clamp

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**4000A
6000VA**

Single-phase test set for high currents. The easy to use and rugged **VE 2000-N** is particularly adapted to primary testing : transformer ratios, auxiliaries, bushings, circuit breakers, over-current relays, etc.

The **VE2000-N** has an in-built digital measurement and control module. The latest version has a big graphical display for easy reading of the TRMS current and for control of the injection...



PRIMARY INJECTION

OVERVIEW

- 2 flight case :

CONTROL Unit :

Dim : **530 x 385 x 360mm** weight \approx **35 kg**

POWER Unit :

Dim : **450 x 305 x 476mm** Weight \approx **52 kg**

SPECIFICATIONS

Power supply :

230V 50/60Hz 6 kVA

Protection :

Supply and generator by circuit breakers and electronic control.

Generator :

Single generator configured for current three ranges : **1A, 15A and 4000A**

The output current can be adjusted to :

6V 1000A upto 15'

3V 2000A upto 2,5 mn

3000 A upto 10 s

4000 A upto 5s

DIGITAL DISPLAY

The new control enables recording of the trip time, threshold and CT ratio in an internal FLASH memory. These data can be downloaded to a computer with windows® XP/2000/VISTA. The data connexions are **USB** and **RS232**.

Internal ammeter :

- 2 ranges **0-400 A** and **400-4000 A** with automatic selection
- Precision : 1%.

External ammeter :

- 2 ranges **0-1A** and **1-10A**
- Precision : 0.5 %
- The external ammeter has a dedicated menu for measuring the ratio and phase shift of a Current Transformer.

Time measurement :

- Internal START/STOP trigger
- External START.STOP trigger
- free of voltage contact or AC/DC **12 to 250 V**
- precision : 0.02 % \pm 1ms
- range measurement : 9999.999 s

Options

- Set of cables
- Software to edit test reports and record data : MCF-ACQ

20A specific range for self powered or high impedance relay
300A max

- The easiest and fastest way to **test self powered relays**
- Specifically adapted ranges for **self powered relays** up to 20A for secondary injection
- Single commutator to test classical relays
- High current **up to 300A** for primary injection
- **rugged and light weight** conception
- True RMS measurement

New

OVERVIEW

- Flight case enclosure.
- Dim. L x H x P **345 x 280 x 260 mm**
- Weight : **17 kg.**

SPECIFICATION

Power Supply:

- **230V 50/60 Hz**

Maximum power : **1200VA.**

Protection :

- ☐ Supply and generator by circuit breakers

Generator :

One generator usable as a variable current or voltage generator with an output having four adapted ranges for relays with no auxiliary supply.

3A PSAA adapted

6A PSAA adapted

12A PSAA adapted

20A PSAA adapted

And 3 high current ranges

15A maximum voltage **24V** ; **32A** **140s**

30A maximum voltage **12V** ; **100A** **15s**

70A maximum voltage **5V** ; **300A** **15s**



DIGITAL DISPLAY

The latest controller enables recording of trip time, threshold and CT ratio in an internal FLASH memory. These data can be downloaded to a computer with windows® 9x/NT/XP/2000. The data connexions are **USB** and **RS232**.

Internal ammeter :

- 2 ranges **0-120 A** and **120-1200 A** with automatic selection
- Precision : **1%**

Time measurement :

- Internal START/STOP trigger
- External START.STOP trigger
- free of voltage contact or AC/DC **12 to 250 V**
- precision : **0.02 % +-1ms**
- range measurement : **9999.999**

Options

- integrated ammeter to measure ratio and direction of current transformer : **MCF500-Aext**
- Set of cables : **JC13**
- Software to edit test reports and records data : **MCF-ACQ**

SECONDARY INJECTION

300A
250V

Single-phase test set for current or voltage.

The easy to use and rugged **MG 50-N** is a reference for testing over and under voltage relays and also those of the Statimax ® type with no auxiliary supply.

The **MG 50-N** has an in-built digital measurement and control module. The latest version has a big graphical display for easy reading of the TRMS current and control of the injection..

OVERVIEW

- Light aluminium case,
- Size (W x D x H) :
390 x 300 x 310 mm.
- Weight ± 18 kg.

SPECIFICATIONS

Power supply :

- **230 Volt, 50 or 60 Hz.**
- Maximum power : **1500VA.**

Protection :

Supply and generator by breakers.

Generator :

Single generator configurable for current or voltage with five ranges :

50A at max. **10V**

10A at max **50V**

2A at max **250V**

5A at max **7,5VA**

1A at max **1,3A**

Overload of 2 x rating for 1 minute.

DIGITAL DISPLAY

The new control enables recording of the trip time, threshold and CT ratio in an internal FLASH memory. These data can be downloaded to a computer with windows® 9x/NT/XP/2000. The data connexions are **USB** and **RS232**.



Internal ammeter :

- 2 ranges **0-30 A** and **30-300 A** with automatic selection
- Precision : 1%.

Time measurement :

- Internal START/STOP trigger
- External START.STOP trigger
- Voltage free contact or AC/DC **12 to 250 V**
- precision : 0.02 % +-1ms
- range measurement : 9999.999 s

Options

- integrated ammeter to measure ration and direction of current transformer : MCF500-Aext
- Set of cables : JC06
- Software to edit test reports and records data : MCF-ACQ

Injection cables :

Réf. JC06

- 4 wires 2 m length sectionen 2,5 mm² with banana plug
- 4 test clips
- 2 wires length 2 m section 16 mm² with grips
- 1 plastic transport case. 420 x 210 x 180 mm.

250 Aac
300 Vac
330 Vdc

Single phase AC current and AC/DC voltage injection set. The combination of the ruggedness and ease of use of the VE range with the digital technology of the HEXAN system mean that the SMARTCASE is a good compromise between digital and analogue technologies. The design of the SMARTCASE means that it is the ideal tool for systematic field testing of over and under voltage, current and frequency relays in addition to wattmeter and impedance relays. The alphanumeric display and menu control clearly indicates the measurements performed.

ENCLOSURE

- Flight case style.
- Dimension : 43 x 23 x 23 cm
- Weight : **18 kg.**

SPECIFICATIONS

Main Supply

- **230V 50/60 Hz**

Maximum power : **1000 VA.**

Protection

- Main supply and generator by circuit breakers.

Generators

One main generator supplying current to 250 A, Voltage to 250 Vac or 330 Vdc

One voltage generator phase adjustable compared to the main generator : 300 V

Current generator : 4 ranges

2 A, 10 A, 50 A, 100 A

Voltage output :

250 VAC 2 A or 330 VDC 1.5 A

Voltage and frequency generator : 3 ranges

75 V, 150 V, 300 V 50 VA

Auxiliary supply : 3 voltages

24 V, 48 V, 127 V DC 50 W

Measurements

Digital module covering: internal or external timer, frequency meter, voltmeter and ammeter



Digital Timer

- Accuracy : 0.02 % \pm 1 ms
- measurement range : 27599.999 s

Functions :

- internal or external Start/Stop
- Cycle measurement (e.g. automatic recloser)
- External stop signals: volt-free contacts or voltages **24 V/250 V AC** or **5 V/250 VDC**.
- Output by volt-free contacts with programmable delay

Internal digital ammeter

- Range **25 A, 100 A** and **250A**
- External : **6 A AC/DC** for CT ratio or differential current
- Accuracy : 1 %.

Digital voltmeter (internal or external)

- Automatic ranges **150 V, 500 V**
- Accuracy : 1 %.

Frequency generator

Range : 40 to 70 Hz
Resolution : 0.01 Hz

Phase shift

Range : -180° / +180° or 0° / 360°

INJECTION SECONDAIRE

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HEXAN version II

PORTABLE THREE-PHASE PROTECTION RELAY TEST SET

Current (25 A/ph) & Voltage (300 V/ph)

Extremely versatile

Very user friendly

Run from PC OR Custom interface

Modular & Configurable

Easily portable



HEXAN uses Digital Signal Processing to combine the accuracy necessary for testing Electronic relays (Static or Digital) with the power needed to test Electromagnetic relays by secondary injection.

HEXAN is available in two versions :

- **HEXAN-C** : with integrated command front panel in flight case type housing
- **HEXAN type II** : in aluminium enclosure with handle. This test set is compact and lightweight

The **HEXAN** can be controlled in two ways:

* **MANUALLY**, using the **MCM Custom Interface** which displays and sets the electrical parameters (simple & complex voltages, currents, phases, frequency...) which define a healthy or faulty network. A scrolling menu gives access to the various test modes : shunt, re-closer, generator protection, and neutral offset

* **By PC**, using the user-friendly **MANUSOFT** control software which presents the operator with a virtual manual control panel as for a typical test set, with potentiometers for control as well as advanced injection tools, Fresnel diagram display and the symmetrical components..

Accessories supplied with **HEXAN**

Power cable IEC320, USB cable, CD-ROM with Manusoft software, User guides in paper and pdf format

Accessories in option

Integrated Auxiliary supply 24/48/127 Vdc 30W réf **HEX-ALIM**

Cable kit JC03 with : 18 safety banana plug cables length 2m 2.5mm², 18 crocodile clips, 1 plastic box 420 x 210 x 180 mm.

Cables with Essailec® plug voltage and currents (consult us)

Transport bag in nylon ref **HEX-HOU** (for HEXAN type II only)

Heavy duty transport case (for HEXAN type II only) rugged IP54 with wheels and removable handle réf **FC-TYPE32B**

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HEXAN-C



THREE-PHASE PROTECTION RELAY TEST SET

Current (25 A/ph) & Voltage (300 V/ph)

Extremely versatile

Very user friendly

Run from PC OR integrated Custom interface

Modular & Configurable

Rugged and portable



The **HEXAN-C** applies the latest technologies for component integration and power supply design to offer a complete three-phase test system of reduced dimensions and weight. The experience acquired during the development of the HEXAN enables us to integrate a custom interface into the front panel. Control by software is also possible for complex relays or those which require more automation. THE **HEXAN-C** is particularly adapted to the testing of electric protection relays, as well as to the verification of meters and converters

The **integrated custom interface** displays and enables easy adjustment of the three voltages, the three currents, the frequency, the phase angle of electrical networks generated by the HEXAN. A simple menu accesses the testing of reclosers, voltage decoupling protections, neutral shifting...

The double network for switching instantaneously between good and faulty networks with digital timer synchronising is very user friendly.

The **alternative control by PC** is available with the HEXAN software. The connexion is easy with the serial **RS232** or **USB** on the front panel. The **Manusoft software** supplied gives the the user a simple front panel on the PC screen with potentiometers having advanced tools. Injecting is aided by the Fresnel diagram. The software is compatible with windows® XP/2000/VISTA.

HEXAN test software modules

AH-PDMI	Minimum Impedance Relay (Railway application)
AH-PRODI	Distance Protection (Electrical transmission)
AH-CTF	Generator Protection
AH-SC	Synchro coupler
AH-MITI	Overcurrent protection (constant & inverse time relays)
AH-SMARTEST	Automatic relay tester & state sequencer
AH-RH7T	Harmonic generator

SPECIFICATIONS

Amplifiers

Protection against overload & short circuit on the voltage & current outputs. All connections for amplifier outputs are 4 mm banana plug

Voltages

Amplifiers **13 V/130 V** for 6X0 models

3x Ph-N **3x 0...130V**
 1x Ph-Ph **1x 0...260 V**
 Puissance : **3x 60 VA à 130 V**
 Résolution : **400 µV à 13V ; 4 mV à 130 V**
 Précision : **0.1 %**
 Distorsion : **0.1 % THD***

Amplifiers **130 V/260 V** for 6X1 models

3x Ph-N **3x 0...260 V**
 1x Ph-Ph **1x 0...520 V**
 Puissance : **3x 60 VA à 260 V**
 Résolution : **4 mV à 130 V ; 8 mV à 260 V**
 Précision : **0.1 %**
 Distorsion : **0.1 % THD***

Amplifiers **150 V/300 V** for 6X2 models

3x Ph-N **3x 0...300 V**
 1x Ph-Ph **1x 0...600 V**
 Puissance : **3x 70 VA à 300 V**
 Résolution : **5 mV à 150 V ; 9 mV à 300 V**
 Précision : **0.1 %**
 Distorsion : **0.1 % THD***

Currents

Amplifiers **15 A 40 VA** for 60X models

3x Ph-N **3x 0...15 A**
 1x Ph-N **1x 0...45 A**
 Puissance : **3x 40 VA à 15 A**
 Résolution : **460 µA**
 Précision : **0.1 %**
 Distorsion : **0.1 % THD***

Amplifiers **15 A 110 VA** for 65X models

3x Ph-N **3x 0...15 A**
 1x Ph-N **1x 0...45 A**
 Puissance : **3x 110 VA à 15 A**
 Résolution : **460 µA**
 Précision : **0.1 %**
 Distorsion : **0.1 % THD***

Amplifiers **5A / 25 A 175 VA** for 61X models

3x Ph-N **3x 0...25 A**
 1x Ph-N **1x 0...75 A**
 Puissance : **3x 175 VA à 25 A**
 Résolution : **150µA à 5A ; 760 µA à 25A**
 Précision : **0.1 %**
 Distorsion : **0.1 % THD***

EMC

The product complies with 2004/108/CE on electromagnetic compatibility

Safety

The product complies with low voltage 2006/95/CE and in particular NF EN 61010-1

* THD : values at full load (100 % of range) and at 45-65 Hz

Environmental conditions

Operating temperature : 0°C—40°C
 Storage temperature : -25°C—+70°C
 Relative humidity : 10 to 80% without condensation
 Pollution degree 2 ; Installation category II

Software

Suitable for Windows® 2000/XP/VISTA
 Connection **USB (integrated without converter)** or **RS232**

Case

HEXAN Type II

Aluminium, with transport handle
 Dimensions : L=448, P=320, H=180,5 mm
 Weight : 13 kg

HEXAN-C

Flight Case enclosure
 Dimensions : L=420, l=350, H=480 mm
 Weight : 20 kg

Power supply

180-264 Vac, 50/60 Hz
 90-132/180-264 Vac, 47 à 63 Hz (option)
 Power : 900 VA Maximum
 2100 VA Maximum for 25 A models
 IEC 320 plug

Timer inputs

Numbers : 4
 All inputs are isolated
 Sensing : Voltage free (dry) contact or voltage AC/DC up to 250V
 Connection : 4 mm security banana plug
 Precision : 0.02 % of value +-1 ms
 Resolution : 1 ms

Logic Outputs

Number : 3
 Dry contact (NO/NC)
 Connection : 4 mm security banana plug

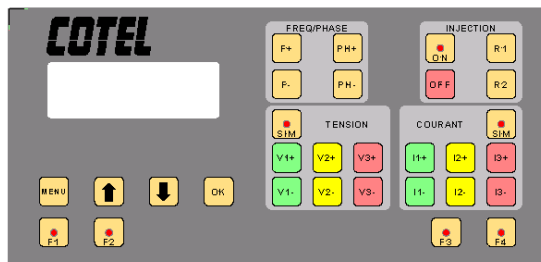
Frequency

Range : 0.1...500 Hz
 Resolution : 500 µHz
 Precision : ± 1 mHz à 50 Hz
 DC voltage or current : all amplifiers are able to generate DC outputs up to their maximum ranges

HEXAN-C

Integrated custom commands

The HEXAN-C range of test sets can be used without a PC for simple testing of three phase relays. The front panel is very easy to use as it represents a simple test set with potentiometers. Its ease of use, its speed of implementation and its multiple preprogrammed functions(offices) make the HEXAN a valuable asset for the systematic testing of protection relays.



Main functions of injection control :

The functions of Manusoft that simplify testing of coupling cabinets are implemented in the MCM :

- **Control of the three voltages and three currents** of the HEXAN. Each value is controlled by an up and down button,
- **Frequency 40 to 70 Hz** on the voltages and currents,
- **Phase shift** of the voltages from the currents -180° / $+180^\circ$,
- **Control of two networks: Pass and Fail,**
- **Injection mode direct or step by step,**
- **Simultaneous variation** of the three voltages and three currents by linking the controls,
- **Moving the neutral point** along V1, V2 or V3,
- **Variation of the phase-to-phase voltage:** U12, U23, U13,
- **Differential current mode,**
- **Vector jump,**
- **Programming of network sequences.**

Timer section and digital injection control :

- Backlit graphical LCD display : for all injection parameters.
- Resolution : **1 ms**
- Range : **0-199.999 s**
- Timer start on injection or external event,
- Cycle measurement (e.g. rearming),
- Programming of volt-free contact in the HEXAN,
- Four independent timer inputs configurable to contact or voltage.

Range resolution :

- 100 mV for voltages
- 10 mA for currents
- 10 mHz for frequency generator
- 0.1° for phase shifter.

HEXAN range MANUSOFT software

Manusoft is suitable for all users since it requires no computing knowledge. It is an easy to use manual interface that enables rapid testing of protection devices. All the settings can be accessed with a few mouse clicks.

The electrical values are set using virtual potentiometers either using the mouse, by moving vectors in a Fresnel diagram or by typing in the values from the keyboard. There are a number of tools to help assist in testing: display and calculation of the symmetrical components, Fresnel diagrams, 4-channel timer with on-screen display, inter-channel timing, balanced networks, tools for creating two-phase and zero sequence faults, and eight memories to hold fault conditions. The test results are stored as files which can be used to produce test reports.

Use For

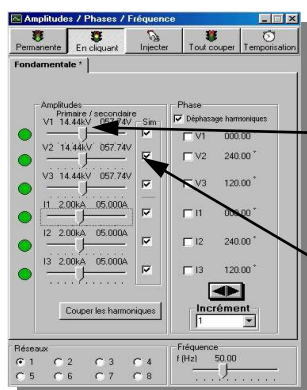
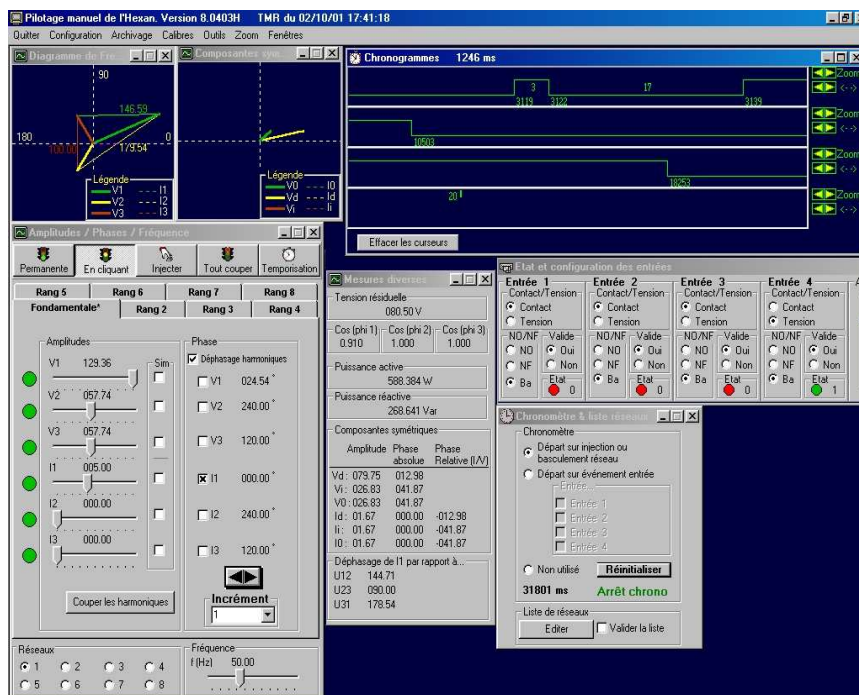
Finding threshold and response time measurement for re-lays of types :

- Overcurrent
- Voltage
- Power (single and three phases)

Fail network :

- Phase-earth
- Phase-Phase
- Three phases
- Simple or with reclosing

The precision and quality of the signal outputs enables testing of measurement transducers.



...Adjust your networks easily – with the mouse for coarse adjustment, the arrow keys for fine adjustment and you can even enter a value from the keyboard.

!

Lock your generators to change the network values simultaneously.

4 time inputs
Integrated breaker
control
Resolution 0.1 ms

Breaker timing measurement
Suitable for use in high-voltage substation

CP 4 is a user friendly chronometer to measure the

- Synchronisation of breaker
- Opening time of main contact
- Closing time of main contact

The sequences which are built-in to the program allow rapid testing of the breaker, with the test report on the screen or from the on-board printer.



TIME MEASUREMENT

SPECIFICATIONS

Mechanical

- Incorporated carrying handle,
- Dimensions : 32 x 17,5 x 26 cm,
- Weight : 7 kg

Power supply

- 230 V \pm 10 % + Earth 50/60 Hz

Time measurement

- 4 inputs configurables in volt-free contact or voltage detection (5 to 250 Vdc/ 24 to 250 Vac), all inputs are isolated.
- DEL wich indicates the state of the Input
- 4 mm banana plug for inputs
- Easy earth ground connection
- Precision : 0.02 % of time value \pm 0.1 ms
- Resolution : 0.1 ms
- View quickly the time and synchronisation of all the cycles.

Breaker control

2 separate contact for close or open the breaker. The breaker operating sequences are programmed into the CP4 : cycles Open, Close, Close-Open, Open-Close-open
Contacts specifications:

Coil current up to 20 A 250 Vac/dc

Open or Close in 0.1 ms

Pulse delay : 1 ms to 1s

OPTIONS

On board Printer

- Print the test report
- Read directly the results

Carrying case

- For CP4 and his accesories. Dimensions : L = 51,5 cm ; p = 45 cm ; h = 32,5 cm.

Cable set

- 4 Cables 15 m to plug the main contacts
- 1 Câble 3 wire to plug the breaker control

Software CP-MICRO-ACQ to edit test report (same database as the micro-ohmmeter software)

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Tél. : +33 (0) 3 28 41 10 10—Fax. : +33 (0) 3 28 42 22 00

Website : www.cotel.fr—E.mail : contact@cotel.fr

200 A dc 5 mn
300 A dc max
Resistance :
1 $\mu\Omega$ up to 10 Ω
Resolution 0.1 $\mu\Omega$

The **MICRO 200** is used for measuring the contact resistance of circuit breakers, sectionners or bus bar junctions. The measurement technique applied is « 4 wire » : the terminals of the voltmeter and of the current generator are separated. The current generator, adjustable from 0 to 300 A dc is capable of delivering 200 A dc for 5 mn. The voltmeter measures voltages from 0 to 10V dc.

FORM

- "flight case" type housing.
- Size:
W = 385 mm ; L = 235 mm ; H = 300 mm
- Weight= 19 kg

CHARACTERISTICS

Supply:

- 230 VAC \pm 10 % + Earth 50/60Hz single phase
- max power : 1200 VA

Protection :

- 200 A for the current injector output by a front-face breaker.
- The 10 A dc filtered output is protected by an automatically re-arming fuse.

Current Generator :

The 200 A output current has a full-bridge rectifier. It can give -

6 Vdc open circuit
4.9 Vdc max for 50 A continuous
3.3 Vdc max for 200 A for 5 mn
2.9 Vdc max for 300 A for 20 s

The 10 A output current is filtered : ripple < 2 % for a current of 10 A into a resistive charge of 0.5 Ω .



Measurements :

Voltage

- 3 ranges of 0 to 10 V
- Accuracy 0.5 %

Current

- two ranges on the 200 A output :
0 to 70 and 70 to 300 A,
- one range on the 10 A output :
0 to 13 A
- Accuracy 0.5 %

Resistance :

- 6 display ranges : 0-999.9 $\mu\Omega$, 1.000 to 9.999 m Ω , 10.00 to 99.99 m Ω , 100.0 to 999.9 m Ω , 1.00 to 10.00 Ω .
- Precision 2 %

Options :

- Cable kits for current injection and measurement available in lengths of 3, 5 or 10 m.
- Test SHUNT 100 $\mu\Omega$ at 0.5 %.
- Software CP-MICRO-ACQ to edit test report (same database as the digital timer software)

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Tél. : +33 (0) 3 28 41 10 10—Fax. : +33 (0) 3 28 42 22 00

MEBOD 1000-N

The rugged and powerful power supply **MEBOD** is able to test the coils and the motor of breaker. This power source can inject an AC voltage up to 230Vac or a DC voltage up to 220Vdc. The instrument has an integrated timer to measure the response time of breaker system.

230 Vac / 1 kVA
220 Vdc / 1 kW

FORM

- Flight case type housing
- Dimensions : L = **390 mm** ; l = **300 mm** ; H = **310 mm** ;
- Weight ≈ **21 kg**.

SPECIFICATIONS

Power supply :

- **230 Vac ± 10 % 50/60Hz**
- Pmax ≈ **1200 VA**

Protections :

Power supply and generators by circuit breaker and fuses.

Generators :

One voltage generator :

- 0 to 230 Vac
- 0 to 220 Vdc

Outputs :

230 Vac / 1000 VA. 8A overload during 0.5s

220 Vdc / 1000 W. 8A overload during 0.5s. The output is smoothed.

The outputs are isolated of mains supply



Measurements :

- One internal voltmeter with two automatic ranges **0-150V** and **150-300V** precision **1 %** switchable in AC voltage(True RMS) or DC voltage (mean value)
- One digital timer of **1 ms resolution** with internal or external START/STOP. Sensing by contact(dry) or voltage up to 250 Vac/dc. Measurement range 0-9999.999s.

Applications :

- Big LCD display.
- The outputs can be preset with no voltage on outputs to avoid coil overheating
- Instantaneous cut off of DC and AC outputs to have the real trip time
- Injection delay programmable to avoid coil overheating
- Useable with shunt trip coil and undervoltage coil



VE C 500-1000-3000 T-VA 1200

48 or 127 V Dc injection test sets The easy to use and rugged VEC and VA test cases are particularly adapted to test the coils of circuit breakers or to be used as rugged dc power source .

FORM

- "flight case" type housing



VEC 500

- Size : **310 x 270 x 335 mm**
- Weight : **18 kg**

VEC 1000

- Size : **310 x 270 x 335 mm**
- Weight : **25 kg**

VEC 3000

- Size : **450 x 310 x 580 mm**
- Weight : **54 kg**

VA 1200 220 AC/DC

- Size : **400 x 300 x 320 mm**
- Weight : **35 kg**

VEC 3000

- **48V** for **1000W**
- **300 V** for **3000W**
- Adjustable from **0** to **100%** of ranges.

VA 1200 220 AC/DC

- **220 Vdc** for **1200W**
- **220 Vac** for **1200VA**
- Adjustable from **0** to **110%** of ranges.

SPECIFICATIONS

- Power supply **230V** single phase **50/60 Hz**,
- Protections : power supply and generator by circuits breaker
- Control : START and STOP by pushbutton
- Single voltage generator with two ranges output
- Measurements : **LCD 3 1/2** digit Voltmeter accuracy **1%**

VEC 500

- **48V** or **127 V** for **500W**
- Adjustable from **0** to **130%** of ranges.

VEC 1000

- **48V** or **127 V** for **1000W**
- Adjustable from **0** to **110%** of ranges.

Options for VEC models

Temporised output 500 ms

MEB-II

The test set **MEB II** is able to test easily the fault passage indicator for underground network for new installation or in maintenance operation. The system is able to inject a current up to **350A**. The current can be inject continuously or with a **programmable delay** from **10 to 990 ms**.

350A
10 to 990 ms



OVERVIEW

- Enclosure : flight case
- Dimensions : **39 x 23 x 31 cm**
- Weight \approx **16 kg**.

SPECIFICATIONS

POWER SUPPLY :

- **230 Vac \pm 10 % 50/60Hz**
Power max \approx **800 VA**

Protections :

Power supply and generator by circuit-breaker on front panel

Generator :

Single current generator with two push buttons command :

- One button to inject the current continuously to find the threshold.
- One button to inject the current with a programmable delay to check the system trip.

Current output

0-140 A/2.5 V
Current overload up to 350A for 60s.

Measurement:

- Ammeter with **350A range 1 %**

Injection delay settings :

- Adjustable by pushwheel switches from **10 to 990 ms** with **10 ms** resolution.

Supplied with :

Injection cable length **5m** with **25 mm²** section with contact locking system.

A tester for wet cell batteries with the following characteristics :

**Accuracy,
Very user
friendly**

- Internal impedance measurement
- Cell & battery voltage measurement
- Rapid start-up – only two cables to connect.
- Possible to use on a connected battery, thus maintaining the safety function of the battery.

VISUBAT can be used on sealed and unsealed lead acid batteries.

OVERVIEW

- Aluminium case with handle
- Dimensions : **410x 302 x 158 mm**
- Weight : **8kg.**

SPECIFICATIONS

General :

- Power supply : **230V +/- 10 % 50/60Hz**
- Power consumption : **230W** Max
- Measurement ranges :

0.000 mΩ à 0.999 mΩ

1.00 mΩ à 9.99 mΩ

10.0 mΩ à 90.0 mΩ

Accuracy **2 %**

-- Cell voltage

0.00 to 18.00 Vdc

Precision **1%**

- Battery voltage

0.6 Vdc à 250.0 Vdc

Precision **1%**

- Memory capacity :

100 batteries with 27 cells

48 batteries with 60 cells.

- Operation temperature : **0 — 40 °C**

- Storage temperature : **-25 — 50°C**

Protection :

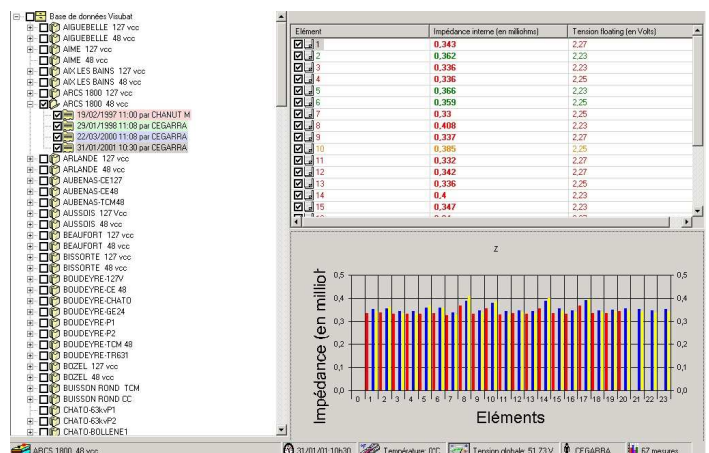
- Main protection by fuses
- Permanent monitoring of measurement circuit
- Protected against inverted polarity.



Main functions of the software :

- Creation of a database of batteries.
- Capture and automatic archiving of measurements.
- 2D and 3D display of measurements
- Numeric data and graphics (overall trend of battery or cell).
- Programming of alarms.
- Printing of test reports.
- Files compatible with Access®

Example of display :





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Battery Load Unit

Battery Discharger at constant current



The battery discharger, with constant current, is a portable device that can determine the efficiency of a battery, new or used. It can measure the Ah supplied by the battery before reaching the level at which it is considered discharged

Dimensions :

L x p x h : **565 x 265 x 400** mm,
Weight : **26** Kg.

Power Supply:

230 Vac - 50/60 Hz - 150W

Specifications :

Battery voltage : 6 to 220 Vdc selon modèles
Courant de décharge réglable par pas de 1 A

Protections :

- thermal protection
- Inverse polarity
- Overvoltage

Settings :

- Discharge timer,
- Stop voltage,
- Discharge current from 1 to max amps,

References :

BDS 220V-50A

voltage from 6 to 220V, current up to 50A

BDS 160V-75A

voltage from 6 to 160V, current up to 75A

BDS 120V-100A

voltage from 6 to 120V, current up to 100A

BDS 80V-150A

voltage from 6 to 80V, current up to 150A

OPTIONS :

Software for windows ® 95, 98, NT, XP

- RS 232 interface.
- Save all data of discharge
- Viewing of discharge
- Print the discharge curve

Complementary module

Slave module with same weight and size
To multiply by 2 the discharge current (call factory to have more information)



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