

## High Voltage Cable testers

### SYNOR 5000H



- ▶ AC/DC dielectric strength test
- ▶ Insulation measurement
- ▶ 2 & 4 wire continuity test
- ▶ Functional test / stimuli
- ▶ Test of components
- ▶ ALL board types can be mixed
- ▶ Stand alone tester
- ▶ Synor 420X series compatibility
- ▶ Ethernet, PLC interfaces, wifi
- ▶ Windows 7 compatible software
- ▶ Multilingual software, free updates available on our web

This high voltage cable tester is the most compact system on the market regarding his amount of available points, with such good specs/ price ratio. Working with or without PC, it is as much dedicated to production or laboratory than maintenance, for indoor and outdoor applications in its ruggedized version. Our Synor 420X cable testing solution can be modernised into Synor 5000 series, in order to benefit the wide additional possibilities of our new Winpass software platform with regular free web updates

“ Browse our internet pages in order to always benefit our free latest Winpass software functionalities “

## TECHNICAL CHARACTERISTICS

### CONTINUITY TEST

In order to check the conformity of your cable and connexions (no opens, no shorts, no inversions, no point shifting, ...), the continuity test allows you to test in 2 or 4 wire mode depending on the accuracy and resistance level you are looking at.

#### In 2 wire mode

- Test voltage 0,1 V to 20 V  $\pm$  5%
- Test current 10 mA to 2 A  $\pm$  1%
- Continuity low limit 1  $\Omega$  to 2 k $\Omega$   $\pm$  2%
- Continuity high limit 1  $\Omega$  to 2 k $\Omega$   $\pm$  2%
- Test time 1 ms to 99 s  $\pm$  1 ms
- Accuracy  $\pm$  2%

#### In 4 wire mode

- Test voltage 0,1 V to 20 V  $\pm$  5%
- Test current 10 mA to 2 A  $\pm$  1%
- Continuity low limit 1 m $\Omega$  to 2 k $\Omega$
- Continuity high limit 1 m $\Omega$  to 2 k $\Omega$
- Test time 1 ms to 99 s  $\pm$  1 ms
- Accuracy  $\pm$  2%

### INSULATION TEST

In order to check the quality of your cable and connexions (no scratch, no bended pins, no insulating problems, ...), the insulation test allows you to test in medium or very high resistance depending on your standard requirement or industry you are working in. Typically aerospace, aeronautic or military applications are requiring highest levels of insulation than industrial applications.

- Test voltage 2 VDC to 2121 VDC  $\pm$  5% (depending on the switching card type)
- Insulation limit from 50 k $\Omega$  to 5 G $\Omega$
- Accuracy : 50 k $\Omega$  to 1 G $\Omega$   $\pm$  5% / 1 G $\Omega$  to 3 G $\Omega$   $\pm$  8%  
3 G $\Omega$  to 56 G $\Omega$   $\pm$  15%
- Short-circuit current : 2 V to 20 V : 40 mA / 20 V to 2120 V : 10 mA
- Rise/fall time 1 ms to 60 s
- Hold time 1 ms to 99 s

### DIELECTRIC STRENGTH TEST (HIPOT)

In order to check the quality of your cable and connexions (not respected distance, flashes to earth, no cable scratches, no crushed cable, no bended pins, no insulating problems, ...), the hipot test is more stressy and lets you see additional problems in your cabling. Different voltages will be applied to different cable types (power, audio, bus, network, telecommunication, ...).

#### ✓ In DC

- Voltage 20 V to 5500 VDC (depending on options and switching card type)  $\pm$  5%
- Breakdown current 500  $\mu$ A to 10 mA
- Rise/fall time 1 ms to 60 s
- Hold time 1 ms to 99 s

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## SYNOR 5000H

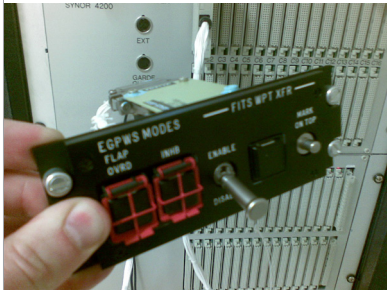
✓ In AC

- Voltage 50 V to 4000 VAC (depending on options and switching card type)  $\pm 2\%$
- Breakdown current from 500  $\mu\text{A}$  to 10 mA
- Leakage current measurement 500  $\mu\text{A}$  to 100 mA  $\pm 2,5\%$
- Rise/fall time 500 ms to 60 s
- Hold time 20 ms to 99 s

### FUNCTIONAL TEST / STIMULI

Once you are sure of the conformity and the quality of your cable, you can then use it for what it is : powering elements, energizing relays, lighting lamps, activating speakers, switches, servos, push buttons, ... You can really make your module, cable, harness, backplane, ... as it should be in real operation. All this is done without disconnecting anything from our harness tester.

- Typical maximum switching voltage : up to 2000 VDC / 1500 VAC
- Typical maximum switching current : up to 10A
- Higher voltage/current parameters are also possible on demand



Example : on this plane control module, once the cabling has been tested in continuity, insulation and high voltage, the user is guided through pictures and messages on the screen to test switches, to check the back light is working ok, to check that switch lights are activated in different positions, to validate that the push switch is good in both positions, ... Thanks to our cable tester, 70 % of manual test time is saved, human mistakes are limited, quality is optimal and traceability automatic

### TEST OF COMPONENTS

#### Diode Measurement



- Test current 10 mA to 2 A
- Voltage limit 100 mV to 20 V  $\pm 5\%$
- Voltage measurement  $\pm 1\%$

#### Zener Diode Measurement



- Test voltage 2 VDC to 90 VDC  $\pm 5\%$  (depending on the switching card type)
- Short-circuit current :  
2 V to 20 V : 10 mA  
20 V to 2121 V : 10 mA

#### Transil, transorb, t.v.s., surge protector measurement



- Test voltage 2 VDC to 2121 VDC  $\pm 5\%$  (depending on the switching card type)
- Short-circuit current  
2 V to 20 V : 40 mA  
20 V to 2121 V : 10 mA
- Breakdown current 500  $\mu\text{A}$  to 10 mA  $\pm 10\%$
- Voltage measurement  $\pm 5\%$

#### Resistance Measurement

##### In 2 wire mode

- Resistance 10  $\Omega$  to 10 M $\Omega$   $\pm 2\%$
- Test current 1  $\mu\text{A}$  to 10 mA
- Test time from 1 ms to 99 s  $\pm 1\text{ms}$

##### In 4 wire mode



- Resistance 100 m $\Omega$  to 10 M $\Omega$   $\pm 2\%$
- Test current 1  $\mu\text{A}$  to 10 mA
- Test time from 1 ms to 99 s  $\pm 1\text{ms}$

#### Capacitor Measurement

- Capacity from 100 pF to 10 mF  $\pm 20\text{ pF} \pm 5\%$
- Accuracy  $\pm 5\% \pm 20\text{pF}$



#### Shielding, Twisted Pairs

- Shielding 10 pF to 10  $\mu\text{F}$
- Accuracy  $\pm 5\% \pm 10\text{pF}$



# High Voltage Cable testers

## SYNOR 5000H

### OTHER SPECIFICATIONS

#### Ethernet Interface

- Standard 10/100 Mbit communication with cable tester network



#### Plc

- 3 inputs at 24VDC, 10 mA / 5 outputs at max. 48VDC / 2 A



#### 0-10V

- 4 floating outputs 0.1VDC to 10 VDC
- Accuracy  $\pm 1\% \pm 10\text{mV}$

#### Remote Control

- 1 input that allows to start a test at distance or validate an action



#### User Safety

- Double hardware safety loop



#### External Light



- red/green/yellow light (24VDC, 450mA) :
- RED : test running
- YELLOW : status
- GREEN : test not running

#### Floating mode

- This mode is dedicated to measure products referenced to ground (typically trains, planes, missiles, ...)

#### Stand alone mode (black box)

- Stand alone mode ; Synor 5000 harness tester can work without any PC connected (internal memory)



### SOFTWARE SPECIFICATIONS



Connected or not to our cable tester, Winpass software automatically switches in simulation or real mode.

Ran under Windows XP or Seven, it complies with the latest market solutions. Every time a new Winpass release is available, you can freely download it from our web site.

What you will gain with our latest Winpass 5000 software platform is :

QUALITY + CONFORMITY + EASE OF USE  
+ COMPATIBILITY + TRACEABILITY + PRICE + INTERNATIONAL

### QUALITY

BE SURE YOUR CABLE TESTER IS OK

- **Self-test** it automatically checks that the generators and internal measuring equipment are working ok, and that all the relays are working ok ; in case a relay is defective it gives its exact position in the tester in order to replace it as fast as possible
- **Security tag** in order to be sure a user or sub contractor is using the right test file version. Anything modified in a test program can be noticed just by comparing the compilation date tags
- **User level** Each user can get a password in order to access or not the test file edition, modification, execution, ...

### CONFORMITY

IMPORT YOUR TEST FILE INTO WINPASS

- **File transformer** the fastest way to create a Winpass test file is to import it from your database. It also guarantees no mistakes are done and automatically create test file, correspondence table and connector library

### EASE OF USE

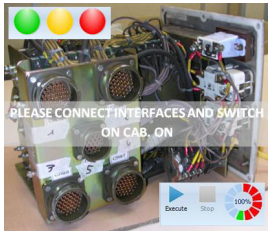
DO NOT WRITE YOUR TEST FILE, LEARN IT

- **Self-learning** an other way to create a Winpass test file is to plug the device under test that will be learned ; test program will be automatically written. If you decide to write it you do not have to be a programmer to do so

# High Voltage Cable testers

## SYNOR 5000H

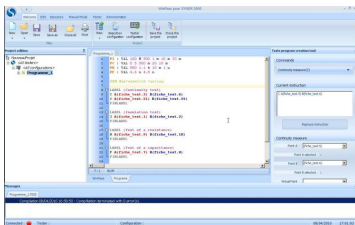
- For production we just show limited information on screen and big in size



### EDIT, MODIFY AND TEST EASILY

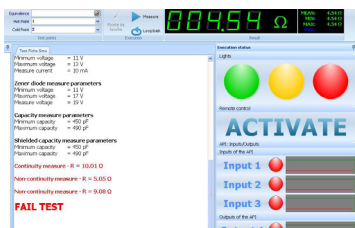
#### SWITCH TO BOTH WINDOWS IN A CLICK

- **Graphical and colour editor** it lets you easily identify what you do, where you are and whether your syntax is good or not
- **Edit/Test window** in one click just test what you just wrote by switching from the edit window to the test window



### TEST AND DEBUG FAST

- **Automatic test** the automatic test can make a test in between :
  - two points
  - one point against and all other points
  - a group of points and an other group of points
- **Manual test** the manual test can pop up during a test file is ran in order to provide you accurate information for debugging and doing maintenance. It provides you a wide panel of tools (touch probe, oscilloscope) to rapidly identify the mistake on your DUT and where it is



### TRACEABILITY

#### PROVIDE REPORTS TO CUSTOMER

- **Printing test reports** including your logo and company details, it is automatically generated with the information you require, for traceability

### TEST AND TRACE RESULTS

- **Result saving** you can save your result locally or on networks, in text files or excel files
- **Statistics** let you evaluate your production feedback for analyse on corrective actions

Label	Tests	Test Pos	Gold Pos	Status	Results	Values	Inverter Error
10	Test de continuité	100	100	PASS	R = 0.000 Ω	0.0000	C-400 100%
14	Test de continuité	100	100	PASS	R = 0.000 Ω	0.0000	C-400 100%
18	Test de continuité	100	100	PASS	R = 0.000 Ω	0.0000	C-400 100%
20	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
22	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
24	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
26	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
28	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
30	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
32	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
34	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
36	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
38	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
40	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
42	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
44	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
46	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
48	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
50	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
52	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
54	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
56	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
58	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
60	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
62	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
64	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
66	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
68	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
70	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
72	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
74	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
76	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
78	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
80	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
82	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
84	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
86	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
88	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
90	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
92	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
94	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
96	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
98	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%
100	Test de non-continuité	100	100	FAIL	R = 0.000 Ω	0.0000	NC-400 100%

### PRICE

#### COST EFFECTIVE AT ALL LEVELS

- **Free software updates** downloadable from our web site, you can enjoy our latest functionalities thank to our latest software releases

### INTERNATIONAL

#### EXPORTABLE SOLUTION

- **Unlimited languages** our open source language pack makes Winpass interface customizable to any language. In addition to German, English, French and Spanish user interface, Winpass accepts any other custom language





## High Voltage Cable testers

### SYNOR 5000H

## GENERAL CHARACTERISTICS

#### Presentation

- Table top unit
- Metal case
- 19 inches rack

#### Dimensions

- Height 375 mm
- Width 520 mm
- Depth 560 mm

#### Weight

- 25kg

#### Mains

- 115/230VAC  $\pm 15\%$ , 47...64 Hz
- Consumption 500 VA

#### Operating temperature & humidity

- 0°C to +45°C Up to 90% RH

#### Storage temperature

- -10°C to +60° C

#### Over-voltage category

- CATII

#### Pollution degree

- 2

#### Safety class

- Class I (earth protection)

#### Output connector type

- Female 64 points DIN41612 or any other customized type



# High Voltage Cable testers

## SYNOR 5000H

### SWITCHING CARD TYPE

#### SWITCHING CARDS

Those cards are mostly dedicated to test sub-assemblies for conformity

##### SY5000-M128A5A

500 VDC (if option SY5000-HVDC) / 350 VAC (if option SY5000-HVAC) / 2A switching card - 128 points



##### SY5000-M128A10

1000 VDC (if option SY5000-HVDC) / 750 VAC (if option SY5000-HVAC) / 2A switching card - 64 points



##### SY5000-M64A15

1500 VDC (if option SY5000-HVDC) / 1000 VAC / 2A switching card - 64 points

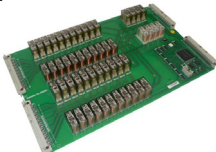
##### SY5000-M64A20A

2121 VDC (if option SY5000-HVDC) / 1500 VAC (if option SY5000-HVAC) / 2A switching card - 64 points



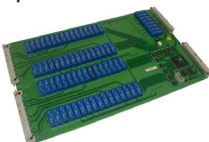
##### SY5000-M22A20

2000 VDC (if option SY5000-HVDC) / 1500 VAC (if option SY5000-HVAC) / 10A stimuli card - 22 points



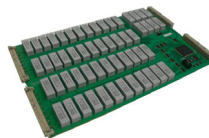
##### SY5000-M32A30

3000 VDC / 2000 VAC / 2A switching card - 32 points ; requires SY5000-XS-VHV option + a XS equipment



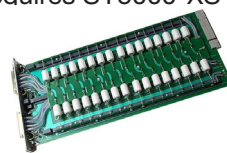
##### SY5000-M24A42

4200 VDC / 3000 VAC / 2A switching card - 24 points ; requires SY5000-XS-VHV option + a XS equipment



##### SY5000-M8A55

5500 VDC / 4000 VAC / 2A switching card - 8 points ; requires SY5000-XS-VHV option + a XS equipment



##### SY5000-EXS

6000 VDC / 5000 VAC (if option SY5000-HVG) / 40A switching card - 4, 8, 12 or 16 points

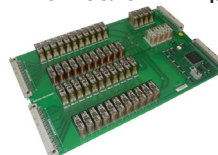


#### STIMULI CARDS

Those cards are mostly dedicated to activate components (lights, engines, ...), energise relays, check switches and functionalities of systems

##### SY5000-S22A20

2000 VDC / 1500 VAC (if option SY5000-HVAC) / 10A stimuli card - 22 points



#### MIXED STIMULI/SWITCHING CARDS

##### SY5000-MS32A20

2000 VDC / 1500 VAC / 2A stimuli card - 32 channels + common. 2 variable power supplies can be driven independently

# High Voltage Cable testers

## SYNOR 5000H

### OPTIONS

#### SY5000-HVAC

High voltage AC dielectric strength tester at 1500 VAC  
50 Hz / 60 Hz

#### SY5000-HVDC

High voltage DC dielectric strength tester + insulation  
meter at 2120VDC

#### SY5000-FLT

Floating continuity measurement;  
dedicated to measure products  
referenced to ground (typically trains,  
planes, ...)

#### SY5000-STDA

Stand alone mode ; Synor 5000 harness tester can  
work without any PC connected (internal memory)

#### SY5000-OUT10V

0-10V analog outputs (4 outputs available)



#### SY5000-STI

Stimuli power supply input

#### SY5000-AUX

Auxiliary input for T&M equipment such as MGR10, XS  
series, ... has to be ordered with the associated cables  
(ref. SY5000-MGR10, SY5000-M1501P, SY5000-XS,  
SY5000-XSVHV)



#### SY5000-XS-VHV

I/O connexion for XS equipment ( $U > 2000VDC$  /  
 $1500VAC$ ), including connexion cables

#### PDZA series

Wide range of simple or double power supplies for  
stimuli option, fully driven by our software platform



#### SY5000-MGR10

##### VERY LOW RESISTANCE OPTION

(able to measure below  $100 \mu\Omega$ , up to 10 A depending on  
the switching card type) ; to be ordered with ref. SY5000-  
MGR10



#### SY5000-M1501

##### VERY HIGH RESISTANCE OPTION

(able to measure up to  $2000 T\Omega$ ) ; to be ordered with ref.  
SY5000-M1501P

#### SY5000-DESKTOP

Desktop PC, display, inkjet printer, Windows™ XP PRO



#### SY5000-LAPTOP

Laptop PC, inkjet printer, Windows™ XP PRO



#### SY5000-RACK PC1

Rackable industrial PC, external display, external keyboard;  
inkjet printer, Windows™ XP PRO



#### SY5000-RACK PC2

Rackable industrial PC, external display, rackable industrial  
keyboard; inkjet printer, Windows™ XP PRO



#### SY5000-RACK PC3

Rackable industrial PC, rackable industrial display, rackable  
industrial keyboard; inkjet printer, Windows™ XP PRO



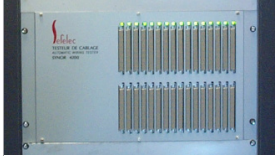
# High Voltage Cable testers

## SYNOR 5000H

### OPTIONAL FRONT PANEL CONNECTOR OUTPUTS

#### STANDARD OUTPUTS

All our testers are delivered with DIN41612 connector types, per default.



If the application requires stronger type of connector, zero insertion force connectors, military type connectors, ... then see below some typical connector front panel outputs.

Sefelec customizes the connector outputs as required.



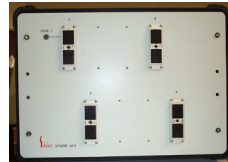
#### SY5000-HAN

Harting 64 pts, 128 pts, ... connector type is popular for railway industry or any other type of environment where test conditions need rough connexions



#### SY5000-ITTC

ITT CANNON 264 pts, ... connector type is popular for aeronautic industry or any other type of environment when one need to connect a big quantity of points at the same time



#### SY5000-EDAC

EDAC 56 or 120 pts, ... connector type is popular for Aeronautic, military industry or any other type of environment when one need cheap and locable connectors



#### SY5000-OTTY

Any configuration for the connector outputs is possible ; just supply Sefelec with your specifications or leave us guide you on your requirement and our experience





## High Voltage Cable testers SYNOR 5000H

### AVAILABLE ACCESSORIES

#### SY5000-LIGHTS

Red-Green lamp to indicate the high voltage presence



#### KRXS

19" rack mounting adaptation kit



SY5000-PROBE (standard accessory, automatically delivered with new equipment)

Touch probe, useful for debugging & manual testing



### CALIBRATION

#### SY5000-CAL

Synor series automatic calibration kit

