

- Mégohmmètres
- Megohmmeters
- Megohmmeter
- Megaohmmetri
- Megaóhmetros

C.A 6545

C.A 6547



FRANÇAIS
ENGLISH
DEUTSCH
ITALIANO
ESPAÑOL

Notice de fonctionnement
User's manual
Bedienungsanleitung
Libretto d'Istruzioni
Manual de Instrucciones

CHAUVIN[®]
ARNOUX
CHAUVIN ARNOUX GROUP

English

Meaning of symbol

Caution! Please consult the User Manual before using the device.

In this User Manual, failure to follow or carry out instructions preceded by this symbol may result in personal injury or damage to the device and the installations.

Meaning of symbol

This appliance is protected by double insulation or reinforced insulation. It does not have to be connected to an earth protection terminal for electrical safety.

Meaning of symbol

Caution! Risk of electric shock.

The voltage of the parts identified by this symbol, may be ≥ 120 V DC. For safety reasons, this symbol goes ON on the LCD screen as soon as a voltage is generated.

Thank you for purchasing this **C.A. 6545 or C.A. 6547 megohmmeter** and thank you for your confidence. To obtain the best possible service from your instrument:

- **read** these operating instructions carefully,
- **comply** with the precautions for use.



PRECAUTIONS FOR USE



- Comply with the conditions for use: temperature, humidity, altitude, degree of pollution and place of use
- This instrument may be used directly on installations whose operating voltage does not exceed 1000 V in relation to the earth (measurement category III) or on circuits, by-passing the network and protected or not by-passing the network (measurement category I). In the latter case, the service voltage must not exceed 2500 V with impulse voltages limited to 2.5 kV (see NF EN 61010 ed. 2 for 2001).
- Use only the accessories delivered with the unit, compliant with safety standards (NF EN 61010-2-031).
- Respect the value and type of the fuse (see § 8.1.2) to avoid damaging the instrument and cancelling the warranty.
- Set the switch to OFF when the instrument is not in use.
- Check that none of the terminals is connected and that the switch is set to OFF before opening the instrument.
- Repairs and metrological verifications must be carried out by approved, qualified personnel.
- A battery charging up is indispensable before metrological tests.

CONTENTS

1. PRESENTATION	35
1.1 The megohmmeters	35
1.2 The accessories	35
2. DESCRIPTION	36
2.1 Casing	36
2.2 Display	37
3. MEASUREMENT FUNCTIONS	39
3.1 AC / DC voltage	39
3.2 Insulation measurements	39
4. SPECIAL FUNCTIONS	41
4.1 Key 	41
4.2 V-TIME key / 	41
4.3 R-DAR-PI-DD / R (t) key	41
4.4 * / ALARM key	44
4.5  / SMOOTH key	44
4.6 Key 	45
4.7 SET-UP Function (device configuration)	45
5. USE	49
5.1 Measurement procedure	49
5.2 Insulation measurement (see § 3.2)	49
5.3 Capacity measurement	50
5.4 Residual or leakage current measurement	50
6. MEMORY / RS 232 (C.A 6547)	51
6.1 RS 232 Characteristics	51
6.2 Recording/reviewing of memorised values (MEM/MR key)	52
6.3 Printing measured values (PRINT/PRINT MEM key) (C.A 6547)	53
6.4 Printing with series-parallel adapter	55
7. SPECIFICATIONS	56
7.1 Reference conditions	56
7.2 Characteristics per function	56
7.3 Power Supply	60
7.4 Environmental parameters	60
7.5 Construction specifications	60
7.6 Compliance with international standards	60
7.7 Variations in operating range	61
8. MAINTENANCE	62
8.1 Servicing	62
8.2 Metrological verification	62
9. GUARANTEE	63
10. TO ORDER	63
11. APPENDIX	157

1. PRESENTATION

1.1 The megohmmeters

The **C.A 6545** and **C.A 6547 megohmmeters** are portable units, fitted into a rugged construction site casing with cover, operating on battery and on AC current.

They are used to measure:

- voltages:
- insulation,
- capacity.

These megohmmeters help to ensure the safety of electrical installations and equipment.

Their operation is controlled by microprocessor for the acquisition, processing, measurement display, memorisation and printing of results (C.A 6547).

They offer a wide range of advantages such as:

- digital filtering of insulation measurements,
- automatic voltage measurement,
- automatic detection of the presence of AC or DC external voltage on terminals, before or during the measurements, which inhibits or stops the measurements,
- threshold programming, to trigger alarms using audible beeps,
- the timer for measurement time checks,
- protection of the device by fuse, with detection of defective fuses,
- operator safety by means of automatic discharge of the residual high voltage on the equipment tested,
- automatic stopping of the device to save battery power
- indication of battery charge condition,
- a large backlit LCD screen with a wide range of indicators making it very easy for the user to read.

The C.A 6547 integrates the following additional functions:

- Memory (128 kb), real time clock and series interface
- PC control of the device (using MEGOHM VIEW software, optional)
- Printing in RS 232 or Centronics mode

1.2 The accessories

■ "Megohm View" PC software (optional for C.A 6547)

PC software is used for:

- recovering memorised data, plotting the insulation development curve in accordance with the application time of the test voltage $R(t)$,
- printing personalised test protocols in accordance with user needs,
- creating text files to use spreadsheets (Excel™ ...),
- configuring and controlling the unit via the RS 232.

The minimum recommended configuration is a PC fitted with a 486DX100 processor.

■ Serial printer (option)

This compact printer is used to print the measurement results directly in the field, whether memorised or not.

■ Series-parallel adapter (option)

The optional RS232/Centronics adapter converts the serial interface (RS232) into a parallel printer interface (Centronics), enabling direct printing of all measurements on A4-format office printers, without having to use a personal computer.

2. DESCRIPTION

2.1 Casing

See the presentation views of the instruments in § 11 Appendix, at the end of this user's manual.

2.1.1 C.A 6545 and C.A 6547

- ① 3 safety terminals, Ø 4 mm marked: "+", "G" and "-"
- ② Access to terminal "G" protective fuse
- ③ 7-way rotary switch:
 - Off: switches off unit power
 - 500 V - 2 TΩ : insulation measurement up to 2 TΩ
 - 1000 V - 4 TΩ : insulation measurement up to 4 TΩ
 - 2500 V - 10 TΩ : insulation measurement up to 10 TΩ
 - 5000 V - 10 TΩ : insulation measurement up to 10 TΩ
 - Var. 50 - 5000 V : insulation measurement with variable test voltage
 - SET-UP: adjustment of unit configuration
- ④ 1 yellow START / STOP push button: start / end of measurement
- ⑤ 6 keys (C.A 6545) or 8 keys (C.A 6547) made of elastomer each having a main function and a secondary function:



Selection of the second function (in yellow Italics above each key)

R-DAR-PI-DD



R (t)

Primary function: before the insulation measurements, selection of required measurement type: normal measurement, calculation of dielectric absorption ratio (DAR), calculation of polarisation index (PI) or Dielectric Discharge test DD. After or during the measurements, display of R, DAR, PI, DD and capacity (μF).

Secondary function: display/no display of intermediate values of insulation resistance, test voltage and time stamp, following a programmed time test (the V-TIME keys may also be used).

V-TIME



Primary function: In insulation, display of elapsed time from the beginning of measurement, then of exact voltage generated. In MR (memory recall) mode, display of the date and time of the memorised measurement, of the exact test voltage and of the memory address OBJ: TEST.

Secondary function: activation/deactivation of «programmed time test» mode



Primary function: ON/OFF of display backlighting

ALARM

Secondary function: activation/deactivation of alarms programmed in the SET-UP



Primary function: Select a parameter for modification.

SMOOTH

Secondary function: ON/OFF for display smoothing during insulation measurement

▲ **Primary function:** increments the displayed flashing parameter. Displacement on the list of intermediate insulation measurements in the R(t) function.

▼ **Secondary function:** decrements the flashing parameter displayed. Displacement on the list of intermediate insulation measurements in the R(t) function.

If keys ▲ and ▼ are pressed and held, the parameter variation speed is rapid.

■ On the C.A 6547 only

MEM Primary function: memorisation of measured values

MR Secondary function: recalling of memorised data (this function is independent of the switch position)

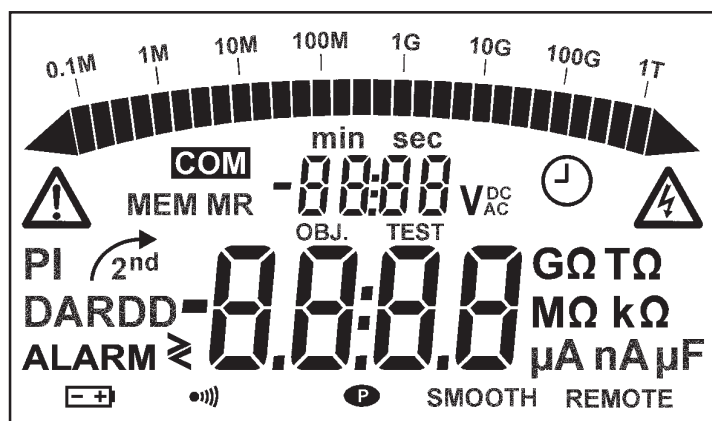
PRINT Primary function: immediate printing of measurement result

PRINT MEM Secondary function: printing of memory content

- ⑥ Backlit liquid crystal display
- ⑦ Socket for connection to AC network (direct operation on AC network/battery recharge)
- ⑧ Male connector RS 232 series INTERFACE (9-pin) for connection to a PC or printer (C.A 6547 only).
On the C.A 6545, this connector is used for adjustments of the instrument only.

Note: The battery compartment is inside the casing.

2.2 Display



2.2.1 Digital display.

The main digital display indicates the values for insulation measurement: resistance, DAR PI, DD or capacity).

The small digital display indicates the voltage measured or applied by the instrument.

During the insulation measurement, the elapsed time or output voltage is displayed.

After the recording of a group of data (C.A 6547), the small display also indicates the date and time in MR (Memory recall) mode. It is also used to indicate the memory address using the OBJ number. TEST (see § 2.2.3 Symbols).

2.2.2 Bargraph

The bargraph is active during insulation measurement (0.1 MΩ to 1 TΩ). It is also used, to indicate the battery charge, and the memory space, a segment representing approximately 50 groups of storable values.

2.2.3 Symbols

MEM/MR indicates the memorisation (MEM) or memory reading (MR) operations (C.A 6547)

OBJ: TEST Memory address (C.A 6547): the number is displayed above, on the small digital display.

COM Flashes on the screen when the data is transmitted to the serial interface (C.A 6547) or is displayed constantly if there is a problem during transmission.

DAR/PI/DD indicates the mode chosen before the insulation measurement or the results of these measurements.



Voltage generated dangerous, $U > 120 V_{DC}$.



External voltage present, symbol activated following press on the START push button, if $U > 25 V_{AC} \pm 3 V$ or $> 35 V_{DC}$



Activation of the "Programmed-time test" mode or, on the SET-UP position of the switch, clock adjustment (C.A 6547). Flashes with each sample recording.



Indicates that the secondary function of a key will be used



Flashes if the battery is low and must be recharged (see § 8. Maintenance).

The voltage is displayed on the small digital display for 2 seconds when the device is switched on. The main display indicates «bat ». This test is performed internally on a load corresponding to the functional measurement.



The audio warning (buzzer) is activated



Indicates that the automatic stop function is deactivated

SMOOTH Smoothing of insulation measurement display

REMOTE Remote control via interface (C.A 6547). In this mode, all the keys and the rotary switch are inactive, except when stopping the instrument.

FUSE -G- Flashes if the fuse of input «G» is defective.

3. MEASUREMENT FUNCTIONS

3.1 AC / DC voltage

Any rotation of the switch on an insulation position sets the unit to automatic AC / DC voltage measurement. The voltage is measured continuously and indicated on the small display.

The start of the insulation measurements is inhibited if an excessively high external voltage is present on the terminals, before pressing START. Also, if an excessively high parasite voltage is detected during these measurements, they are automatically stopped and the voltage is indicated (see § 3.2).

Switching between the AC and DC modes is automatic and the measurement is performed in RMS values in AC.

3.2 Insulation measurements

As soon as the switch is rotated to an insulation position, the main display indicates "- - - MΩ", and the small display indicates the voltage present on the + et – terminals of the unit.

- ⚠ **If, when the START key is pressed**, the external voltage present at the terminals of the unit is higher than the value defined by the relation above, the insulation measurement is not triggered and a series of buzzes (beep, beep, beep...) is transmitted with flashing of the ⚠ symbol for 2 seconds, then the unit returns to automatic voltage measurement.

$$U_{\text{peak}} \geq dISt \times U_n$$

with:

- U_{peak} : external peak voltage or DC present at unit terminals
- $dISt$: coefficient defined in the set-up menu (adjustable to 0.03 – 0.10 – 0.20 – default value: 0.03)
- U_n : test voltage chosen for insulation measurement

If the external voltage at the terminals of the unit is less than the value defined previously, the insulation measurement is authorised.

Pressing the START key immediately triggers the measurement. The value of the measurement is displayed on the main digital display and on the bargraph.

An audio warning is transmitted every 10 seconds to indicate that a measurement is in progress.

- ⚠ **If the voltage generated might be dangerous** (> 120 V), the ⚠ symbol is displayed.
- ⚠ **If, during the insulation measurements, an external voltage higher than the value defined** by the relation below is detected, the measurement stops as long as the external voltage remains at the terminals of the unit. The ⚠ symbol flashes and the external voltage value is displayed on the small digital display.

$$U_{\text{peak}} > (dISt + 1,05) U_n$$

Note: Adjustment of the $dISt$ factor optimises the measurement build-up time.

If there is no parasite voltage present, the $dISt$ factor may be adjusted to the minimum value to obtain a build-up time for the minimum measurement.

- ⚠ **If a significant parasite voltage is present**, the $dISt$ factor may be increased so that the measurement is not interrupted by the appearance of a negative alternation during the generation of the test voltage, which is the same as optimising the measurement build-up time in the presence of the parasite voltage.

If the measurements are unstable, it is possible to use the *SMOOTH* function (see § 4.5).

Pressing on a V-TIME key during the measurement alternatively displays the measurement time and the exact voltage generated on the small display (see § 4.2).

The stopping of the measurement is caused by pressing the STOP key.

After the measurement stops, the main result remains displayed.

It is possible to scroll through all the other results available on the main display using the R-DAR-PI-DD key. This key may also be used before the triggering of the measurement (see § 4.3).

If the "Programmed time test" $\oplus$ mode was selected, the *R(t)* key is used to access all the intermediate measurements memorised automatically (see § 4.2 and 4.3).

If the ALARM function is activated, a buzzer will go off as soon as the measurement exceeds the programmed threshold in the SET-UP configuration menu (see § 4.4).

■ Display of values after a measurement

The indications below may be displayed:

R-DAR-PI-DD key		V-TIME key
Main display	Small display	Small display if the <i>MR</i> key is activated (C.A 6547)
Resistance	duration (min. sec)	date, time, test voltage, OBJ: TEST.
DAR	duration (min. sec)	date, time, test voltage, OBJ: TEST.
PI	duration (min. sec)	date, time, test voltage, OBJ: TEST.
DD*	duration (min. sec)	date, time, test voltage, OBJ: TEST.
Current	duration (min. sec)	
Capacity**		
<i>R(t)</i>	duration (min. sec)	last test voltage

* The value of DD is displayed only **one minute after** the measurement stops

** The capacity measurement (μF) is displayed only after the measurement stops and the circuit discharges

4. SPECIAL FUNCTIONS

4.1 Key

This key is used to select the secondary function of the function keys. It is always related to the  symbol. This symbol disappears as soon as the selected function key is pressed, unless the  key is activated. In this case, it disappears only if the  key is pressed again or if other function keys are pressed. This is used to rapidly decrement the parameters using the  key without having to press the  key each time.

4.2 V-TIME key /

■ V-TIME Primary function

This key gives a read-out of all available secondary information on the small display, both during and after measurement.

In the insulation measurement function:

- Time elapsed since the beginning of the measurement
- Voltage between terminals + and – of the unit
- Date, time, test voltage and OBJ: TEST in memory recall mode (MR) (C.A 6547)

■ Secondary function (Programmed-time test)

- The small display shows the time of the programmed measurement in the SET-UP, the symbol is ON. Pressing the START key starts the measurement.
- By default, the measurement lasts 30 minutes, but this value can be changed in the SET-UP menu.
- As soon as the measurement has started, the small display decrements the remaining time. When this time reaches zero, measurement stops.

During the running of a programmed-time test, intermediate samples (resistance/voltage values as a function of time) are automatically memorised.

The time between each sample is 30 s by default, but this value may be changed in the SET-UP menu.

The samples may be displayed using the $R(t)$ function (see § 4.3) as long as a new measurement has not been launched. They are erased at each new measurement.

They are automatically memorised with the final value of the resistance when using the MEM function (memorisation) (C.A 6547).

If the position of the rotary switch is modified, or if the STOP key is pressed during the measurement, the measurement is stopped.

4.3 R-DAR-PI-DD / $R(t)$ key

■ R-DAR-PI-DD Primary function

The R-DAR-PI-DD key is used to calculate automatically the Polarisation Index (PI) and the Dielectric Absorption Ratio (DAR) or perform a Dielectric Discharge test (DD).

These PI and DAR values are particularly interesting for monitoring the ageing of the insulation of rotating machines or very long cables, for example.

On this type of component, the measurement is disturbed at the beginning by parasite current flows (capacitive load current, dielectric absorption current) which progressively cancel each other out.

To measure exactly the representative leak current of the insulation, it is therefore necessary to perform long duration measurements, to by-pass the parasite currents present at the beginning of measurements.

Then the PI or DAR ratios are calculated:

$$PI^* = R_{10 \text{ min}} / R_{1 \text{ min}} \text{ (2 values to be noted during a 10-min. measurement)}$$

$$DAR = R_{1 \text{ min}} / R_{30 \text{ s}} \text{ (2 values to be noted during a 1-min. measurement)}$$

The quality of the insulation is a function of the results.

DAR	PI	Condition of insulation
< 1,25	< 1	Insufficient if not dangerous
	< 2	
< 1,6	< 4	Good
> 1,6	> 4	Excellent

For multilayer insulation, if one of the layers is defective but if all the others show strong resistance, the calculation of the PI and DAR ratios is not sufficient to show up this type of problem.

It is therefore necessary to supplement the PI and DAR indications by a dielectric discharge test used to calculate the DD term.

This test measures the dielectric absorption of heterogeneous or multilayer insulation while ignoring the parallel-surface leak currents.

It consists of applying a test voltage for a period sufficient to electrically «charge» the insulation to be measured (a typical value is the application of a 500 V voltage for 30 minutes).

The test voltage is chosen in the same way as the insulation measurement and the duration, for a test with a programmed duration, in the SET-UP menu. The device then causes a fast discharge during which the insulation capacity is measured then measured 1 minute after the residual current circulating in the insulation.

The term DD is then computed from the relation below:

$$DD = \frac{\text{current measured after 1 minute (mA)}}{\text{test voltage (V)} \times \text{capacity measured (F)}}$$

The indication of the insulation quality as a function of the resulting value is as follows:

DD value	Insulation quality
DD > 7	Very bad
7 > DD > 4	Bad
4 > DD > 2	Doubtful
DD < 2	Good insulation

Note: The dielectric discharge test is particularly suited for the insulation measurement of rotating machines and in general for the insulation measurement of heterogeneous or multilayer insulation containing organic materials.

■ Utilisation of R-DAR-PI-DD function

During or after a measurement, the R-DAR-PI-DD key is used to scroll through the values:

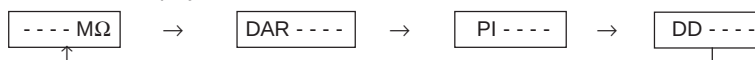
- DAR (if measurement > 1 min)
- PI* (if measurement > 10 min)
- DD can only be calculated 1 mn after the end of the insulation measurement and circuit discharge, and only if it was selected before beginning the measurement
- Capacity in μF (only after the stopping of the measurement and the discharging of the circuit)
- Residual leakage current circulating in the installation in μA or nA
- Insulation resistance in $\text{M}\Omega$ or $\text{G}\Omega$ or $\text{T}\Omega$

Note: During the measurement, the DAR value is not available if value DD was preselected before the measurement, value PI is not available if values DAR or DD were preselected before the measurement.

* For the PI calculation, the 10 and 1 minute times can be modified in the SET-UP menu, so to adapt to any normative changes or specific applications.

Automatic DAR or PI measurement:

If the R-DAR-PI-DD key is actuated during the voltage measurement before the start of a measurement, the display is as follows:



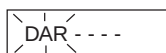
and the value of the input current (between terminals "+" and "-") + is indicated

Note: The input current may be a depolarisation current resulting from an earlier insulation measurement. It is recommended to start a new DAR and PI measurement after the current has dropped to a negligible value (on the order of 100 pA) to avoid variations on these measurements.

Depending on the choice (DAR, PI or DD), here is the measurement procedure:

- a) **DAR:** press START → the DAR symbol flashes and the display indicates «- - -» as long as the calculation of the coefficient is impossible ($t < 1$ min).

For example:

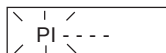


After 1 min. the measurement stops, the DAR symbol becomes steady and the main display automatically shows the DAR value.

The R-DAR-PI-DD key may be used during and after the measurement to see the insulation measurement performed, but it does not provide the PI value, since the measurement did not last long enough.

- b) **PI:** press START → the PI symbol flashes and the display indicates «- - -» as long as the calculation of the coefficient is impossible ($t < 10$ min*).

For example:

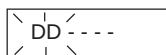


After 10 min*. the measurement stops, the PI symbol becomes steady and the main display automatically shows the PI value.

During and after the measurement, the R-DAR-PI-DD key is used to display the DAR (after 1 min), the PI (after 10 min.*) and the insulation measurement.

- c) **DD:** press START → the DD symbol flashes and the display indicates «- - -» as long as the calculation of the coefficient is impossible ($t < 30$ min.* + 1 min.).

For example:



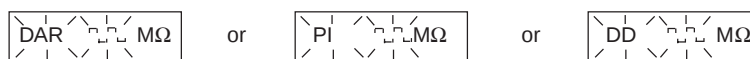
1 min. after the measurement stops, the DD symbol becomes steady, the display automatically shows the value of DD.

Therefore: if the measurement lasts 1 min. → DAR

if the measurement lasts 10 min. → PI

if 1 min. after the end of the measurement → DD

Note: If, during the measurement of DAR, PI or DD, automatic or not, a major external parasite voltage appears, or if the insulation resistance exceeds the measuring range of the device, the DAR or PI measurements are stopped and the screen shows:



These measurements resume as soon as the parasite voltage disappears.

The display of the DD value is:

- unknown (- - -) if $C < 1$ nF and $I_{dd} < 100$ pA
 - known and flashing if 1 nF $\leq C < 10$ nF and 100 pA $\leq I_{dd} < 1$ nA
 - known and permanent if $C \geq 10$ nF and $I_{dd} \geq 1$ nA
- (with C = measured capacitance and I_{dd} = measured leakage current)

* **Note:** The 10 min/1 min times for the calculation of PI and test duration for the insulation measurement and the calculation of DD may be modified in the SET-UP menu (see § 4.7) to adapt to a possible change in standards or a specific application. These times may be shortened at any time during the measurement by pressing the START / STOP push button.

■ Secondary function *R(t)*

The *R(t)* key is used to access the intermediate insulation resistance values measured as a function of time, after a measurement in «Programmed-time test» mode (see § 4.2).

The time between each memorised sample is programmed in the SET-UP configuration menu.

This function is also available on model C.A 6545 that has no RAM for the memorisation of measured data, or interface to recover this data from the instrument on a PC.

On the C.A 6545, during measurement, up to 20 samples may be recorded in the unit at the rate chosen in the SET-UP (the default value being 30 seconds).

It is possible to memorise more than 20 samples if the available processor memory allows.

On the C.A 6547, the number of recordable samples is limited only by the available RAM. This number is equal to approximately 10000 with a completely empty memory.

After pressing the *R(t)* key, the instrument switches to display mode:

- the small display indicates a time of 00:30 (if the sampling frequency is 30 s)
- the main display indicates the corresponding value R.

The V-TIME key is used to alternate between time and voltage (on the small display), with the value R on the main display.

The $\blacktriangleup$ key is used to scroll through all the samples memorised during the measurement. This makes it possible to note the elements for an R(t) and U(t) diagram.

It is therefore possible to perform, on-site, an R(t) analysis with no printer or PC.

A new press of the R(t) or R-DAR-PI-DD key, will exit the function.

4.4 * / ALARM key

■ Primary function of *

This function is used to activate or deactivate the backlight.

■ Secondary ALARM function

Activation/deactivation of the ALARM function. The corresponding symbol is displayed when activated.

If this function is active and the upper or lower value limit programmed in the SET-UP menu is exceeded during the measurement, the **ALARM** symbol will flash and the buzzer (if activated) will sound continuously. It is possible to program a different limit for each test voltage, the limits will be memorised after the device stops.

4.5 ► / SMOOTH key

■ Primary function ►

Used to select a parameter for modification – the active parameter flashes.

It may be modified using the $\blacktriangleup$ key (see § 4.6).

■ Secondary *SMOOTH* function

Used to activate a digital filter for insulation measurements. It affects only the display (which is smoothed) and not the measurements.

This function is useful in case of high instability of the displayed insulation values, caused by a strong capacitive component of the part to be tested, for example. The time constant for this filter is approximately 20 seconds.

4.6 Key

This function is used to modify the flashing parameters displayed, or to consult the R (t) values (see § 4.3). In general, two figures (day, month, hour, min., sec., OBJ, TEST) flash.

The  and  functions have a "roll" mode: as soon as the upper or lower modification limit is reached, the parameter to be modified automatically switches to the following upper or lower limit.

- **Primary function :** A brief press increments the displayed number by one unit.
A longer pressure on this key will cause fast incrementation.

- **Secondary function :** A brief press increments the displayed number by one unit.
A long press, will cause rapid decrementation.

Contrary to all the secondary functions of the other keys, it is not necessary in this case to press the  key each time to access the function . The  symbol remains displayed and therefore valid for the function  only) as long as the user does not deactivate it by pressing the  key or another key again.

4.7 SET-UP Function (device configuration)

This function, located on the rotary switch, is used to change the configuration of the device by accessing directly the parameters to be modified.

After turning the rotary switch to the SET-UP position:

- all the segments of the display are activated for 1 second,
- the number of the software version is displayed
- the serial number of the device is displayed
- **PUSH** then appears on the small display and **btn** on the main display, to prompt you to press a key.

The SET-UP function is then used to access directly the parameters to be modified, by pressing the corresponding key:

- After pressing a key, the figures or symbols corresponding to the function selected appear on the screen.
- The modifiable figures or symbols will flash. The normal modification procedure using the  and  keys must be used.
- All the parameters are recorded immediately and continuously.

The table on the following page defines the active keys in the SET-UP function and the corresponding display, with the possible adjustment ranges.

Parameters to be modified	Control key	Display			
		main	small	symbols	values
Test duration of the test, in "Programmed-time test" mode		tEst	30 : 00	min. sec,	01:00 - 59:59
1 st and 2 nd time for PI calculation	R-DAR-PI-DD	second period (10:00)	first period (01:00)	min.: sec	00:30 - 59:59
Time between samples in  mode «Programmed-time test»	R (t)		00 : 30	min.: sec	00:05 - 30:00
Limit for 500 V - 2 TΩ	ALARM	500 kΩ	500 V	ALARM <	30 k-2 TΩ and ><
Limit for 1000 V - 4 TΩ	ALARM (2 nd press)	1 MΩ	1000 V	ALARM <	100 k-4 TΩ and ><
Limit for 2500 V - 10 TΩ	ALARM (3 rd press)	2.5 MΩ	2500 V	ALARM <	300 k-10 TΩ and ><
Limit for 5000 V - 10 TΩ	ALARM (4 th press)	5 MΩ	5000 V	ALARM <	300 k-10 TΩ and ><
Limit for Var-50/5000 V	ALARM (5 th press)	5 MΩ	Set	ALARM <	10 k-10 TΩ and ><
Time	V-TIME		12 :55		hh(00-23) min (00-59)
Date (Europe version)	V-TIME (2 nd press)	17.03	2000		dd.mm .yyyy
version: USA, Europe	V-TIME (3 rd press)	USA/Euro			USA/Euro
Erase memory	MEM then MEM (2 s)	cLr	ALL	MEM	
Selective deletion of memory	MEM then  and  and MEM (2 s)	FrEE / OCC	Number of OBJ: TEST.	MEM	00...99
Baud	PRINT	9600	bAUd		300...9600 or "parallel"
Buzzer	*	On			ON / OFF
Auto cut-off	* (2 nd press)	On			ON / OFF
Configuration by default	* (3 rd press) then START	DFLt	SEt		
Dielectric test voltage:	* (4 th press)	SEt	100 V	V	40/5100 V
Disturbance Limit voltage	* (5 th press)	0.03 U	dISt	V	0,03-0,10-0,20
Automatic range	* (6 th press)	Auto	rAnG		Auto/1/2/3
Test voltage locking	* (7 th press)	oFF	1000 V		ON / OFF 40-5100 V

The values shown in this table, in the «Display / main» and «Display / small» columns are default values programmed at the factory. In case of mistaken modification, it is possible to find them: see § 4.7.3.

4.7.1 Memory deletion

In the **SET-UP**, press the MEM key:

- The **MEM** symbol flashes
- **ALL** is shown flashing on the small display
- The main display indicates **cLR**

To delete the entire memory, press again on the MEM key for 2 seconds:

- The **MEM** symbol is displayed steady.
- **ALL** is shown constant on the small display
- The main display indicates **FrEE**

To delete the content of an OBJ: Specific TEST:

- Select the number using keys ► and ◆
- **FrEE** or **OCC** is shown on the main display

Press again on the MEM key for 2 seconds to delete:

- The **OBJ: TEST** is indicated on the small display
- The main display indicates **FrEE**

4.7.2 Output in bauds (RS 232)

In the **SET-UP**, press the PRINT key:

The main display indicates the output in bauds, i.e. 300, 600, 1200, 2400, 4800, 9600 or Parallel.

On the small display, **baud** appears. The value may be modified using the keys ▲ and ▼.

The «Parallel» display means that the parallel mode is selected, to print on parallel printers via the series-parallel adapter (RS 232-Centronics).

4.7.3 Default configuration of the device

In the **SET-UP**, 3rd press on the * key:

- The small display shows **SEt**.
- The main display shows **DFLt** (flashing).

Press on START to reconfigure the device using the default parameters (see previous table).

4.7.4 Voltage disturbance limit

In the **SET-UP**, 5th press on the * key:

- The small display indicates dISt
- The main display shows **0.03U** (flashing)
- Modify this value if necessary using the key (possible choice between: 0,10 - 0,20 - 0,03)

Note: This adjustment provides the best compromise between the measurement build-up time and the presence of external parasite voltages (§ 3.2).

If no parasite voltage is present, this value will be chosen equal to 0.03 to obtain a rapid measurement build-up time.

Example: If an insulation measurement is performed under a test voltage of 5000 V and the limit equals 0.10 it will be possible to perform a correct measurement with the presence of an external parasite voltage ≤ 500 V, to the detriment of a longer measurement build-up time.

4.7.5 Automatic measuring range

In the SET-UP, 6th press on the * key:

- The small display indicates **rAnG**
- The main display indicates **Auto**

Use the $\blacktriangle$ key to choose a fixed (1, 2 or 3 on the main display) or automatic (Auto on the main display) measurement range

Note: The fixed measurement ranges correspond to the current ranges of the following measurements:

- 1 : 50 pA to 200 nA
- 2 : 150 nA to 50 μ A
- 3 : 30 μ A to 3 mA

The choice of a fixed measurement range optimises the measurement build-up time for a known value of insulation resistance.

Example: Choice of range 1 for a measurement greater than 500 G Ω .

4.7.6 Test voltage limit

In the SET-UP, 7th press on the * key:

- The small display indicates **1000 V**
- The main display indicates **OFF**
- Choose On or OFF using key $\blacktriangle$ and modify if necessary the value of the voltage using key $\blacktriangleright$ then key $\blacktriangle$ (adjustment by 10 V steps).

Note: This function prohibits the use of the insulation measurement from a maximum test voltage value. This enables the device to be used by less experienced persons for specific applications (telephony, aerospace...).

This limit may be hidden by using the application software MEGOHMVIEW.

Example: By choosing On and a test voltage limit of 750 V, the measurement will be performed under 500 V for the corresponding position on the rotary switch, and at 750 V for all the other positions on the rotary switch (with prior lighting of the LIM for 3 seconds on the main display).

5. USE

5.1 Measurement procedure

- Start up the instrument by setting the switch to the corresponding position. All the segments of the LCD screen are displayed, then the battery voltage.
- Connect the + and - leads to the measurement points.
- The voltage is measured continuously and indicated on the small display.
If an external voltage higher than the authorised limit value (see § 3.2) is present, the measurement will be inhibited.
- A press on START/STOP starts the measurement.
- Another press on START/STOP stops the measurement. The last result remains displayed until the next measurement or the rotation of the switch.

If a voltage higher than the authorised limit value (see § 3.2) appears during all the measurements, the device will indicate this voltage on the small display using the flashing warning symbol and stop the measurement in progress.

Note: A certain number of special functions may be used (see § 4).

5.2 Insulation measurement (see § 3.2)

With this function, the instrument can measure insulation between 10 k Ω and 10 T Ω , according to the chosen test voltage (among 500 - 1000 - 2500 - 5000 V) or programmed voltage (between 40 V and 5100 V).

- Position the switch on "500 V-2 T Ω ", or "1000 V-4 T Ω ", or "2500 V-10 T Ω ", or "5000 V-10 T Ω " or "Var 50-5000 V"



- Connect the device to the part to be tested.
If the voltage present is higher than the authorised limit value (see § 3.2) the measurement will be inhibited.
- Start the measurement and note the results.

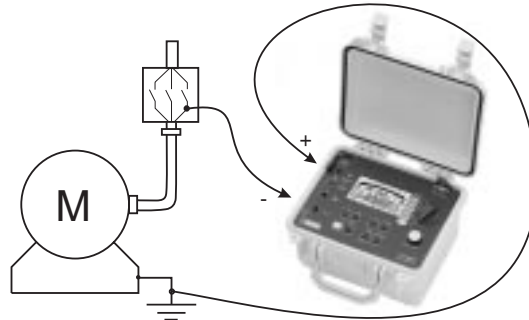
It is possible to scroll through all the results on the main display using the R-DAR-PI-DD key (see § 4.3) or on the small display using the V-TIME key (see § 4.2).

R (t) is used to access the intermediate values measured and memorised at a rate set in the SET-UP, in "Programmed-time test" mode. These samples are available until the start of another measurement or until the next rotation of the switch (see § 4.3)

To measure high insulation values (> 1 G Ω), you are advised to use the "G" guard terminal to remove the influence of superficial leak currents or eliminate the influence of superficial leak currents. The guard terminal will be connected to a surface capable of being the circulation base of superficial currents via dust and humidity: for example, the insulation surface of a cable or transformer, between two measurement points.

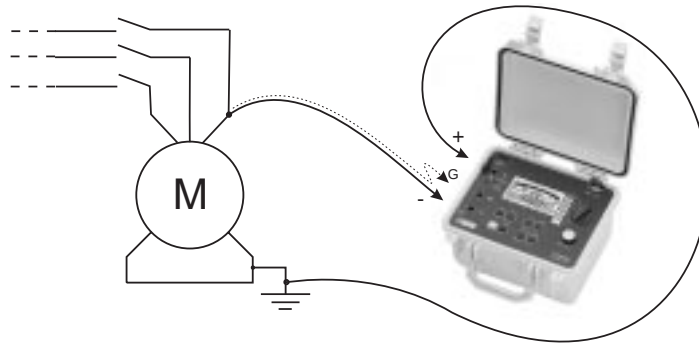
As soon as insulation measurements stop, the tested circuit is automatically discharged via an internal resistor of the device.

■ **Connection diagram for measurement of low insulation** (example: motor)

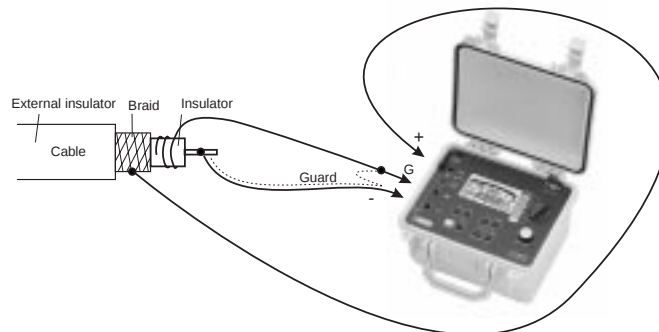


■ **Connection diagram for measurement of strong insulation**

a) Example of a motor (reduction of capacitive effects)



b) Example of a cable (reduction of superficial leak effects)



5.3 Capacity measurement

Capacity measurement is performed automatically during the insulation measurement, and is displayed after the measurement stops and the discharge of the circuit, using the R-DAR-PI-DD key.

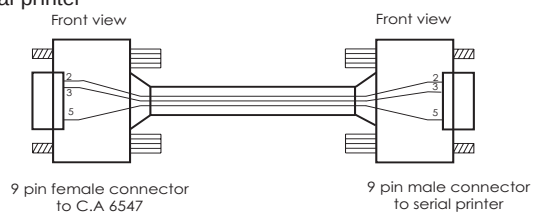
5.4 Residual and leakage current measurement

The measurement of residual current circulating in the installation is automatically made during an insulation measurement. It is displayed at the end of the measurement with the R-DAR-PI-DD key.

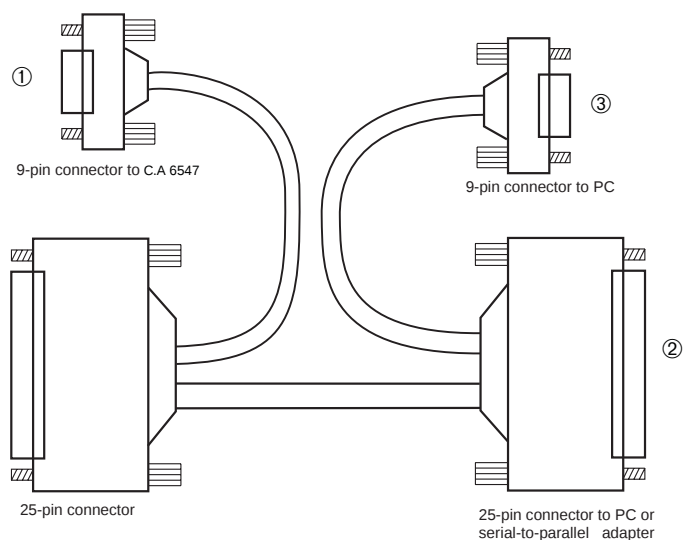
6. MEMORY / RS 232 (C.A 6547)

6.1 RS 232 Characteristics

- The speed in bauds may be adjusted to 300, 600, 1200, 2400, 4800, 9600, or «Parallel» for printing on parallel printers via the optional series/parallel adapter. This adjustment is performed in the SET-UP menu (see § 4.7.2)
- Data format: 8 data bits, 1 stop bit, no parity, protocol Xon / Xoff
- Connection to serial printer



- Connection to a PC or parallel printer



- Required links DB9 → B25 (① → ②)
(standard null - modem cable):

1 → 8 6 → 20
2 → 2 7 → 5
3 → 3 8 → 4
4 → 6 9 → 22
5 → 7

- Conversion DB25 → DB9 (② → ③) :

2 → 3
3 → 2
7 → 5

6.2 Recording/reviewing of memorised values (MEM/MR key)

6.2.1 Primary MEM function (memorisation)

This function is used to record results in the device's RAM.

These results are recordable at an address identified by an object number (OBJ) and a test number (TEST).

An object represents a «box» in which 99 tests can be stored. An object can thus represent a machine or an installation on which a number of measurements will be performed.

1. When the key is activated, the **MEM** symbol flashes and the small display indicates the first OBJ: TEST Free, for example, **02: 01**. The main display indicates **FrEE**.

The OBJ is that of the last measurement memorised, but the TEST number is incremented by 1.

It is still possible to modify the OBJ: TEST using the ► and ▲.

If the user selects an already occupied memory address, **OCC** appears on the main display.

If a new OBJ is selected, TEST is set to 01.

2. By pressing again on the MEM key, the results of measurements in progress will be recorded in the selected memory address (whether occupied or not). The MEM symbol no longer flashes and remains displayed. The time and date of this recording are memorised with already available data (R, U, t).



If another key than MEM where the switch is activated before the second press of MEM, the record mode will be exited without memorising the results.

3. If a programmed-time test was performed, intermediate measurements (samples) are available (see § 4.3). They are automatically recorded under the same OBJ number: TEST as the final measurement.

■ Estimate of result recording capacity

Total memory space: 128 Kbytes

Internal management: 8 Kbytes

Memory space available: 120 Kbytes

An insulation measurement result requires approximately 80 bytes.

In "Programmed-time test" ⊕, a sample requires 10 additional bytes.

It is therefore possible to record approximately 1500 insulation measurements.

■ Memory space available

This function is automatically activated when recording a result.

Press once on MEM to obtain the OBJ. Next free TEST; the indication of the bargraph is proportional to the free memory available.

- If the entire memory is free, all the segments are activated.
- If the entire memory is full, the left-hand bargraph arrow flashes.
- When the recording is completed, the bargraph fades.

One segment of the bargraph corresponds to about 50 recordings.

6.2.2 Secondary MR function

The MR function is used to recall any data from the memory, regardless of the position of the rotary switch.

- When the key is activated, the MR symbol is displayed (not flashing).
The small display indicates the last OBJ: TEST busy, for example, 02:11.

02 «11» opposite the flashing TEST symbol, the normal modification procedure with keys ► and ▲ must be used to select the OBJ: TEST required.

If a new OBJ is selected, TEST is automatically set on the maximum memorised number.

At this level it is possible to consult the entire result memory using keys ► and ◀ since the measurement values correspond to the OBJ: TEST selected is shown on the main display. It is possible to scroll through them using the R-DAR-PI-DD key.

- The V-TIME key is active and gives access to the date / time / U / OBJ-TEST number for each result. If the recording selected by the OBJ : TEST number corresponds to a programmed-time test ⊕, the R (t) values can be accessed by pressing the R (t) key. The small display changes and indicates **min : sec** (1st sample time) and the symbol flashes on the screen. You may use the ▲ key to scroll through the other samples.

To exit the R (t) mode and return to normal memory recall condition (OBJ : TEST), press the R-DAR-PI-DD key again.



To exit the MR function, press again on MR or turn the switch.

6.3 Printing measured values (PRINT/PRINT MEM key) (C.A 6547)

If you use a serial printer, choose the appropriate communication speed, in the SET-UP menu, between 300...9600 bauds, then program the printer to the format controlled by the instrument (see § 6.1).

If you use a parallel printer, you must adjust the speed to «Parallel» in the SET-UP and use the series/parallel adapter sold optionally (connect in series the cable delivered + adapter + Centronics printer cable).

Two print modes are available:

- Immediate printing of the measurement (PRINT)
- Printing of memorised data (*PRINT memory*)

If the transmission of data to the printer goes well, the COM symbol will flash on the display.

If a problem occurs, the COM symbol remains permanently displayed on the LCD screen.

6.3.1 Immediate printing of the measurement (PRINT key)

Following a measurement or after access to the MR mode (Memory Recall), the PRINT function is used to print the measurement results.

As soon as the key is used, it prints:

- 1 group of measurements (U/R/DAR/PI/DD/date/time) in case of normal test,
- the R(t) values if the "Programmed time test" ⊕ function was activated.

To stop printing, change the position of the rotary switch.

Depending on the function used, the following models are obtained.

■ Insulation Measurements

CHAUVIN ARNOUX C.A 6547

Instrument number: 000 001

INSULATION RESISTANCE TEST

PURPOSE: 01 TEST: 01 (*printed only in MR mode*)

Description:

.....

Date: 31.03.1998

Starting time: 14h55

Running time: 15 min. 30 seconds.

Temperature: °C °F

Relative humidity: %

Test voltage: 1000 V
 Insulation resistance (R): 385 GOhm
 DAR: 1,234
 PI: 2,345
 DD:
 Capacitance: μ F
 I residual: nA
 Comments:

 Date of next test : /.../.....

After a «Programmed time test» other results are printed (intermediate samples):

Time	Resistance	Voltage
00 : 30	35.94 GOhm	1005 V
01 : 00	42.00 GOhm	1005 V
01 : 30	43.50 GOhm	1005 V

etc.

A line for the signature of the operator appears at the end of printing.

6.3.2 Printing of memorised data (PRINT MEM key)

This is used to print the content of the unit's RAM.

The small display indicates **01: 01** for the OBJ number: TEST (print starting address).

The main display indicates the last recording in the memory (end print address).

For example **12: 06**;

01 opposite the OBJ position flashes and the normal modification procedure must be used (► and ◄ keys) to define the start/end of printing addresses.

To exit without printing, change the position of the rotary switch.

To start printing, press again on the PRINT key.

To stop printing, change the position of the rotary switch.

The printing of each data group is reduced to the main results.

Example:

CHAUVIN ARNOUX C.A 6547

Instrument number: 000 001

INSULATION RESISTANCE TEST

PURPOSE: 01 TEST: 01

Description:

.....

Date: 31.03.1998

Starting time: 13h 35

Running time: 16 min 27 sec

Temperature: °C °F

Relative humidity: %

Test voltage: 5000 V

Insulation resistance (R): 3.85 T Ω

DAR: 1,273

PI: 2.382

DD:

Capacitance: μ F

I residual: nA

Comments:

Date of next test: /.../.....

INSULATION RESISTANCE TEST
 PURPOSE: 01 TEST: 02
 Description:

 Date: 31.03.1998
 Starting time: 15h 10
 Running time: 15 min 30 sec
 Temperature: °C °F
 Relative humidity: %
 Test voltage: 1000 V
 Insulation resistance (R): 385 GΩ
 DAR: 1,234
 PI: 2,345
 DD:
 Capacity: μF
 I residual: nA
 Comments:

 Date of next test : /.../.....

A line for the signature of the operator appears at the end of printing.

6.4 Printing with series-parallel adapter

1. Connect RS232 null-modem cable to C.A 6547
2. Connect this cable to the adapter, then connect the adapter to the printer cable.
3. Turn on the printer.
4. Turn on the C.A 6547
5. To print non-recorded measurements (immediate print), press PRINT after performing a measurement.
6. To start a printing of recorded measurements, press the "PRINT MEM" key

 **CAUTION:** This adapter is exclusively designed to be used with the C.A 6543 and the C.A 6547 and cannot be used with any other applications.

7. SPECIFICATIONS

7.1 Reference conditions

Influence quantities	Reference values
Temperature	23°C ± 3 K
Relative humidity	45% to 55 %
Supply voltage	9 to 12 V
Frequency range	DC and 15.3...65 Hz
Capacity in parallel on resistor	0 µF
Electrical field	nil
Magnetic field	< 40 A/m

7.2 Characteristics per function

7.2.1 Voltage

■ Characteristics

Measurement range	1.0...99.9 V	100...999 V	1000...2500 V	2501...5100 V
Frequency range (1)	DC and 15 Hz...500 Hz			DC
Resolution	0.1 V	1 V	2 V	2 V
Accuracy	1% reading +5 pt	1% reading +1pt		
Input impedance	750 kΩ at 3 MΩ depending on measured voltage			

(1) Over 500 Hz, the small display indicates "- - -" and the main display gives only an assessment of the peak value of the measured voltage.

■ **Measurement category:** 1000 V CAT III or 2500 V CAT I (transients ≤ 2.5 kV)

7.2.2 Insulation resistance

■ **Method:** Voltage-current measurement per EN 61557-2 (ed. 02/97)

■ **Nominal output voltage:** 500, 1000, 2500, 5000 V_{DC} (or adjustable from 40 V to 5100 V)

■ **No adjustment in variable mode:** 10 V from 40 V to 1000 V
100 V from 1000V to 5100 V

■ **Off-load voltage:** ≤ 1.02 × U_n ±2% (U_n ±2% in variable mode)

■ **Max. overrunning of voltage U_n:** (1.05 + dISt) U_n +50 V
with dISt = 0.03 – 0.10 or 0.20

■ **Nominal current:** ≥ 1 mA_{DC}

■ **Short-circuit current:** < 1.6 mA ±5%

■ **Load current on capacitive component:** 3 mA_{DC} approximately when starting measurement

■ **Maximum acceptable AC voltage during measurement:** U_{peak} = (1.05 + dISt) U_n
with dISt = 0.03 – 0.10 or 0.20

■ Measuring ranges:

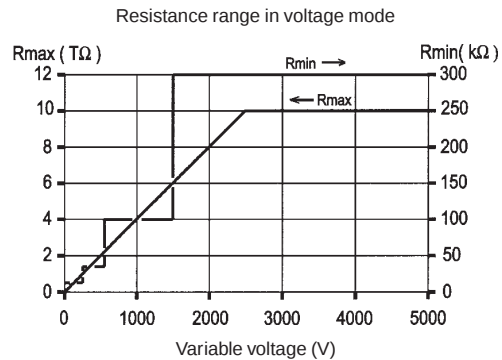
500 V : 30 kΩ... 1.999 TΩ

1000 V : 100 kΩ... 3.999 TΩ

2500 V : 100 kΩ... 9.99 TΩ

5000 V : 300 kΩ... 9.99 TΩ

Variable (40 V...5100 V) : see following graph



■ Accuracy

Test voltage	500 V	500 V - 1000 V	500 V - 1000 V - 2500 V - 5000 V		
Specified measurement range	30...99 kΩ	100...299 kΩ	300...999 kΩ 1.000...3.999 kΩ	4.00...39.99 MΩ	40.0...399.9 MΩ
Resolution	1 kΩ			10 kΩ	100 kΩ
Accuracy	±5% reading + 3 pt				

Test voltage	500 V - 1000 V - 2500 V - 5000 V				1000 V - 2500 V 5000 V	2500 V 5000 V
Specified measurement range	400...999 MΩ 1.000...3.999 GΩ	4.00 to 39.99 GΩ	40.0 to 399.9 GΩ	400...999 GΩ 1.000...1.999 TΩ	2.000...3.999 TΩ	4.00...9.99 TΩ
Resolution	1 MΩ	10 MΩ	100 MΩ	1 GΩ		10 GΩ
Accuracy	±5% reading + 3 pt			±15% reading + 10 pt		

■ Accuracy in variable mode

To be interpolated between the values of the table above and per § 7.2.2 Measuring ranges

■ Measurement of DC voltage during insulation test

Specified measurement range	40.0...99.9 V	100...1500 V	1501...5100 V
Resolution	0.1 V	1 V	2 V
Accuracy	1% reading + 1 pt		

■ Measurement of DC voltage after insulation test

Specified measurement range	25...5100 V
Resolution	0.2% Un
Accuracy	5% reading + 3 pt

■ **Typical build-up time for the measurement according to components tested ($U_{\text{dist}} = 0,03 U_n$)**

These values include the influences caused by the charge of the capacitive component, by the automatic range system and to the test voltage control

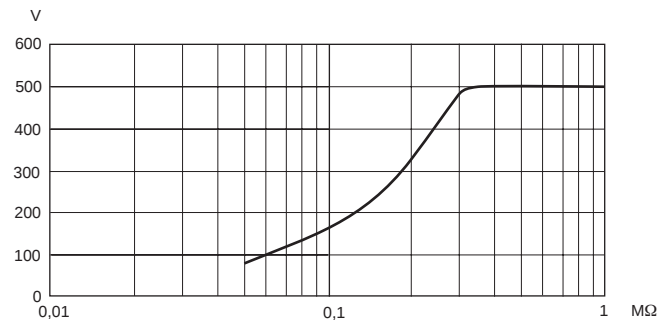
Test voltage	Load	Non capacitive (unsmoothed measurement)	With capacitance of 1 μF (smoothed measurement)
500 V	1 M Ω	3 s	4 s
	100 G Ω	8 s	40 s
1000 V	1 M Ω	3 s	4 s
	100 G Ω	8 s	80 s
2500 V	3 M Ω	3 s	4 s
	100 G Ω	8 s	90 s
5000 V	5 M Ω	4 s	16 s
	100 G Ω	8 s	120 s

■ **Typical discharge time for a capacitive component to reach 25 V_{DC}**

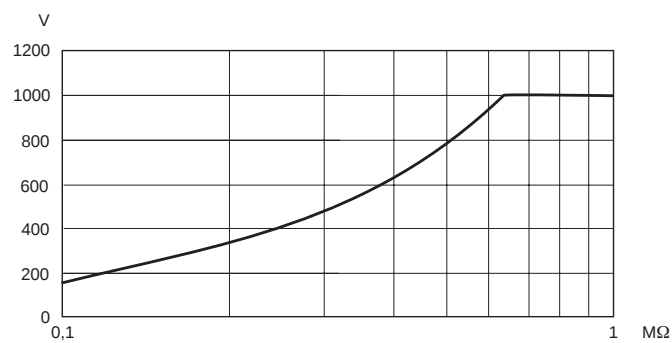
Initial voltage	500 V	1000 V	2500 V	5000 V
Discharge time (C in μF)	C x 3 s	C x 4 s	C x 4 s	C x 7 s

■ **Typical change curve for test voltages according to load**

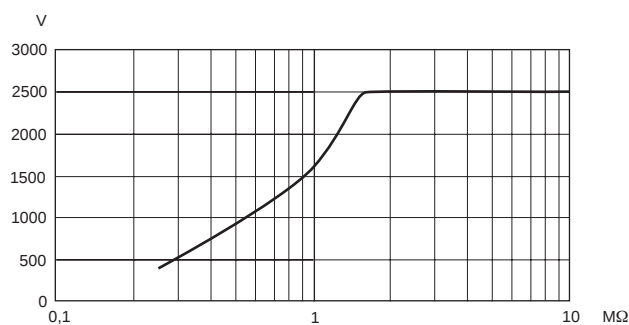
Range 500 V



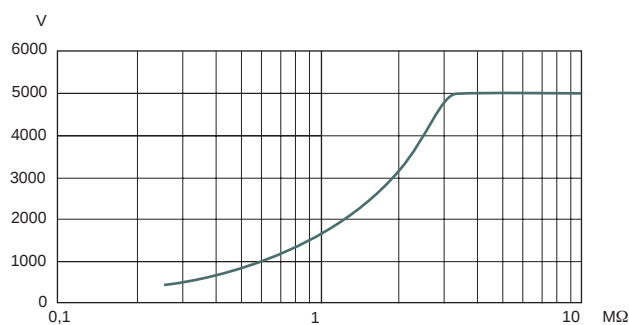
Range 1000 V



Range 2500 V



Range 5000 V



■ **Capacity measurement (after discharge of tested component)**

Specified measurement range	0.005...9.999 μF	10.00...49.99 μF
Resolution	1 nF	10 nF
Accuracy	10% reading +1 pt	

■ **Leak current measurement**

Range of measurement specified	0,000 to 0,250 nA	0,251 to 9,999 nA	10,00 to 99,99 nA	100,0 to 999,9 nA	1,000 to 9,999 μA	10,00 to 99,99 μA	100,0 to 999,9 μA	1000 to 3000 μA
Resolution	1 pA		10 pA	100 pA	1 nA	10 nA	100 nA	1 μA
Accuracy	15% read. +10 pt	10% reading	5% reading					10% reading

■ **Calculation of terms DAR and PI**

Specified range	0,02...50,00
Resolution	0,01
Accuracy	5% reading + 1 pt

■ **Calculation of term DD**

Specified range	0,02...50,00
Resolution	0,01
Accuracy	10% reading + 1 pt

7.3 Power Supply

■ **The equipment power supply is obtained from:**

- Rechargeable NiMH batteries - 8 x 1.2 V / 3.5 Ah
- External recharge: 85 to 256 V (50 -60 Hz)

■ **Minimum battery charge life** (per NF EN 61557-2)

Test voltage	500 V	1000 V	2500 V	5000 V
Nominal charge	500 kΩ	1 MΩ	2.5 MΩ	5 MΩ
Number of measurements 5 s on nominal charge (with 25 s pause between each measurement)	6500	5500	4000	1500

■ **Average battery charge life**

Supposing a DAR measurement of 1 minute, 10 times per day, with a PI measurement of 10 minutes, 5 times per day, l'autonomie sera d'environ 15 jours ouvrables ou 3 semaines.

■ **Recharge time** (C.A 6545 and C.A 6547)

6 hours to recover 100% capacity (10 hours if the battery is completely run down)
0.5 hours to recover 10% capacity (charge life: 2 days approximately)

Note: It is possible to recharge the batteries while performing insulation measurements provided that the values measured are higher than 20 MΩ. In this case, the recharging time is higher than 6 hours and depends on the frequency of the measurements.

7.4 Environmental parameters

■ **Range of use**

- 10°C to 40°C, during battery recharging
- 10°C to 55°C, during measurement
- 10% to 80 % RH

■ **Storage:**

- 40°C to 70°C
- 10% to 90 % RH

■ **Altitude:** < 2000 m

7.5 Construction specifications

- Overall dimensions of the unit (L x w x h): 270 x 250 x 180 mm
- Weight: approx. 4.3 kg

7.6 Compliance with international standards

- Electrical safety as per: EN 61010-1 (Ed. 2 for 2001), EN 61557 (Ed. 97)
- Dual insulation: 
- Pollution level: 2
- Measurement category: III
- Max. voltage relative to earth: 1000 V (2500 V in measurement category I)

7.6.1. Electromagnetic compatibility:

■ NF EN 61326-1 (Ed. 97) + A1, industrial environment category

7.6.2. Mechanical protection

IP 53 per NF EN 60529 (Ed. 92)

IK 04 (per NF EN 50102 Ed. 95)

7.7 Variations in operating range

Influential quantity	Range of influence	Quantity influenced (1)	Influence	
			typical	Max.
Battery voltage	9 V -12 V	V MΩ	< 1 pt < 1 pt	2 pt 3 pt
Temperature	-10°C...+55°C	V MΩ	0,15% read./10°C 0,20% reading	0,3% reading +1 pt 1% reading +1 pt
Humidity	10%...80% HR	V MΩ (10 kΩ to 40 GΩ) MΩ (40 GΩ to 10 TΩ)	0,2% reading 0,2% reading 3% L	1% reading +2 pt 1% reading +5 pt 15% L +5 pt
Frequency	15...500 Hz	V	0,3% reading	0,5% reading +1 pt
AC voltage superimposed on the test voltage	0% Un...20% Un	MΩ	0,1% read./% Un	0,1% read./% Un +5 pt

(1) The terms DAR, PI, DD and the capacity and current leak measurements are included in the quantity "MΩ"

8. MAINTENANCE

-  **For maintenance, use only specified spare parts. The manufacturer will not be held responsible for any accident occurring following a repair done other than by its After Sales Service or approved repairers.**

8.1. Servicing

8.1.1. Battery recharge

-  **If the  symbol appears flashing**, it is necessary to recharge the battery.
Connect the unit to the AC network using connector ⑥, the unit will automatically switch to battery charge:
- **bAt** on the small display and **CHrG** or **chAr** on the main display, means rapid charging in progress.
 - **bAt** on the small display and **CHrG** flashing in the main display, mean slow charging (the rapid charge will begin when the temperature conditions are appropriate).
 - **bAt** on the small display and **FULL** in the main display, means that charging is completed.
- If the unit is activated and the batteries have a voltage of > 8 V, normal utilisation of the unit is authorised.
-  **The battery should be replaced by Manumasure or by a repairer approved by CHAUVIN ARNOUX.**
Changing the battery entails the loss of memorised data. Pressing on the MEM / MR key then causes the display of «OFF». Proceed with a complete deletion of the memory in the SET-UP menu (see § 4.7.1) to be able to use the MEM / MR functions once again.

8.1.2 Replacing the fuses

-  **If FUSE -G- appears on the digital display, you must change the fuse accessible on the front panel after checking that none of the terminals is connected and that the switch is on OFF.**
Exact type of fuse (printed on the front panel label): FF -0.1 A -380 V -5 x 20 mm -10 kA
- Note:** This fuse is in series with a 0.5 A / 3 kV internal fuse active only in case of major fault in the unit. If after changing the fuse on the front panel, the display still indicates FUSE - G -, the unit must be returned for servicing (see § 8.2)

8.1.3 Cleaning

-  **The instrument must be disconnected from any source of electricity.**
Use a soft cloth slightly moistened with soapy water. Rinse with a wet cloth and dry quickly with a dry cloth or pulsated air. Do not use alcohol, solvents or hydrocarbons.

8.1.4 Storing

-  **If the instrument is not used for a long time** (more than two months), it is best to carry out three complete load and run-down cycles before re-using the instrument.
Complete battery run-down can be performed:
- without the instrument at 3 A
 - or
 - on the position that consumes the most, i.e. 5000 V

8.2 Metrological verification

-  **It is essential that all measuring instruments are regularly calibrated.**

We advise you to check this instrument at least once a year.
For checking and calibration of your instrument, please contact our accredited laboratories (list on request) or the Chauvin Arnoux subsidiary or Agent in your country.

8.2.1 Repairs

Repairs under or out of guarantee

Please return the product to your distributor.

9. GUARANTEE

Our guarantee is applicable for **twelve months** after the date on which the equipment is made available (extract from our General Conditions of Sale, available on request).

10. TO ORDER

C.A 6545	P01.1397.01
C.A 6547	P01.1397.02

Delivered with bag containing:

1 cable DB9F-DB9F
1 adapter DB9M-DB9M
2 x 3 m safety leads, fitted with a HV plug and a HV crocodile clip (red and blue)
1 x 3 m guarded safety lead, fitted with a HV rear pick up plug and a HV crocodile clip (black)
1 2-m mains power lead
1 cable with rewinder, 0.35 m
5 simplified operating manuals (1 per language)
and this 5-language user's manual.

Accessories:

■ PC (C.A 6547) software	P01.1019.38A
■ Serial printer (C.A 6547)	P01.1029.03
■ Series parallel adapter (C.A 6547)	P01.1019.41
■ Set of 2 HV cables with safety connector Ø4mm (red/guarded black) 3m	P01.2952.31
■ Set of 2 alligator clips (red/black)	P01.1018.48
■ Set of 2 test prods (red/black)	P01.1018.55
■ HV cable with safety connector Ø4mm (blue) 3m + alligator clip (blue)	P01.2952.32
■ HV cable long blue crocodile clip. 8 m	P01.2952.14
■ HV cable long red crocodile clip. 8 m	P01.2952.15
■ HV cable crocodile clip with long grounding rewinder. 8 m	P01.2952.16
■ HV cable long blue crocodile clip. 15 m	P01.2952.17
■ HV cable long red crocodile clip. 15 m	P01.2952.18
■ HV cable crocodile clip with long grounding rewinder. 15 m	P01.2952.19

Spare parts:

■ 3 HV cables (red + blue + guarded black) - 3 m	P01.2952.20
■ 0.35 m rear pick up lead	P01.2952.21
■ Bag N° 8 for accessories	P01.2980.61
■ Fuse FF 0.1 A - 380 V - 5 x 20 mm - 10 kA (lot de 10)	P03.2975.14
■ Battery 9.6 V – 3.5 AH - NiMh	P01.2960.21
■ Cable RS 232 PC DB 9F - DB 25F x2	P01.2951.72
■ Cable RS 232 printer DB 9F - DB 9M N°01	P01.2951.73
■ Mains power supply cable 2P	P01.2951.74