

		Loop controller GSE	
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User manual			

USER MANUAL



LOOP CONTROLLER

PN: 20549 SI

DOCUMENT REF N° 3266-9001

REVISIONS

Revision	Date	Reason for Revision	Pages
A	23/01/2009	Initial Issue	All
B	01/02/2012	XLR harness removed	5 - 9
C	24/04/2012	Addition of the crocodile clip	9
D	25/06/2012	Update §4.3 "Precaution of use"	19
E	22/10/2012	Update charger voltage values	5-9
F	08/03/2016	Update Logo	All

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REFERENCES

TOOL DEFINITION :

LOOP CONTROLLER
 IN ECA SINTERS : 20549 SI
 TOOL ISSUE : A

TOOL MANUFACTURER & MAINTENANCE COMPANY

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DEFINITION

The purpose of this document is to describe:

- The description of the tools,
- The instructions for use of the tools,
- The conditions and limits for use of the tools,
- The maintenance operations of the equipment.

Applicable Documents:

- Definition document PN: 20549 SI No. 3266
- EMC Directive 89/336/EEC

3 OVERALL PRESENTATION

3.1 TOOL PRESENTATION

The equipment consists of:

TYPE	PN	QTY
Suitcase	PN : 20549SI-300	1
Portable measuring device LOOP CONTROLLER	PN : 20549SI-1	1
Charger 100/240Vac and adapters	PN : 20549SI-202	1
Harness for connection to the loop 'Banana plug'	PN : 20549SI-201	1
User manual	PN : 20549SI-1	1



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DESCRIPTION OF FUNCTIONALITY.

This tool is designed to measure the key characteristics of the CFD elements loops on the system fire detection:

- Measure of the core resistance
- Measure of Insulation resistance between core and shield

It is used during the checking operations of the loops and their wiring aircraft in assembly line (except Thermocoax ©). It is also used during maintenance on track.

The supported loops are:

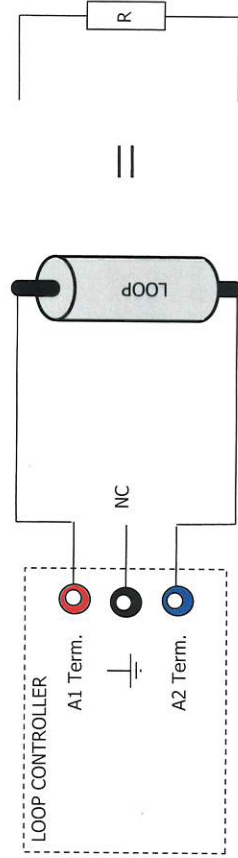
- Fenwall CFD P/N 35xxx-y-255

It provides 3 distinct modes of measurement:

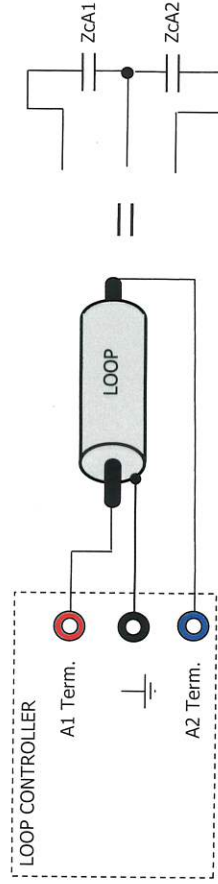
- **"CONTINUITY"** mode to measure the core continuity (sensitive element).
- **"INSULATION"** mode to measure Fenwall© loop insulation (Z_c)
In this mode, the tool measures the parallel capacity of the loop and calculates the equivalent resistance at 1KHz. The displayed value is the impedance of the parallel capacity (Z_c in Ohms).
- **"INSULATION & CONTINUITY"** mode combines the two previous modes.

3.3 MEASURE DESCRIPTION

3.3.1 "CONTINUITY" mode



3.3.2 "INSULATION" mode



PRINCIPLE OF MEASURE AND LIMIT

3.4.1 Continuity measure

The device generates a current of 10mA between terminals A1 and A2.
By measuring the voltage between terminals, the tool makes the calculation and displays the resistance of the element.

Limit of measure: 1 to 99 Ohms with a precision of 1% of the full scale.

3.4.2 Insulation measure

The device generates a sinusoidal voltage of 1Vrms @1KHz with zero mean value and a limited power of 1mW.
The measurement is made alternatively between the terminals GND and then A1 and A2 GND terminals.
The tool measures the capacity of this terminal and calculates the equivalent impedance value ZC at 1KHz.
The result is displayed on the screen in Ohms.

Limit of measure: Zc = 1 KOhms (C~156nF) to 5 MOhms (C~31pF) with a precision of 5%.

3.4.3 Continuity and Insulation measure

The measurement principle is identical to the descriptions above.

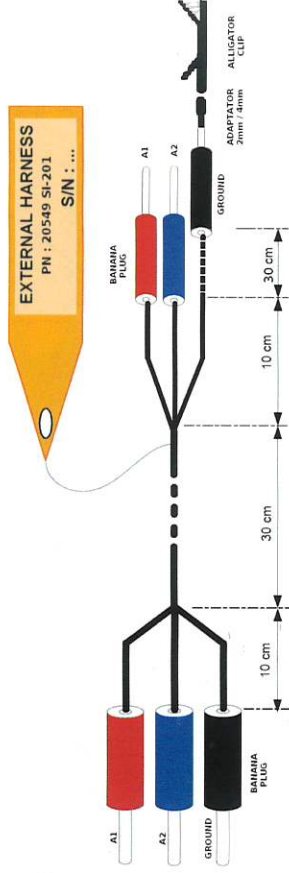
The tool performs periodically in continue three different measures including:

- Measure continuity between terminals A1 and A2.
- Measurement of insulation between the terminals GND and A1
- Measurement of insulation between the terminals GND and A2.

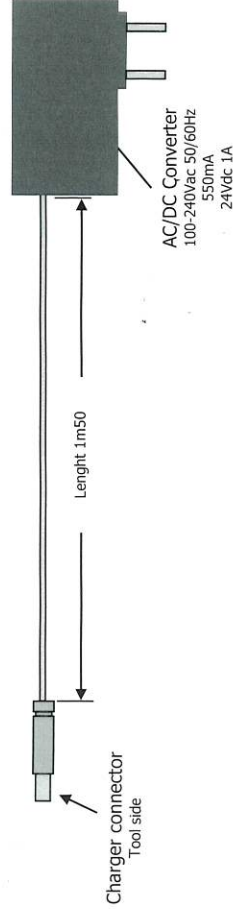
3.5 DESCRIPTION OF THE HARNESS.

3.5.1 Harness for connection to the loop

This harness allows the manual measurement with standard 2mm test probes and alligator clip with 2mm / 4mm test probes.



3.5.2 Charger 100-240VAC



DESCRIPTION OF THE FRONT FACE



4 NOTICE OF USE

4.1 CONNEXION OF THE EQUIPMENT

4.1.1 230VAC battery charger harness

The charger can be connected and disconnected without powering down the device. The tool can be used with or without the charger connected. There is no need to switch on the tool to charge the battery.

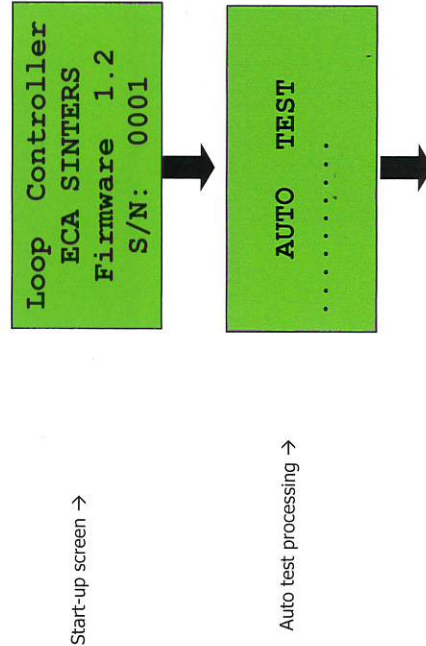
4.1.2 Terminals connexions to the loop

Connect terminal equipment, using harness provided with the loop, taking into account the **3.3 "Measure description"**. Use inscription in front panel to identify the terminals to be connected.

4.2 USE

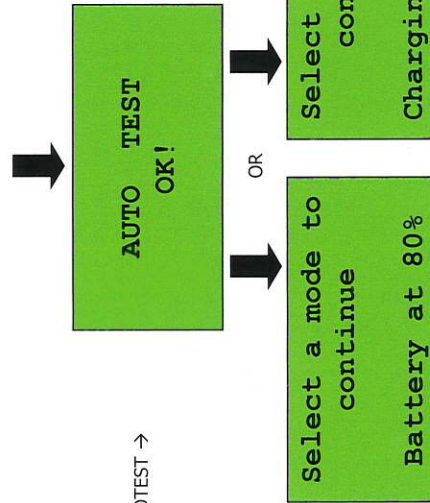
4.2.1 Power On and Auto test

- Press the ON / OFF push-button to power-on the device
- The start-up screen appears during 3sec and self-test starts:



- The Auto test checks the measurement module and the calibration of equipment. If the Auto test is not good, the tool displays the breakdown and gets stuck on this screen. It is not possible to use the equipment in case of Auto test fail.
- At the end of the Auto test, if it is good, a waiting screen is displayed for selecting the measure mode. The battery status or the indication of the presence of the charger appears on the button of screen.

Result of AUTOTEST →



Waiting screen →

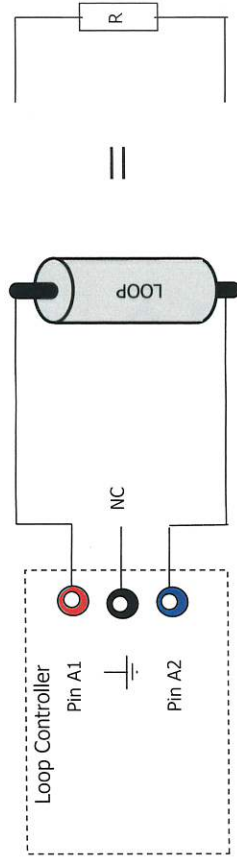
The tool is waiting for selection, the user choose one of the 3 possible measure mode :

- "CONTINUITY" mode,
- "INSULATION" mode,
- "INSULATION & CONTINUITY" mode.

4.2.2 "CONTINUITY" measurement mode

This mode allows measuring the core resistance of the loop and the associated aircraft wire resistance.

In this mode, the tool generates a DC current of 10mA between the pin A1 and A2.



To select this mode:

- Power On the tool (Cf. 4.2.1 Power On and Auto test)
- Wait for the message "Select a mode to continue"
- Push the "CONTINUITY" push-button
- The measure is done immediately and continuously

The displayed messages are:

Mode select→

Link checked →

Measurement result →

CONTINUITY
Link A1/A2

← Indication of the battery status

$$R = 75.12 \, \Omega$$

* CONTINUITY *

Q
Q
A
R

The resistance value between A1 and A2 is over 99Ω

* CONTINUITY *
Link A1/A2

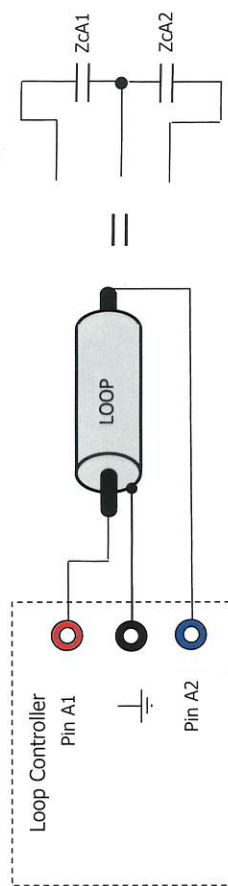
Q1V R

The resistance value between A1 and A2 is lower than 1Ω

Limits of measures: 1 to 99 Ohms with an accuracy of 1% of the full scale.

4.2.3 "INSULATION" measurement mode

This mode allows measuring the loop insulation resistance between the shield and each part of the core element.
 In this mode, the tool generates a sinusoidal signal of 1Vrms of 1 KHz (power limited to 1mW). The measure is done alternately between A1/GND and between A2/GND and the parallel capacitance is computed to be displayed in its equivalent impedance at 1 KHz.



To select this mode:

- Power On the tool (Cf.4.2.1 Power On and Auto test)
- Wait for the message "Select a mode to continue"
- Push the "INSULATION" push-button
- The measure is done immediately and continuously

The displayed messages are:

* **INSULATION** * 
Pins Ax/GND
ZC A1 = 15.6 KΩ
ZC A2 = 15.7 KΩ

Mode select →
 Link checked →
 Measurement result between A1 and GND →
 Measurement result between A2 and GND →

* **INSULATION** * 
Pins Ax/GND
ZC A1 < 1 KΩ
ZC A2 = 15.7 KΩ

The insulation value between A1 and GND is under 1K Ω (156nF)

Limits of measure: Zc = 1 KOhms (C~156nF) to 5 MOhms (C~31pF) with an accuracy of 5% in the full scale.

* **INSULATION** * 
Pins Ax/GND
ZC A1 = 15.6 KΩ
ZC A2 > 5 MΩ

The insulation value between A2 and GND is over 5M Ω (31pF)

4.2.4 "CONTINUITY AND INSULATION" measurement mode

This mode combines in a single display the two previous modes.
 To select this mode:

- Power-On the tool (Cf.4.2.1 Power On and Auto test)
- Wait for the message "Select a mode to continue"
- Push the "INSULATION & CONTINUITY" push-button
- The measure is done immediately and continuously

The displayed message is:

* **CONT. & INSUL.** * 
R = 75.12 Ω
ZC A1 = 15.6 KΩ
ZC A2 = 15.7 KΩ

Mode select →
 Resistance measurement result →
 Insulation measurement result between A1 and GND →
 Insulation measurement result between A2 and GND →

- If a measured value is out of range, the displayed messages are the same as those in the previously described menus (Cf. § 4.2.2 "CONTINUITY" measurement mode & 4.2.3 "INSULATION" measurement mode).

Limits of measures:

- **Continuity:** 1 to 99 Ohms with an accuracy of 1% of the full scale.
- **Insulation:** Zc = 1 KOhms (C~156nF) to 5 MOhms (C~31pF) with an accuracy of 5% in the full scale.

- Exit by pressing "Auto test" with update of the new value settings in the flash memory.

Progression →

Backup in progress
.....



Recall of new updated values →

Update successful!
Auto OFF: 10mn
Light OFF: 15s

- Exit by pressing "Continuity and Insulation" without saving the new value :

Recall of stored values →

No modification !
Auto OFF: 5mn
Light OFF: 15s

4.3 PRECAUTION OF USE

The unit contains a sealed battery with NiMH. It requires no special maintenance except to be fully charged before storage period.

The NiMH battery is not interchangeable with any other type of battery.

In case of destruction of this element, replace the defective battery by the same type of NiMH battery.

The device must be used exclusively with the supplied charger. Do not use a charger suitable for fear of damage to the device.

→ **In case of prolonged storage, fully charge the batteries every two months.**

The tool is designed to measure a loop with her aircraft wiring but the flight calculator must be disconnected. Be careful that no voltage is applied to the loop at the same time that the tool is connected.

→ **In case where the tool is connected on the powered loop (flight calculator connected) or if a voltage is applied on the tool's connectors, the internal electronics can be damaged.**

4.4 CLEANING OPERATIONS

The tool is IP54, ie tight spray. It can be cleaned with a damp cloth soaked in non-aggressive cleaner for plastics.

It should not be submerged and used in the rain. The humidity can affect the measurements.

4.5 PREVENTIVE MAINTENANCE OF THE TOOL

Maintenance operations are to be carried out periodically by the organism of maintenance of the equipment (Cf. 1 REFERENCES).

These operations consist of preventive maintenance to avoid failures due to normal aging equipment and the drift of some measurement chain. The list of maintenance operations with their periodicity is described in the table below.

List of maintenance operations to be performed by the manufacturer or organism of maintenance (Cf. 1 REFERENCES):

Operations	Periodicity
Verification of the batteries	1 year
Calibration of the 1Vrms 1KHz signal generation	1 year
Calibration of measurement chain	1 year