

Test report : L15-20056-T2

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LQF-510-02

EMC TEST REPORT

Project No.: L15-20056

Equipment under Test: Smart Water Flow Meter

Model/Type : EASY MAG SAMART 800-ELC
Serial Number : 359509211491
Rating : 100-240 VAC; 50-60 HZ
Battery: 3.6 VDC

Manufactured By: IFA SANAT GHARB Co.

Applicant: Pasargad Water and Energy Equipment Engineering Co.

Tested According To: OIML R 49-2:2013/ISO 4064-2:2013

Issue Date: 27-Dec-16

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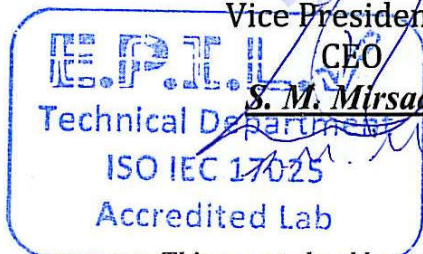
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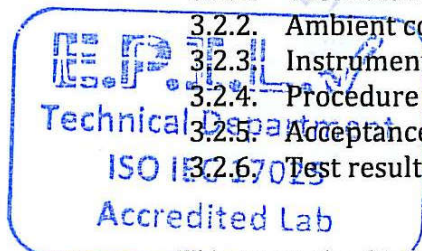
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1. GENERAL INFORMATION

1.1. Product Information

Equipment under test	: Smart Water Flow Meter
Manufacturer	: IFA SANAT GHARB Co.
Model	: EASY MAG SMART 800-ELC
S/N	: 359509211491
Rating(s)	: 100-240 VAC , 50-60 HZ Battery: 3.6 VDC



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2. SUMMARY

This section presents an overview of standards, results and functions which was checked for all tests. Refer to the next section for details of measured Test results and applied test levels.

2.1. Overview of Results

Immunity Tests	Basic Standards	Result
Electrostatic Discharge	IEC 61000-4-2:2008	PASS
Burst	IEC 61000-4-4:2012	PASS
Surge	IEC 61000-4-5:2014	PASS
RF Conducted Immunity	IEC 61000-4-6 :2013	PASS
Static Magnetic Field	OIML R 49-1:2013	PASS
Interruption in Battery Supply	OIML R 49-2:2013	PASS
Power Voltage Variations	OIML R 49-2:2013	PASS
Voltage Dips and Short Interruptions	IEC 61000-4-11:2009	PASS

2.2. Ports

Ports	Tested
Enclosure	Yes
AC Power Supply	Yes
DC Power Supply	N/A
Battery Powered	Yes
Interface Cable (between flow sensor and meter)	N/A
Interface Cable (between meter and valve)	N/A
Interface Cable (between meter and water pump)	N/A
Data Line	Yes

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2.3. Inspected Functions and Performances

- LCD
- Registers and settings
- Application of electrical valve when credit was expired
- The difference between the relative error of indication, obtained during The application of test and before the test at the same flow rate.
- Meter totalization changing by zero flow rate



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3. IMMUNITY TEST RESULTS

3.1. Electrostatic Discharge Immunity Test

Electrostatic discharges (ESD) are the result of persons or objects that accumulate static electricity due to for instance walking on synthetic carpets. The ESD can influence the operation of equipment or damage its electronics, either by a direct discharge or indirectly by coupling or radiation. Both effects are simulated during the tests.

3.1.1. Test data

Location : EPIL
Date : 25-Dec-2016
Engineer of EPIL : Mr. Ghaffari

3.1.2. Ambient conditions

Ambient temperature : 21 °C
Relative humidity : 32 %
Atmospheric pressure : 86.5 kPa

3.1.3. Instrument used for test

Equipment	Manufacturer	Model	S/N
ESD Generator	Schloeder	SESD 200	-----

3.1.4. Procedure of test

The test was carried out according to IEC 61000-4-2 under the following conditions:

- Tested as Floor-Standing equipment

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- The EUT was operated within the rated operating voltage range and normal working condition

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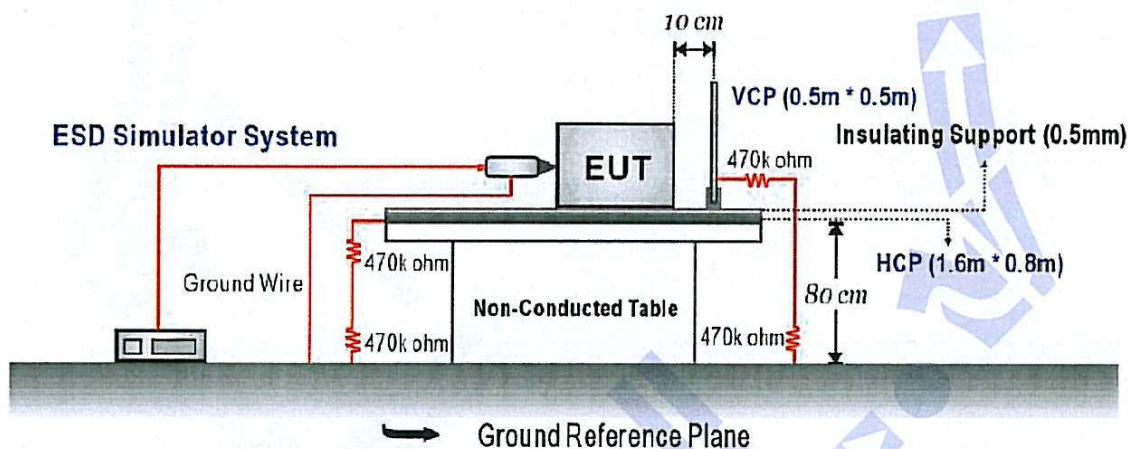


Figure 1: Test set-up for ESD immunity test

Performed test:

Basic Standard	: IEC 61000-4-2
Tested Ports	: Surface of the specimen
Air Discharges	: ± 8 kV
Contact Discharges	: ± 6 kV
Polarity	: Positive and negative
Number of application of the test voltage on each port	: Ten positive and ten negative
Interval between each discharges	: 10 Sec



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3.1.5. Acceptance conditions of test

- a) After the application of the disturbance, all the functions of the EUT shall operate as designed.
- b) The difference between the relative error (of indication), obtained during the application of the electrostatic discharges and that obtained before the test, at the same flow rate, under reference conditions, shall not exceed one-half of the maximum permissible error in the upper flow rate zone.
- c) For tests at zero flow rate, the water meter totalization shall not change by more than the value of the verification interval.

3.1.6. Test result

EUT Complied with the standard.



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3.1. Electrical Fast Transient Burst Immunity Test

This test simulates quick transient noise interferences mostly generated when switching inductive loads. Significant for this interference's is a very short rise time of the single pulses and the high repetition rate within burst packet.

3.1.1. Test data

Location : EPIL
Date : 25-Dec-2016
Engineer of EPIL : Mr. Ghaffari

3.1.2. Ambient conditions

Ambient Temperature : 21 °C
Relative Humidity : 32 %
Atmospheric Pressure : 86.5 kPa

3.1.3. Instrument used for test

Equipment	Manufacturer	Model	S/N
Burst Generator	Schloeder	SFT 400	403315

3.1.4. Procedure of test

Performed test:

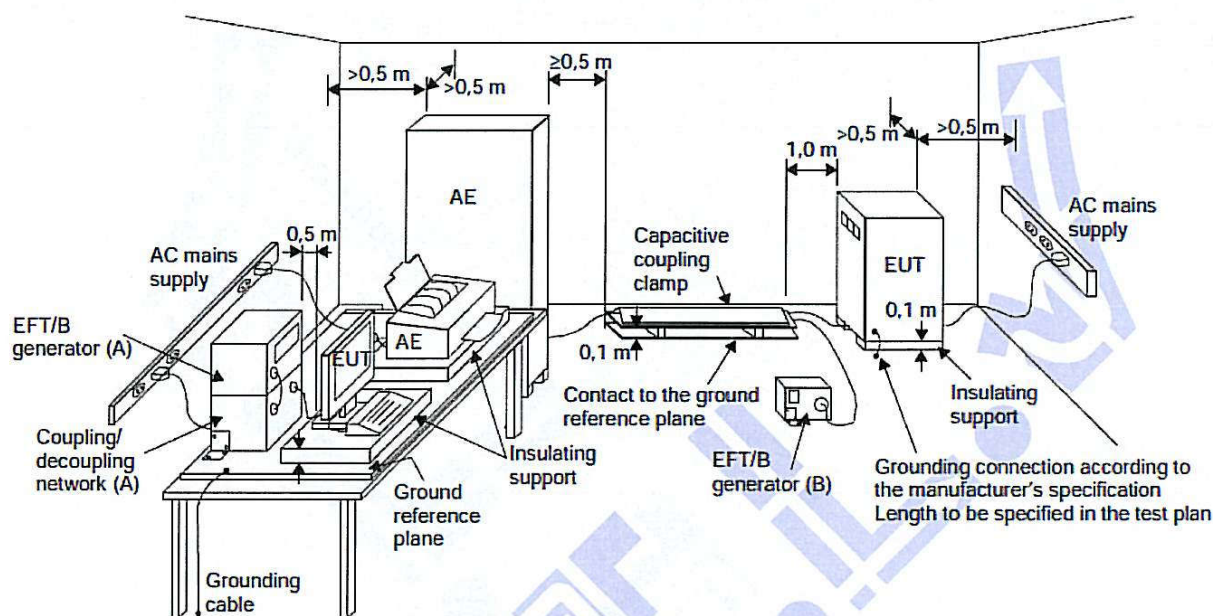
Basic Standard	IEC 61000-4-4
Peak Voltage	±2 kV; ±1 kV (Direct & Indirect)
Coupling Method	Direct, Indirect
Tested Ports	AC power supply, Interface
Repetition Rate	5 kHz
Coupling Lines	L; N; PE; L-N; L-PE; N-PE; L-N-PE, I/O interface cable (between flow sensor and meter)
Test Time	60 seconds

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IEC 645/12

- (A) location for supply line coupling
- (B) location for signal lines coupling

Figure 2: Example of a test setup for laboratory type test

3.1.5. Acceptance conditions of test

- a) After the application of the disturbance, all the functions of the EUT shall operate as designed;
- b) The difference between the relative error of indication, obtained during the application of the bursts and that obtained at the same flow rate before the test, under reference conditions, shall not exceed one-half of the maximum permissible error in the upper flow rate zone.

3.1.6. Test result

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EUT complied with the standard.

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3.2. Surge Immunity Test

This test simulates high-energy pulses on supply mains as if they appear for example after over-voltage events (e.g. lightning strikes). The pulse is a low transient with high-energy contents and due to its long duration may cause damage to an unprotected EUT.

3.2.1. Test data

Location : EPIL
Date : 25-Dec-2016
Engineer of EPIL : Mr. Ghaffari

3.2.2. Ambient conditions

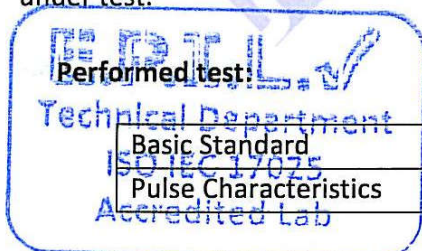
Ambient temperature : 21 °C
Relative humidity : 32 %
Atmospheric pressure : 86.5 kPa

3.2.3. Instrument used for test

Equipment	Manufacturer	Model	S/N
Surge Generator	Schloeder	CWG 500	312081

3.2.4. Procedure of test

The 1.2/50 us surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave may be applied on the lines under test.



Basic Standard	IEC 61000-4-5
Pulse Characteristics	1.2/50 µs

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Peak Voltage	1kV (Line to Line); 2kV (Line to Earth)
Tested Ports	AC Power Supply
Coupling Line	L-N; L-PE ;N-PE
Repetition Rate	60 Sec
Polarity	Positive and Negative
Phase Angles	0°, 90°, 180°, 270°
Number of Application of the Surge	3 times for each polarity

3.2.5. Acceptance conditions of test

- After the application of the disturbance, all the functions of the EUT shall operate as designed;
- The difference between the relative error of indication, obtained after the application of the surge transient voltages and that obtained at the same flow rate before the test, under reference conditions, shall not exceed one-half of the maximum permissible error in the upper flow rate zone.

3.2.6. Test result

EUT complied with the standard.



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3.3. Immunity to Conducted Disturbances, Induced by RF Fields

The object of this test is evaluating the functional immunity of electrical and electronic equipment when subjected to conducted disturbances induced by radio-frequency fields.

3.3.1. Test data

Location : EPIL
Date : 25-Dec-2016
Engineer of EPIL : Mr. Ghaffari

3.3.2. Ambient conditions

Ambient temperature : 21 °C
Relative humidity : 32 %
Atmospheric pressure : 86.5 kPa

3.3.3. Instrument used for test

Equipment	Manufacturer	Model
Signal Generator	R&S	SML-01
BCI	Com-Power	CLCI-100

3.3.4. Procedure of test

The test procedure was in accordance with EN 61000-4-6 as the following:

- The frequency range is swept from 150 kHz to 80 MHz, using the signal level of 10 V established during the setting process, and with the disturbance signal 80 % amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or to change coupling devices as necessary.
- Where the frequency is swept incrementally, the step size is 1 % of the preceding frequency value.
- The dwell time at each frequency was 0.5 sec.

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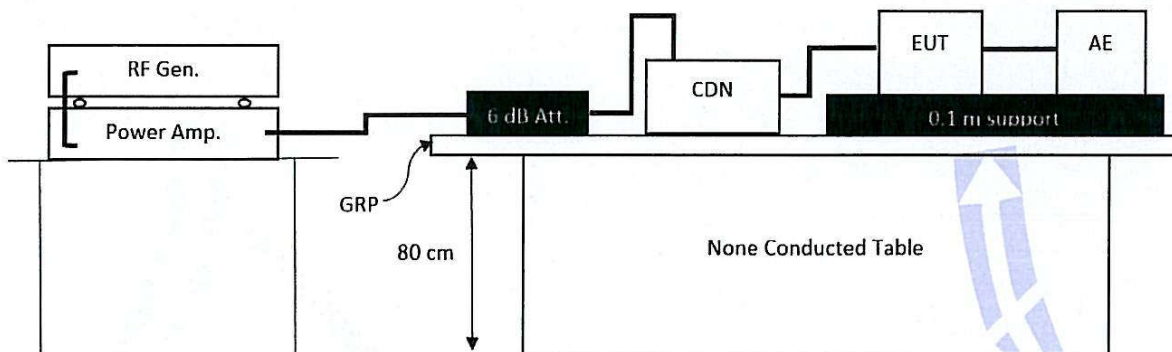


Figure 3: Schematic setup for immunity test used to RF conducted disturbances

3.3.5. Test result

EUT complied with the standard.



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3.4. Static Magnetic Field Test

All water meters where the mechanical components may be influenced by a static magnetic field (e.g. equipped with a magnetic coupling in the drive to the readout or with a magnet-driven pulse output) and all meters with electronic components shall be tested to show that they are able to withstand the influence of a static magnetic field.

3.4.1. Test data

Location : EPIL
Date : 25-Dec-2016
Engineer of EPIL : Mr. Ghaffari

3.4.2. Ambient conditions

Ambient Temperature : 21 °C
Relative Humidity : 32 %
Atmospheric Pressure : 86.5 kPa

3.4.3. Procedure of test

- a) The permanent magnet is placed in contact with the EUT at a position where the action of a static magnetic field is likely to cause errors (of indication) that exceed the MPE and alter the correct functioning of the EUT. The location of this position is derived by trial and error and by acknowledging the type and construction of the EUT, and/or previous experience. Different positions of the magnet may be investigated.
- b) When a test position is identified, the magnet is immobilized at that position and the error (of indication) of the EUT is measured at flow rate, Q_3 .
- c) When measuring the error (of indication), the installation and operational conditions specified in 7.4.2 shall be followed and the reference conditions shall be applied unless otherwise specified. Meters not marked "V" shall only be tested with the flow axis in horizontal orientation. Meters

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3.4.4. Acceptance conditions of test

During the application of the test conditions:

- a) all the functions of the EUT shall operate as designed;
- b) The relative error (of indication) of the EUT, at the test conditions, shall not exceed the maximum permissible error of the upper flow rate zone (see OIML R 49-1:2013, 4.2).

3.4.5. Test result

EUT complied with the test.



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3.5. Interruption in Battery Supply

To verify that a water meter complies with the requirements in OIML R 49-1:2013, 5.2.4.3, during replacement of the supply battery.

3.5.1. Test procedure

- a) Ensure that the meter is operational.
- b) Remove the battery for a period of 1 h and then reconnect it.
- c) Interrogate the functions of the meter.
- d) Complete the section reference OIML R 49-1:2013, 5.2.4 in OIML R 49-3:2013, 4.4.2.2.

3.5.2. Acceptance criteria

After the application of the test conditions:

- a) all the functions of the EUT shall operate as designed;
- b) The value of the totalization or the stored values shall remain unchanged.

3.5.3. Test result

EUT complied with the test.



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3.6. Power Voltage Variation

The object of the test is to verify that electronic devices which operate during static deviations of the AC (single-phase) mains power supply.

3.6.1. Test data

Location	: EPIL
Date	: 25-Dec-2016
Engineer of EPIL	: Mr. Ghaffari

3.6.2. Ambient conditions

Ambient Temperature	: 21 °C
Relative Humidity	: 27 %
Atmospheric Pressure	: 86.5 kPa

3.6.3. Procedure of test

- 1) Expose the EUT to power voltage variations, while the EUT is operating under reference conditions.
- 2) Measure the error (of indication) of the EUT during the application of the upper mains voltage limit $U_{nom} + 15\%$ (single voltage).
- 3) Measure the error (of indication) of the EUT during the application of the lower mains voltage limit $U_{nom} - 20\%$ (single voltage).
- 4) Check that EUT is functioning correctly during the application of each power supply variation.

3.6.4. Test result

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3.7. Voltage Dips and Short Interruptions Immunity Test

Electrical and electronic equipment may be affected by voltage dips, short interruptions or voltage variations of power supply. Voltage dips and short interruptions are caused by faults in the network, in installations or by a sudden large change of load. In certain cases, two or more consecutive dips or interruptions may occur. Voltage variations are caused by the continuously varying loads connected to the network.

3.7.1. Test data

Location : EPIL
Date : 25-Dec-2016
Engineer of EPIL : Mr. Ghaffari

3.7.2. Ambient conditions

Ambient Temperature : 21 °C
Relative Humidity : 32 %
Atmospheric Pressure : 86.5 kPa

3.7.3. Instrument used for test

Equipment	Manufacturer	Model	S/N
Voltage Dips & Short Interruption Simulator	Schloeder	VIS 700	403054

3.7.4. Procedure of test

Performed test:

Basic Standard : IEC 61000-4-11
Tested Ports : AC Power Supply
Voltage Dips : 0% (0.5 cycle), 0 % (1 cycle), 70% (25 Cycle)
Short Interruption : 0% of Rated Voltage (250 cycle)

3.7.5. Test result
EUT Complied with the standard.

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4. Figures



Figure 4: Test set-up for ESD test



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Figure 5: Burst test set-up

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Figure 6: EUT

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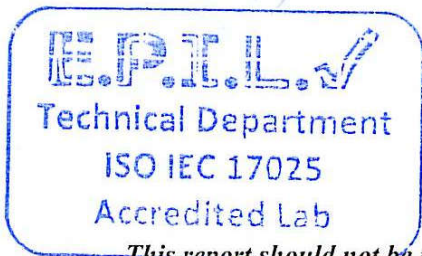
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Figure 7: Meter



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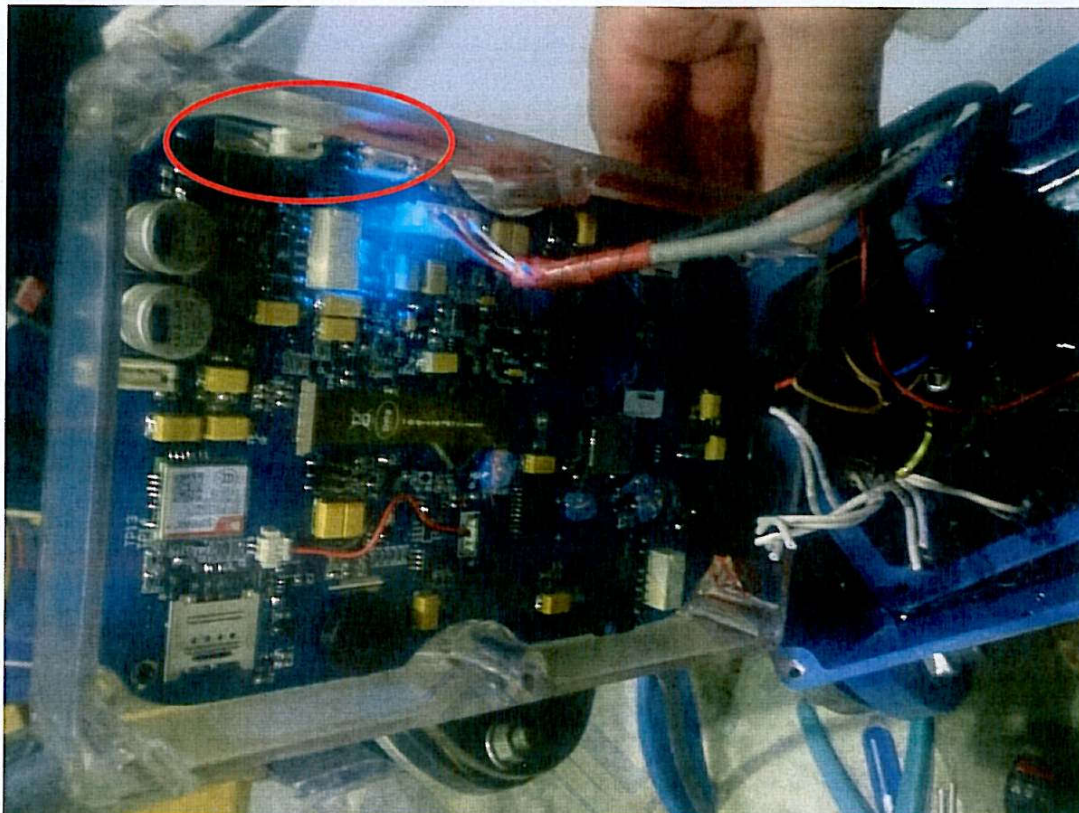


Figure 8: Battery disconnecting



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