Components

- All Error Codes*
- Head Unit
- Shaft
- Front [Wheel]
- Back [Wheel]
- Mid-section

Head Unit

- Throttle
    - Voltage
    - Resistance/continuity
- Ebrake and/or physical brake
    - Lever
    - Hose/Cable/Housing
    - Caliper/Drum
        - Mounting brackets/hardware
        - Pad/rotor
    - Voltage
    - Resistance/continuity
    - Sensors
- Dashboard
    - On button
        - How to test
        - How to take apart
    - Other board components?
- Flashlight
- Handlebars
- Grips

Shaft

- Folding Mechanism
- Battery and/or controller
- Bearings/turning mech.
    - Headset

Front [Wheel]

- Motor
- Fork
    - Suspension
    - Disc Brake/Drum Brake
- Plastic Covers?

Back [Wheel]

- Motor
- Disc brake
- Back fender
- Suspension
- Taillight

Mid-Section

- Battery
- Controller
- Speaker
- Lights
- Connectors
- Wiring components
    - Connectors
    - Harness
    - Wires

Component Systems

- Brakes
    - Ebrake
        - Ebrake actuator>Cotnroller>motor
        - Actuator>Head unit>Controller>Motor
    - Mechanical brake (hydraulic or cable actuated)
        - Sensors
        - Lever>housing/hose>caliper
- Motor
    - Motor>Phase wires>controller>battery
    - Motor>hall sensors>controller>battery
- Light/turn signal
    - Light>controller>bat
    - Turn signal switch>Controller>turn signal
- Controller
    - Bat>controller>all electrical components
    - Controller
        - Mossfets
        - Capacitors
        - Sensors
        -
- Battery
    - Bat>controller

    - Charging port>BMS>battery
- Charging
    - Wall outlet>Charger>Charging port>Battery>Battery
- Display
    - Display>Wiring harness>controller
- Trigger/Throttles
    - Throttle>cont
    - Throttle>head unit>controller
- Rear Suspension
    - Wheel>swingarm>shock>deck
    - Pivots
        - Bushings, bolts, bearings
    - Shock
        - Spring
        - Damper
        - Attachments
            - Attachment>swingarm
            - Attachment>deck
    - Other Linkage
    - Bolts
- Front Susp.
    - Wheel>Fork>Headset>Deck>Steering Column
- Tire
    - Rim>Tube>Tire
    - Rim>Tube>Sealant>Tire

Brakes

- Hand brake
- Brake line/Brake hose
- Brake Caliper
- Brake Pads

Motor

- Coil
- Sensors
- Phase wires
- Signal Wires

Lights

Controller

Battery

Components

- All Error Codes*
- Head Unit
- Shaft
- Front [Wheel]
- Back [Wheel]
- Mid-section

Head Unit

- Throttle
    - Voltage
    - Resistance/continuity
- Ebrake and/or physical brake
    - Lever
    - Hose/Cable/Housing
    - Caliper/Drum
        - Mounting brackets/hardware
        - Pad/rotor
    - Voltage
    - Resistance/continuity
    - Sensors
- Dashboard
    - On button
        - How to test
        - How to take apart
    - Other board components?
- Flashlight
- Handlebars
- Grips

Shaft

- Folding Mechanism
- Battery and/or controller
- Bearings/turning mech.
    - Headset

Front [Wheel]

- Motor
- Fork
    - Suspension
    - Disc Brake/Drum Brake

- Plastic Covers?

Back [Wheel]
- Motor
- Disc brake
- Back fender
- Suspension
- Taillight

Mid-Section
- Battery
- Controller
- Speaker
- Lights
- Connectors
- Wiring components
    - Connectors
    - Harness
    - Wires

Component Systems

- Brakes
    - Ebrake
        - Ebrake actuator>Cotnroller>motor
        - Actuator>Head unit>Controller>Motor
    - Mechanical brake (hydraulic or cable actuated)
        - Sensors
        - Lever>housing/hose>caliper
- Motor
    - Motor>Phase wires>controller>battery
    - Motor>hall sensors>controller>battery
- Light/turn signal
    - Light>controller>bat
    - Turn signal switch>Controller>turn signal
- Controller
    - Bat>controller>all electrical components
    - Controller
        - Mossfets
        - Capacitors
        - Sensors

        - ■
- Battery
    - Bat>controller
    - Charging port>BMS>battery
- Charging
    - Wall outlet>Charger>Charging port>Battery>Battery
- Display
    - Display>Wiring harness>controller
- Trigger/Throttles
    - Throttle>cont
    - Throttle>head unit>controller
- Rear Suspension
    - Wheel>swingarm>shock>deck
    - Pivots
        - Bushings, bolts, bearings
    - Shock
        - Spring
        - Damper
        - Attachments
            - Attachment>swingarm
            - Attachment>deck
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    - Bolts
- Front Susp.
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    - Rim>Tube>Sealant>Tire

Brakes

- Hand brake
- Brake line/Brake hose
- Brake Caliper
- Brake Pads

Motor

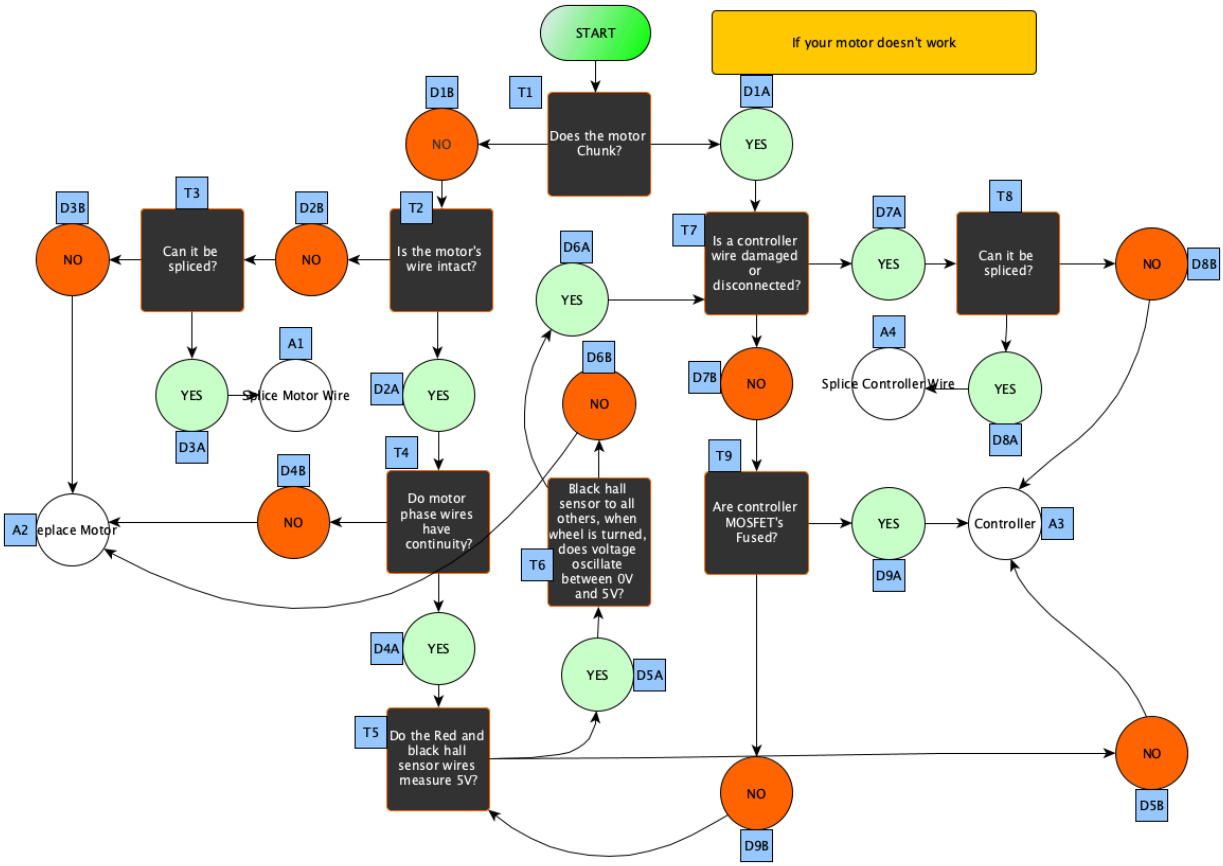
- Coil
- Sensors
- Phase wires
- Signal Wires

Lights

Controller

Battery

W



Intro - Motor No Work

This flowchart is to be used when an electric scooter's motor is not working properly. This is assuming that the scooter turns on and the throttle does not have any problems.

See "Definitions for d

Test 1 - Does the Motor Chunk?

1. Turn your scooter on
2. Attempt to use the throttle to rotate the wheel (don't forget some scooters are kick to start)
    a. Circle One: Chunk or Step or Spin
3. Use your hand to rotate the wheel
    a. Circle One: Chunk or Step or Spin
4. If 2 or 3 are "Chunk" or "Step", Circle "D1A" in the flowchart and move to T7. If both have "Spin", circle "D1B" in the flowchart and go to T2.
    a. Technically D1B and D1A are "together"

When the motor does not work it will either "chunk" when the throttle is pressed, "chunk" when the wheel is rotated, or just not move at all.

"Chunk" or "step", in this case, means that there is resistance or force when attempting to move the wheel. This is not yet measured electrically but by feel. It will sound sort of rough, like something hard is knocking something else. It will go back and forth between feeling like something is stopping you from pushing and easily moving.

→Because the electricity is not being applied at the right time, the two parts of the motor do not properly communicate and the result is lack of a smooth turning motor.

TIM COMMENT:

- **CHUNK = The partial failure of the controller to commutate (rotate) a motor [when activated electrically] (with throttle). Sounds like "chunking".**
    - **Mosfet, hall effect, even phase short**
- **STEPPING = Rotational stepped resistance while PEV is turned off (when you try to turn it manually, by hand)**
    - **When stepping happens ALWAYS because of an electrical short. One of the 3 phase wires is connected with one of the others (shoudn't be) phase wire rubbed through and bare metal touching each other. Can happen in controller, motor, or motor wire. Usually in controller or the wire.**

Test 2 - Is the Motor's wire intact?

1. Take off any caps or parts necessary in order to have as much of the motor's wire exposed as possible.
2. Beginning at the axle, slowly inspect the wire for any tears, extreme bending, burning, or broken wires of any kind.
    a. Result:_____
3. If no damage is seen and the wire is intact, circle D2A and go to T4. If there is damage of any kind, circle D2B and go to T3.

Test 3 - Can It Be Spliced?

In order to determine whether or not a motor wire can be spliced there are a few things to take into account.

1. Is the wire's breakage so close to the axle that the wires can't be spliced or butt connectors won't fit?
    a. Circle: Yes or No
2. Will the splicing shorten the wire to a point where the handlebars can't be turned?
    a. Circle: Yes or No
3. If the above question was circled "yes", is there another place to route the wire through, even by drilling?
    a. Circle: Yes or No
4. The below is referring to the 3 tests conducted in the previous steps
    a. If 1 and 2 are "No", circle D3A and continue to A1.
    b. If 1 is "No" but 2 and 3 are "Yes", circle D3A and continue to A1.
    c. If it is not possible to splice the motor wire, circle D3B and continue to A2

Test 4 - Do Motor Phase Wires Have Continuity?

If a motor does not "Chunk" or "Step" and its motor wire is intact, these are the steps that should be followed in order to electrically test the wires themselves for continuity.

1. Unplug the battery from the scooter's controller.
2. Press the dashboard button to discharge any capacitors.
3. Unplug motor connections from the controller. (Generally 3 phase wires and a clip for the sensor wires)
4. Set your multimeter to the Continuity ('Ω') setting.
    a. *Note: In the case of continuity, the direction of electrical flow is bi-directional meaning that the red and black probe can be swapped and will still give the same result.*
5. Place the red probe on the yellow wire's metal terminal and the black probe on the green wire's metal terminal. Hold the probes in this position for 10 seconds. You should hear a beep sound and final measurement should be 0.1-0.5Ω.
    a. Is there a "beep" sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω
6. Keeping the red probe on the yellow wire, place the black probe on the blue wire. Hold the probes in this position for 10 seconds.
    a. Is there a "beep" sound? Circle: Yes or No

    b. What was the final measurement? Result:____Ω
7. Take the red probe off of the yellow wire and place it on the blue wire. Take the black probe and place it on the green wire. Hold the probes in this position for 10 seconds.
    a. Is there a “beep” sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω
8. Summary:
    a. Yellow+Green:____Ω
    b. Yellow+Blue:____Ω
    c. Blue+Green:____Ω
    d. Technician Interpretation:

9. If the results in the summary are all the same and have continuity, circle D4A and continue to T5. If the results in the summary are not all the same and one does not have continuity, circle D4B and continue to A2.

Test 5 - Do the Hall Sensors Measure 5V?

1. Make sure the scooter’s battery, motor phase wires, and hall sensor wires are plugged into the controller.
2. Turn the scooter on.
3. Set your multimeter to DC Voltage.
4. Through the back of the motor-side hall sensor connector, place the red probe inside so it is touching the red terminal. Place the black probe on the black terminal. If there is nothing, skip step 5.
    a. Result:____V
5. If the result is 5V, then circle D5A and continue to T6.
6. If the result is less than 5V, or nothing, circle D5B and continue to A3.

Test 6 - Does Hall Sensor Voltage Oscillate?

1. Make sure the scooter’s battery, motor phase wires, and hall sensor wires are plugged into the controller.
2. Turn the scooter on.
3. Set your multimeter to DC Voltage.
4. Through the back of the motor-side hall sensor connector, place the black probe inside so it is touching the black terminal.
    a. [INSERT PHOTO HERE]
5. Through the back of the motor-side hall sensor connector, place the red terminal into the yellow phase. Does the voltage oscillate between 0V and 5V?
    a. Circle: Yes or No

6. Repeat step 5, but with the red probe on the green wire. Does the voltage oscillate between 0V and 5V?
    a. Circle: Yes or No
7. Repeat step 5, but with the red probe on the blue wire. Does the voltage oscillate between 0V and 5V?
    a. Circle: Yes or No
8. Were the results of 5, 6, and 7 all “Yes”?
    a. Circle: Yes or No
9. If 8 is “Yes”, circle D6A and continue to T7. If 8 is “No”, circle D6B and continue to A2.

Test 7 - Is a Controller Wire Damaged or Disconnected?

Do a physical check of the controller. Do any wires seem to be burned? Are any wires loose inside the connectors? Are any wires frayed? When controller connectors are plugged into subsequent scooter connectors, are any wires loose?

If the answer to all of these questions is “No”, then the apparent physical state of the controller does not seem to be an issue. Circle D7B and continue to T9.

If the answer to any of these questions is “Yes”, then the apparent physical state of the controller does seem to be an issue. Circle D7A and continue to T8.

Test 8 - Can The Controller Wire be Fixed?

Determining whether or not a controller wire can be fixed will be very similar to T3, or determining if a motor’s wire can be fixed.

If a wire can [easily] be spliced, soldered, secured, or otherwise, then circle D8A and continue to A4.

If a wire cannot [easily] be spliced, soldered, secured, or otherwise, then circle D8B and continue to A3.

Test 9 - Are Controller MOSFETs Fused?

1. Unplug the battery from the controller
2. Press the scooter’s “On” button. This will discharge the controller’s capacitors and allow for accurate test results.
3. Unplug all wires from the controller so it is able to be moved freely.
4. Turn on your multimeter and set it to the Continuity (‘Ω’) setting.
5. Place the black multimeter probe into the black controller-side battery connector.
    a. [Insert Photo]
6. Place the red probe onto the yellow controller-side phase wire. Hold the probes in this position for 10 seconds.
    a. Is there a “beep” sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω

7. Next, place the red probe on the green phase wire. Hold the probes in this position for 10 seconds.
    a. Is there a “beep” sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω
8. Finally, place the red probe on the blue phase wire. Hold the probes in this position for 10 seconds.
    a. Is there a “beep” sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω
9. If 6, 7, and 8 are all “No”, circle D9B and continue to T5. If 6, 7, and 8 contain even one “Yes”, circle D9A and continue to A3.

Examples

Test 2

- [This is what an intact vs non-intact motor wire looks like]

Test 5

- [Step #4: this is the position the probes should be in]

Test 6

- [show with arrows the oscillation and results that should be found]

Test 9

- [show an example]

Analysis

Test 4

- In depth, what does it mean when there is no continuity between the motor phase wires.
- If there is no continuity, this means that the coils in the motor are broken and it will need to be replaced. Because the connections have broken they do not transmit electricity resulting in a lack of continuity. If you get no continuity, open up the motor as it can most likely be fixed.

Test 5

- If the black and red hall sensors do not measure 5V, this is an indication that the controller is not outputting the correct voltage. This could mean that the controller’s DC/DC buck convertor is not working, meaning the hall effect sensors do not re. are not___, or maybe that____. Both of these things can be caused by___. No matter, the controller will need to be replaced.
    - Dcdc takes high voltage from battery and coverts it to low voltage for all of the electronics; lighting, hall effect, display, throttle. If not getting 5v, converter isn’t working. Stop working= usually a mosfet that burn, fuse, or break.

Test 6

- In depth, what does it mean when the voltage of the hall sensor wires does not oscillate?
- Beginning of an example:

- “This indicates a hall sensor in the motor is burned out and is not able to regulate electricity as it should.
-

Test 9

- The cause of a fused MOSFET is usually due to overheating, caused by too much current going through it, usually happening when you are at full throttle or you have all lights on. Essentially “tripping a breaker” or overworked. When a controller MOSFET fuses, this causes the controller to stop working, as it no longer commutates the motor. and in turn the scooter is not able to run.

Reasoning

Answer 1

1. From D3A
    - The motor does not chunk and a wire is not intact, this is the cause of the issue. The wire(s) can either be spliced and reconnected or soldered back together.

Answer 2

1. From D3B
    - The motor does not chunk and the motor’s cable is not intact and is unable to be repaired, unfortunately the only possibility is to replace the whole motor assembly.
2. From D4B
    - The motor does not chunk and the wire is intact, although there is no continuity between the motor phases. In this case the motor assembly must be replaced.
3. From D6B
    - Although the phase wires do have continuity, and the hall sensor wires measure 5v, when the motor is turned the voltage does not oscillate as it should. In this case the motor assembly (or hall sensor) must be replaced.
        i. One or more Hall sensors are bad and the motor needs to be replaced.

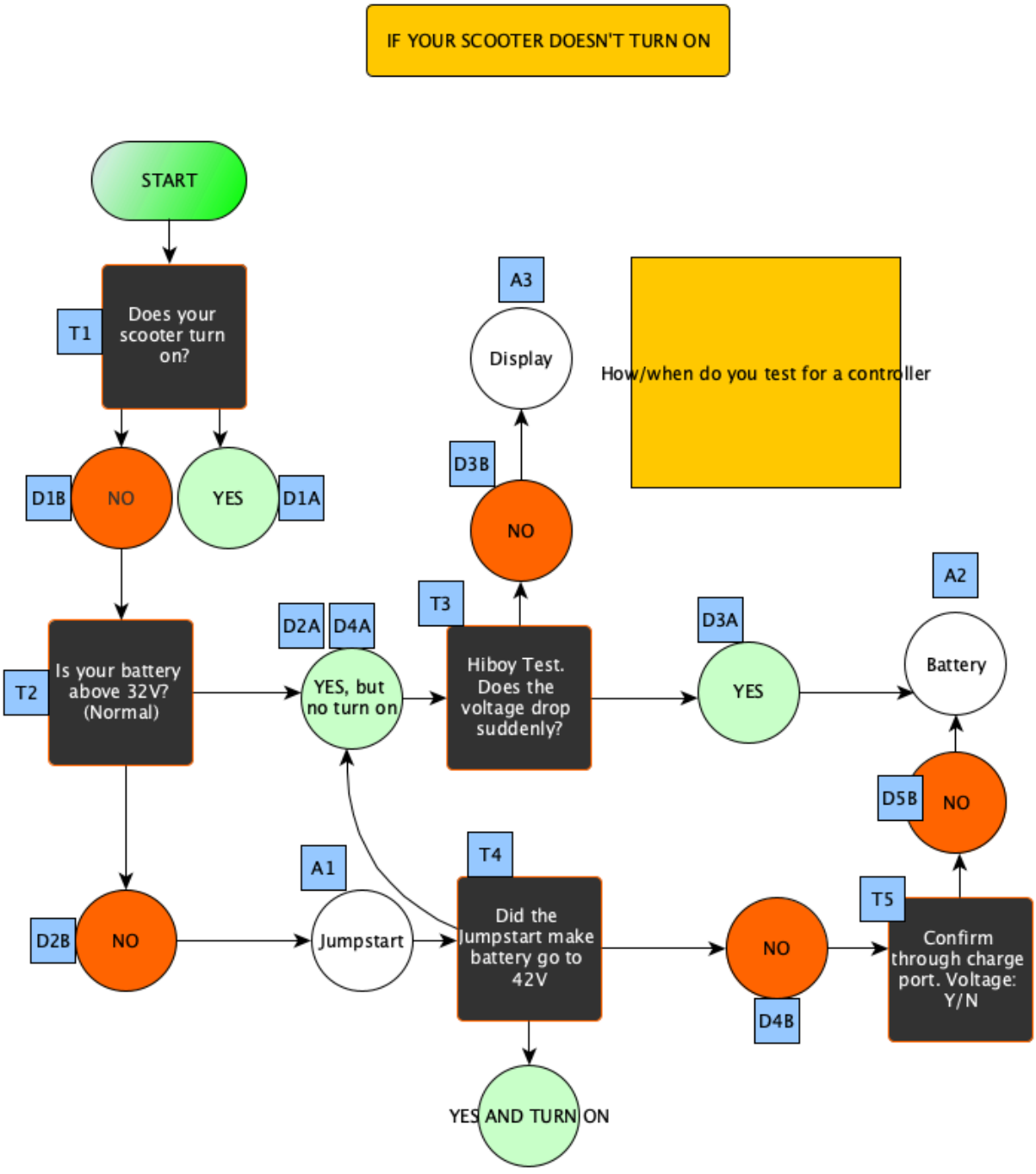
Answer 3

1. From D5B
    - Although the motor wires are intact and the phase wires have continuity, the hall sensor wires do not have 5v going to them, which does not allow the correct power to the motor. In this case, the controller is the issue and must be replaced. [I do not believe that it would be due to a loose wire, ie this test determines that the DC/DC buck converter in the controller is [burnt out].
2. From D8B
    - After determining that the motor is/is not an issue, and that there is indeed an issue with the controller, it is easily able to be seen on the exterior that there is a physical issue with the controller. This issue with the controller may be a burnt wire, loose connection, or something else. If it can not be fixed then you must replace the controller.
3. From D9A

- After ruling out the motor, we have determined that the controller MOSFETs are fused which causes the controller not to output electricity correctly and that the controller should be replaced.

Answer 4

1. From D8A
    - After determining that the motor is not an issue, and that there is indeed an issue with the controller, it is easily able to be seen on the exterior that there is a physical issue with the controller. This issue with the controller may be a burnt wire, loose connection, or something else. If it can be fixed then you are able to repair the controller.



Intro - No Turn On

This test is to be used when the scooter does not turn on, or flashes on then off, when the “On” button is pressed.

Test 1 - Does Your Scooter Turn On?
Press the “On” button on the scooter’s dashboard, hold it down if needed.

If the scooter does not turn on, or if the dashboard comes on and then off almost immediately, circle D1B and continue to T2.

If the scooter does turn on, this flowchart does not need to be used.

Test 2 - Does Your Scooter Have a Fuse?
[IT’S VERY POSSIBLE THAT, EVEN IF THE SCOOTER HAS A FUSE AND THE FUSE IS OUT, THAT THIS WOULD NOT IMPACT THE SCOOTER TURNING ON]

Test 3 - Is The Fuse Good?
[SEE ABOVE]

Test 2 - Is Your Battery Healthy (Normal)?
A healthy battery is somewhat subjective although can be determined based on a few different factors. The Voltage at which a battery is considered “Unhealthy” is different for each battery voltage. For a 36V battery, the Voltage should be at least 30-42V.

1. Unplug the battery from the controller
2. Turn on your multimeter to the DC Voltage setting
3. Touch the red multimeter probe into the red battery-side connector. Plug the black probe into the black battery-side connector. BE VERY CAREFUL TO NOT LET THE PROBES TOUCH WHEN INSIDE OF THE BATTERY CONNECTOR
    a. Result:____V
4. If over 30V, skip 5 Circle D2A and continue to T3.
5. If under 30V, circle D2B and continue to A1

Test 3 - Hiboy Test. Does the voltage Drop Suddenly?

1. Plug the battery-side connector back into the controller.
2. Through the back of the controller-side battery connector, place the red probe on the red terminal and the black probe on the black terminal. Ensure that the probes are actually touching.
    a. Result:____V
3. With the probes still in the controller-side battery connector, press the scooter’s “On” button. Wait a few seconds and then note the result.
    a. Result:____V
4. If the Voltage in 3 is above 10V, skip to step 6.
5. If the voltage drops sharply, or if the voltage in step 2 is below 10V, circle D3A and go to A2.

6. If the voltage does not drop sharply, or if the voltage in 8 is above 10V, circle D3B and continue to A3.
7. Suggestion tim
8. FROM D3A, INSTEAD DO controller side-Battery resistance,
    a. Discharge the capacitors
    b. Double check by testing voltage between controller-side battery connector. Should be 0 volts.
    c. Switch meter to resistance.
    d. While measuring, turn the scooter on.
    e. Beep=continuity, low resistance→replace controller
    f. No beep= high resistance, no continuity→ jumpstart/replace battery
        i. If resistance is very high, in KOhms, then that's good. If short circuit, that's bad.]
        ii. In beep mode, there is continuity (<10ohms).
    g.

WITH LOW voltage output, testing DC/DC converter, usually installed in a controller. Replace whole thing because you cannot replace them separately.

Test 4 - Did the Jumpstart Work?
If the jumpstart did not work, one of two things will happen:

The battery will charge to 42V although the scooter will still not turn on (may or may not draw normal amount of Ah) **or**

The battery will not sustain charge (voltage) within the first few minutes of attempting to Jumpstart.

If the jumpstart does work, the battery should sustain a charge throughout the jumpstart process. If this is the case, note the result, circle D4A, and continue to Test 3.

If the jumpstart **did not** work, circle D4B and continue to T5.

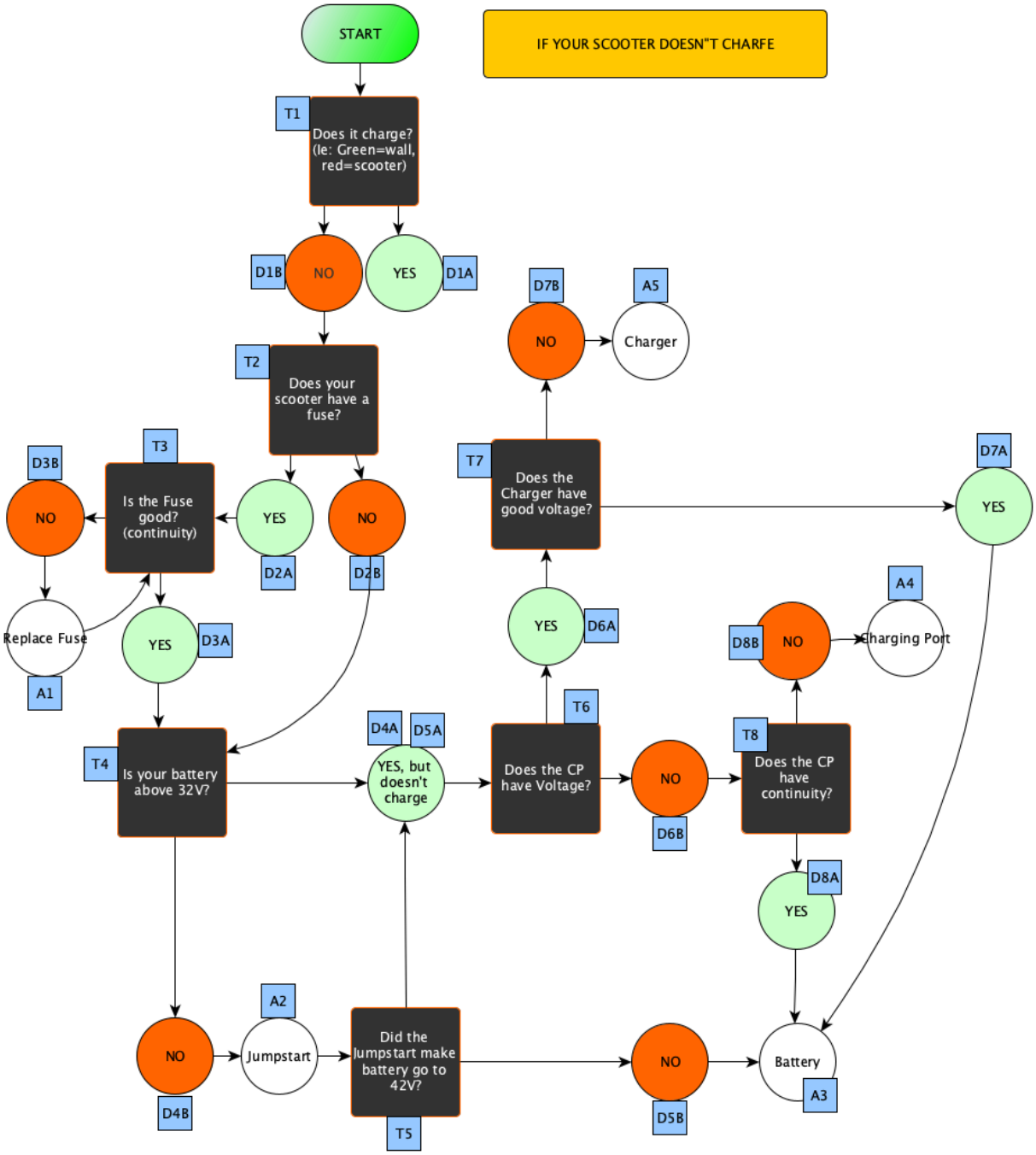
Test 5 - Confirm Through Charge Port Voltage?
[These are the steps to test voltage through a charging port]

If no voltage, circle D5B and continue to A2.

What happens if there is voltage?

6 (mosfets) (Actually, probably A4, but maybe go to T6 in order to "be sure")

[Keep in mind: does the absence of a sharp voltage drop in the hiboy test mean that a jumpstart would not do anything?
Are there any cases where a jumpstart would do anything if there is no voltage drop? In other words: does the result of [this test] mean that you can bypass the Jumpstart?



Intro - No Charge

This troubleshooting guide is to be used when a scooter does not charge. The scooter is (or was) able to be turned on. When the charger is plugged into the wall, the LED is green. When plugged into the scooter, it should change to a different color (usually red) indicating that the scooter is charging. The scooter is not charging if the indicator light does not change/stays green.

Test 1 - Does it Charge?

1. Plug the charger into the wall. Note the color of the LED light on the charger
    a. Charger light color: _____
2. With the charger still plugged into the wall, plug the other end into the scooter. Note the color, as it should have changed.
    a. Charger light color: _____
3. If the charger light does **NOT** change, circle D1B and continue to T2. If

Test 2 - Does Your Scooter Have a Fuse?

Checking your scooter's battery for a fuse is easy.

1. Gain access to the battery
2. Inspect the wires that connect from the battery to the controller. Look for a small plastic "box"that is able to open, in the middle of one of the wires.
3. If there is a box, circle D2A and continue to T3. If there is no box, circle D2B and continue to T4.

Test 3 - Is the Fuse Good?

A fuse is used to allow up to a specified amount of current to flow before the fuse breaks, cutting off any electricity. Essentially it is placed in between parts to protect said part against any surges. Testing a fuse will allow you to determine whether or not it should be replaced. Note: if your scooter does not have a fuse, move to T4.

1. Gain access to the fuse by opening carefully opening the [container/box]. Note: you may have to use an object other than your fingers to open the clip.
2. Remove the fuse. Depending on the type, you may need to use a pair of needle nose pliers to remove the fuse.
3. Once the fuse is removed, take out your multimeter and set it to the Continuity ('Ω') setting.
4. Identify the type of fuse you have see [below] for types of fuses.
5. Place your red probe on one terminal of the fuse and your black probe on the other terminal
    a. Exmaple one (inline fuse)
    b. Example two (cartridge fuse)
6. Is there a "beep" sound? Circle: Yes or No
    a. What was the final measurement? Result:____Ω
7. In step 6:
    a. If you circled "Yes", circle D3A and continue to T4
    b. If you circled "No", circle D3B and continue to A1.

Test 4 - Is your Battery healthy?

A healthy battery is somewhat subjective although can be determined based on a few different factors. The Voltage at which a battery is considered “Unhealthy” is different for each battery voltage. For a 42V battery, the Voltage should be at least 30-42V.

1. Unplug the battery from the controller
2. Turn on your multimeter to the DC Voltage setting
3. Touch the red multimeter probe into the red battery-side connector. Plug the black probe into the black battery-side connector. BE VERY CAREFUL TO NOT LET THE PROBES TOUCH WHEN INSIDE OF THE BATTERY CONNECTOR
    a. Result:____V
4. If over 30V, circle D4A and continue to T6
5. If under 30V, circle D4B and continue to A2

Test 5 - Did the Jumpstart Work?

If the jumpstart did not work, one of two things will happen:

The battery will charge to 42V although the scooter will still not turn on (may or may not draw normal amount of Ah) **or**

The battery will not sustain charge (voltage) within the first few minutes of attempting to Jumpstart.

If the jumpstart **does work**, the battery should sustain a charge throughout the jumpstart process. If this is the case, note the result, circle D5A, and continue to T6.

Result:_____V

If the jumpstart **did not work**, circle D5B and continue to A3.

Test 6 - Does The Charging Port Have Voltage?

1. [This is how you test the charging port for voltage]
2. Also how you test
3. Set your multimeter to the DC Voltage setting.
4. Then____
5. Measure the voltage:
    a. Result:_____V
6. If the voltage in step 5 is [xV, then the port has voltage]. Circle D6A and continue to T7.
7. If the voltage in step 5 is [0V, then the port does not have voltage]. Circle D6B and continue to T8.

Test 7 - Does The Charger Have Voltage?

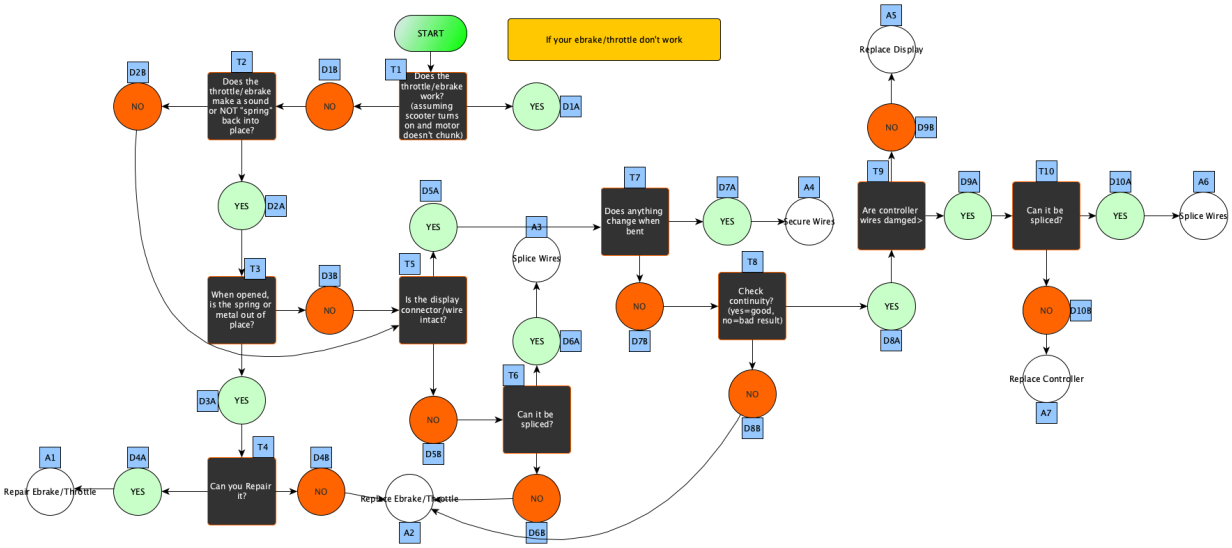
When your scooter won't charge, there is a very small possibility that the charger is the culprit. If this is the case and your scooter will not charge, use this to determine whether or not the charger should be replaced.

1. [this is how you test if the charger has voltage]
2. Measure the Voltage:
    a. Result:_____V
3. Compare the result in step [x] to the charger's advertised voltage. Is the measured voltage at or below the advertised?
    a. Circle one: At or Below
4. If you circled "At", circle D7A and continue to A3. If you circled "Below", circle D7B and continue to A5.

Test 8 - Does the Charging Port Have Continuity?

To determine whether or not a CP has continuity is important.

1. [this is how you test]
2. Set your multimeter to the Continuity ('Ω') setting.
3. Djdfkj
4. Is there a "beep" sound? Circle: Yes or No
    a. What was the final measurement? Result:____Ω
5. In step [4], if you circled "Yes", circle D8A and continue to A3. If you circled "No", circle D8B and continue to A4.



Intro - Throttle No Work

Throttle

https://www.electricscooterparts.com/throttletestingguide.html

Definitions

Tests

Known by T1, T2, T3, really Tx, is the numbering system for each “Test” or “Troubleshooting”. Each test has a Decision (DxA, or DxB) that must be made based on the results of the test. Each decision will lead to an Answer (Ax), or another Test (Tx)

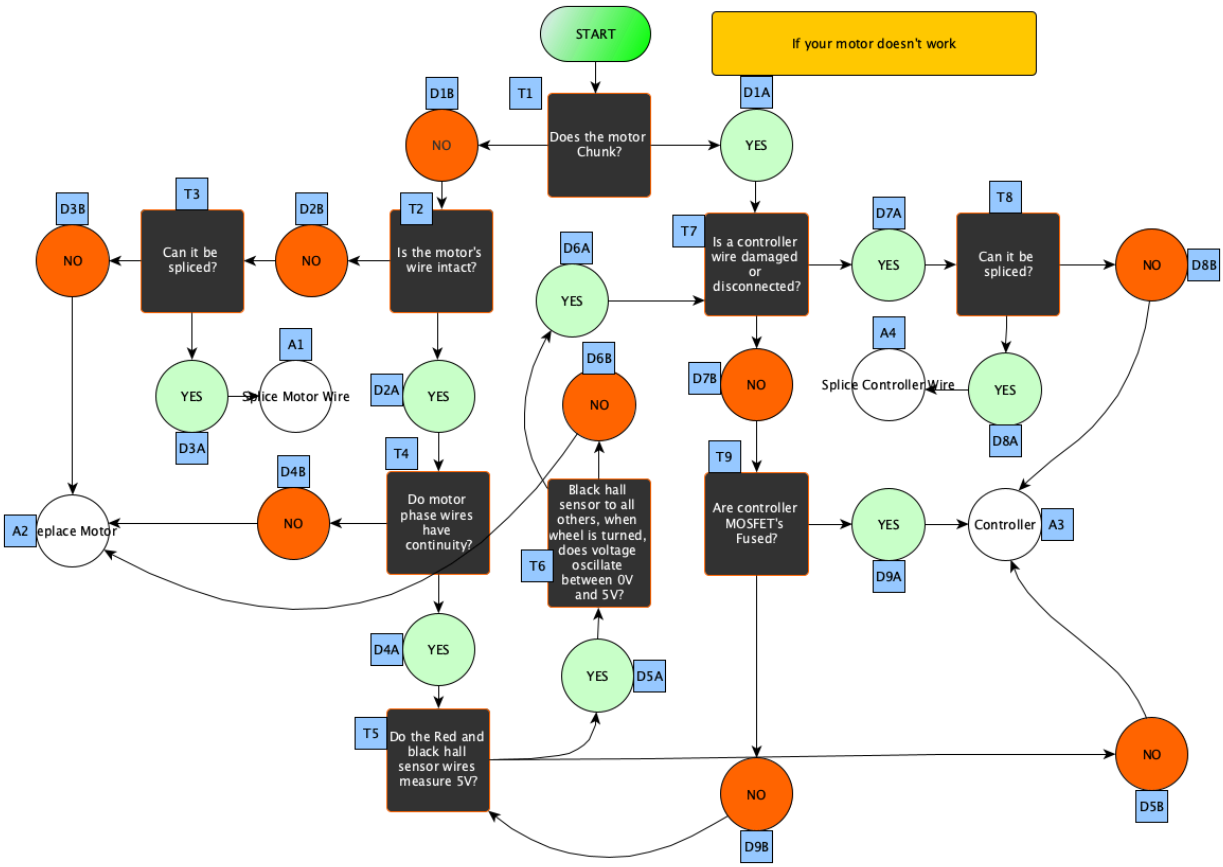
Decisions

Known by D1A, D1B, D2A, really Dxy, is the numbering system for each decision that must be made. A decision must be made after the results of a test are known. The ‘x’ represents the order in which the decisions are made and is represented with ascending numbers. The ‘y’ represents the specific decision being made, either ‘A’ or ‘B’. ‘A’ is a “Yes” decision. ‘B’ is a “No” decision. So, if you see D5B, you know that you are coming from the 5th test, the results of which were “No”. Note: a Yes or No is taken in context of the test and does not necessarily dictate a good or bad.

Answers

Known by A1, A2, A3, and A4, this is a numbering system for the Answers that may result from a Decision. They will always represent a type of repair and/or part.

w


START
If your motor doesn't work
T1
Does the motor Chunk?
D1A
YES
D1B
NO
T2
Is the motor's wire intact?
D2B
NO
T3
Can it be spliced?
D3B
NO
D3A
YES
A1
Splice Motor Wire
D2A
YES
T4
Do motor phase wires have continuity?
D4B
NO
A2
eplace Motor
D4A
YES
T5
Do the Red and black hall sensor wires measure 5V?
D5A
YES
T6
Black hall sensor to all others, when wheel is turned, does voltage oscillate between 0V and 5V?
D6B
NO
D6A
YES
T7
Is a controller wire damaged or disconnected?
D7A
YES
T8
Can it be spliced?
D8B
NO
D8A
YES
A4
Splice Controller Wire
D7B
NO
T9
Are controller MOSFET's Fused?
D9A
YES
Controller
A3
D9B
NO
D5B
NO

Intro - Motor No Work

This flowchart is to be used when an electric scooter's motor is not working properly. This is assuming that the scooter turns on and the throttle does not have any problems.

See "Definitions for d

Test 1 - Does the Motor Chunk?

1. Turn your scooter on
2. Attempt to use the throttle to rotate the wheel (don't forget some scooters are kick to start)
    a. Circle One: Chunk or Step or Spin
3. Use your hand to rotate the wheel
    a. Circle One: Chunk or Step or Spin
4. If 2 or 3 are "Chunk" or "Step", Circle "D1A" in the flowchart and move to T7. If both have "Spin", circle "D1B" in the flowchart and go to T2.
    a. Technically D1B and D1A are "together"

When the motor does not work it will either "chunk" when the throttle is pressed, "chunk" when the wheel is rotated, or just not move at all.

"Chunk" or "step", in this case, means that there is resistance or force when attempting to move the wheel. This is not yet measured electrically but by feel. It will sound sort of rough, like something hard is knocking something else. It will go back and forth between feeling like something is stopping you from pushing and easily moving.

→Because the electricity is not being applied at the right time, the two parts of the motor do not properly communicate and the result is lack of a smooth turning motor.

TIM COMMENT:

- **CHUNK = The partial failure of the controller to commutate (rotate) a motor [when activated electrically] (with throttle). Sounds like "chunking".**
    - **Mosfet, hall effect, even phase short**
- **STEPPING = Rotational stepped resistance while PEV is turned off (when you try to turn it manually, by hand)**
    - **When stepping happens ALWAYS because of an electrical short. One of the 3 phase wires is connected with one of the others (shoudn't be) phase wire rubbed through and bare metal touching each other. Can happen in controller, motor, or motor wire. Usually in controller or the wire.**

Test 2 - Is the Motor's wire intact?

1. Take off any caps or parts necessary in order to have as much of the motor's wire exposed as possible.
2. Beginning at the axle, slowly inspect the wire for any tears, extreme bending, burning, or broken wires of any kind.
    a. Result:_____

3. If no damage is seen and the wire is intact, circle D2A and go to T4. If there is damage of any kind, circle D2B and go to T3.

Test 3 - Can It Be Spliced?

In order to determine whether or not a motor wire can be spliced there are a few things to take into account.

1. Is the wire's breakage so close to the axle that the wires can't be spliced or butt connectors won't fit?
    a. Circle: Yes or No
2. Will the splicing shorten the wire to a point where the handlebars can't be turned?
    a. Circle: Yes or No
3. If the above question was circled "yes", is there another place to route the wire through, even by drilling?
    a. Circle: Yes or No
4. The below is referring to the 3 tests conducted in the previous steps
    a. If 1 and 2 are "No", circle D3A and continue to A1.
    b. If 1 is "No" but 2 and 3 are "Yes", circle D3A and continue to A1.
    c. If it is not possible to splice the motor wire, circle D3B and continue to A2

Test 4 - Do Motor Phase Wires Have Continuity?

If a motor does not "Chunk" or "Step" and its motor wire is intact, these are the steps that should be followed in order to electrically test the wires themselves for continuity.

1. Unplug the battery from the scooter's controller.
2. Press the dashboard button to discharge any capacitors.
3. Unplug motor connections from the controller. (Generally 3 phase wires and a clip for the sensor wires)
4. Set your multimeter to the Continuity ('Ω') setting.
    a. *Note: In the case of continuity, the direction of electrical flow is bi-directional meaning that the red and black probe can be swapped and will still give the same result.*
5. Place the red probe on the yellow wire's metal terminal and the black probe on the green wire's metal terminal. Hold the probes in this position for 10 seconds. You should hear a beep sound and final measurement should be 0.1-0.5Ω.
    a. Is there a "beep" sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω
6. Keeping the red probe on the yellow wire, place the black probe on the blue wire. Hold the probes in this position for 10 seconds.
    a. Is there a "beep" sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω
7. Take the red probe off of the yellow wire and place it on the blue wire. Take the black probe and place it on the green wire. Hold the probes in this position for 10 seconds.
    a. Is there a "beep" sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω

8. Summary:
    a. Yellow+Green:____Ω
    b. Yellow+Blue:____Ω
    c. Blue+Green:____Ω
    d. Technician Interpretation:

9. If the results in the summary are all the same and have continuity, circle D4A and continue to T5. If the results in the summary are not all the same and one does not have continuity, circle D4B and continue to A2.

Test 5 - Do the Hall Sensors Measure 5V?

1. Make sure the scooter's battery, motor phase wires, and hall sensor wires are plugged into the controller.
2. Turn the scooter on.
3. Set your multimeter to DC Voltage.
4. Through the back of the motor-side hall sensor connector, place the red probe inside so it is touching the red terminal. Place the black probe on the black terminal. If there is nothing, skip step 5.
    a. Result:____V
5. If the result is 5V, then circle D5A and continue to T6.
6. If the result is less than 5V, or nothing, circle D5B and continue to A3.

Test 6 - Does Hall Sensor Voltage Oscillate?

1. Make sure the scooter's battery, motor phase wires, and hall sensor wires are plugged into the controller.
2. Turn the scooter on.
3. Set your multimeter to DC Voltage.
4. Through the back of the motor-side hall sensor connector, place the black probe inside so it is touching the black terminal.
    a. [INSERT PHOTO HERE]
5. Through the back of the motor-side hall sensor connector, place the red terminal into the yellow phase. Does the voltage oscillate between 0V and 5V?
    a. Circle: Yes or No
6. Repeat step 5, but with the red probe on the green wire. Does the voltage oscillate between 0V and 5V?
    a. Circle: Yes or No
7. Repeat step 5, but with the red probe on the blue wire. Does the voltage oscillate between 0V and 5V?
    a. Circle: Yes or No

8. Were the results of 5, 6, and 7 all “Yes”?
    a. Circle: Yes or No
9. If 8 is “Yes”, circle D6A and continue to T7. If 8 is “No”, circle D6B and continue to A2.

Test 7 - Is a Controller Wire Damaged or Disconnected?

Do a physical check of the controller. Do any wires seem to be burned? Are any wires loose inside the connectors? Are any wires frayed? When controller connectors are plugged into subsequent scooter connectors, are any wires loose?

If the answer to all of these questions is “No”, then the apparent physical state of the controller does not seem to be an issue. Circle D7B and continue to T9.

If the answer to any of these questions is “Yes”, then the apparent physical state of the controller does seem to be an issue. Circle D7A and continue to T8.

Test 8 - Can The Controller Wire be Fixed?

Determining whether or not a controller wire can be fixed will be very similar to T3, or determining if a motor’s wire can be fixed.

If a wire can [easily] be spliced, soldered, secured, or otherwise, then circle D8A and continue to A4.

If a wire cannot [easily] be spliced, soldered, secured, or otherwise, then circle D8B and continue to A3.

Test 9 - Are Controller MOSFETs Fused?

1. Unplug the battery from the controller
2. Press the scooter’s “On” button. This will discharge the controller’s capacitors and allow for accurate test results.
3. Unplug all wires from the controller so it is able to be moved freely.
4. Turn on your multimeter and set it to the Continuity (‘Ω’) setting.
5. Place the black multimeter probe into the black controller-side battery connector.
    a. [Insert Photo]
6. Place the red probe onto the yellow controller-side phase wire. Hold the probes in this position for 10 seconds.
    a. Is there a “beep” sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω
7. Next, place the red probe on the green phase wire. Hold the probes in this position for 10 seconds.
    a. Is there a “beep” sound? Circle: Yes or No
    b. What was the final measurement? Result:____Ω
8. Finally, place the red probe on the blue phase wire. Hold the probes in this position for 10 seconds.
    a. Is there a “beep” sound? Circle: Yes or No

    b. What was the final measurement? Result:____Ω
9. If 6, 7, and 8 are all “No”, circle D9B and continue to T5. If 6, 7, and 8 contain even one “Yes”, circle D9A and continue to A3.

Examples

Test 2

- [This is what an intact vs non-intact motor wire looks like]

Test 5

- [Step #4: this is the position the probes should be in]

Test 6

- [show with arrows the oscillation and results that should be found]

Test 9

- [show an example]

Analysis

Test 4

- In depth, what does it mean when there is no continuity between the motor phase wires.
- If there is no continuity, this means that the coils in the motor are broken and it will need to be replaced. Because the connections have broken they do not transmit electricity resulting in a lack of continuity. If you get no continuity, open up the motor as it can most likely be fixed.

Test 5

- If the black and red hall sensors do not measure 5V, this is an indication that the controller is not outputting the correct voltage. This could mean that the controller’s DC/DC buck convertor is not working, meaning the hall effect sensors do not re. are not___, or maybe that____. Both of these things can be caused by___. No matter, the controller will need to be replaced.
    - Dcdc takes high voltage from battery and coverts it to low voltage for all of the electronics; lighting, hall effect, display, throttle. If not getting 5v, converter isn’t working. Stop working= usually a mosfet that burn, fuse, or break.

Test 6

- In depth, what does it mean when the voltage of the hall sensor wires does not oscillate?
- Beginning of an example:
    - “This indicates a hall sensor in the motor is burned out and is not able to regulate electricity as it should.
    -

Test 9

- The cause of a fused MOSFET is usually due to overheating, caused by too much current going through it, usually happening when you are at full throttle or you have all lights on. Essentially “tripping a breaker” or overworked. When a controller MOSFET

fuses, this causes the controller to stop working, as it no longer commutates the motor. and in turn the scooter is not able to run.

Reasoning

Answer 1

1. From D3A
    - The motor does not chunk and a wire is not intact, this is the cause of the issue. The wire(s) can either be spliced and reconnected or soldered back together.

Answer 2

1. From D3B
    - The motor does not chunk and the motor's cable is not intact and is unable to be repaired, unfortunately the only possibility is to replace the whole motor assembly.
2. From D4B
    - The motor does not chunk and the wire is intact, although there is no continuity between the motor phases. In this case the motor assembly must be replaced.
3. From D6B
    - Although the phase wires do have continuity, and the hall sensor wires measure 5v, when the motor is turned the voltage does not oscillate as it should. In this case the motor assembly (or hall sensor) must be replaced.
        i. One or more Hall sensors are bad and the motor needs to be replaced.

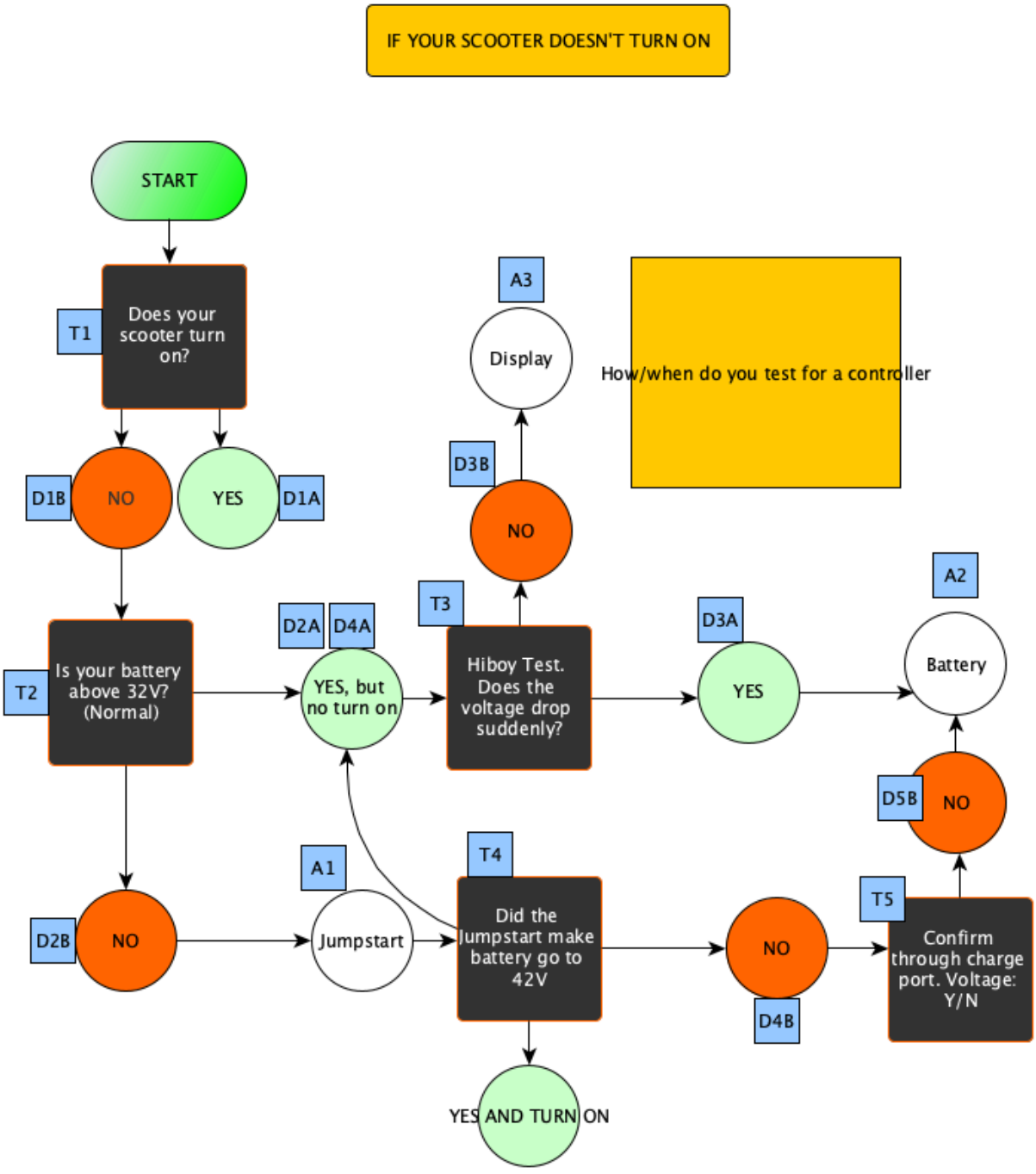
Answer 3

1. From D5B
    - Although the motor wires are intact and the phase wires have continuity, the hall sensor wires do not have 5v going to them, which does not allow the correct power to the motor. In this case, the controller is the issue and must be replaced. [I do not believe that it would be due to a loose wire, ie this test determines that the DC/DC buck converter in the controller is [burnt out].
2. From D8B
    - After determining that the motor is/is not an issue, and that there is indeed an issue with the controller, it is easily able to be seen on the exterior that there is a physical issue with the controller. This issue with the controller may be a burnt wire, loose connection, or something else. If it can not be fixed then you must replace the controller.
3. From D9A
    - After ruling out the motor, we have determined that the controller MOSFETs are fused which causes the controller not to output electricity correctly and that the controller should be replaced.

Answer 4

1. From D8A
    - After determining that the motor is not an issue, and that there is indeed an issue with the controller, it is easily able to be seen on the exterior that there is a physical issue with the controller. This issue with the controller may be a burnt

wire, loose connection, or something else. If it can be fixed then you are able to repair the controller.



Intro - No Turn On

This test is to be used when the scooter does not turn on, or flashes on then off, when the “On” button is pressed.

Test 1 - Does Your Scooter Turn On?
Press the “On” button on the scooter’s dashboard, hold it down if needed.

If the scooter does not turn on, or if the dashboard comes on and then off almost immediately, circle D1B and continue to T2.

If the scooter does turn on, this flowchart does not need to be used.

Test 2 - Does Your Scooter Have a Fuse?
[IT’S VERY POSSIBLE THAT, EVEN IF THE SCOOTER HAS A FUSE AND THE FUSE IS OUT, THAT THIS WOULD NOT IMPACT THE SCOOTER TURNING ON]

Test 3 - Is The Fuse Good?
[SEE ABOVE]

Test 2 - Is Your Battery Healthy (Normal)?
A healthy battery is somewhat subjective although can be determined based on a few different factors. The Voltage at which a battery is considered “Unhealthy” is different for each battery voltage. For a 36V battery, the Voltage should be at least 30-42V.

1. Unplug the battery from the controller
2. Turn on your multimeter to the DC Voltage setting
3. Touch the red multimeter probe into the red battery-side connector. Plug the black probe into the black battery-side connector. BE VERY CAREFUL TO NOT LET THE PROBES TOUCH WHEN INSIDE OF THE BATTERY CONNECTOR
    a. Result:____V
4. If over 30V, skip 5 Circle D2A and continue to T3.
5. If under 30V, circle D2B and continue to A1

Test 3 - Hiboy Test. Does the voltage Drop Suddenly?

1. Plug the battery-side connector back into the controller.
2. Through the back of the controller-side battery connector, place the red probe on the red terminal and the black probe on the black terminal. Ensure that the probes are actually touching.
    a. Result:____V
3. With the probes still in the controller-side battery connector, press the scooter’s “On” button. Wait a few seconds and then note the result.
    a. Result:____V
4. If the Voltage in 3 is above 10V, skip to step 6.
5. If the voltage drops sharply, or if the voltage in step 2 is below 10V, circle D3A and go to A2.

6. If the voltage does not drop sharply, or if the voltage in 8 is above 10V, circle D3B and continue to A3.
7. Suggestion tim
8. FROM D3A, INSTEAD DO controller side-Battery resistance,
    a. Discharge the capacitors
    b. Double check by testing voltage between controller-side battery connector. Should be 0 volts.
    c. Switch meter to resistance.
    d. While measuring, turn the scooter on.
    e. Beep=continuity, low resistance→replace controller
    f. No beep= high resistance, no continuity→ jumpstart/replace battery
        i. If resistance is very high, in KOhms, then that's good. If short circuit, that's bad.]
        ii. In beep mode, there is continuity (<10ohms).
    g.

WITH LOW voltage output, testing DC/DC converter, usually installed in a controller. Replace whole thing because you cannot replace them separately.

Test 4 - Did the Jumpstart Work?
If the jumpstart did not work, one of two things will happen:

The battery will charge to 42V although the scooter will still not turn on (may or may not draw normal amount of Ah) **or**

The battery will not sustain charge (voltage) within the first few minutes of attempting to Jumpstart.

If the jumpstart does work, the battery should sustain a charge throughout the jumpstart process. If this is the case, note the result, circle D4A, and continue to Test 3.

If the jumpstart **did not** work, circle D4B and continue to T5.

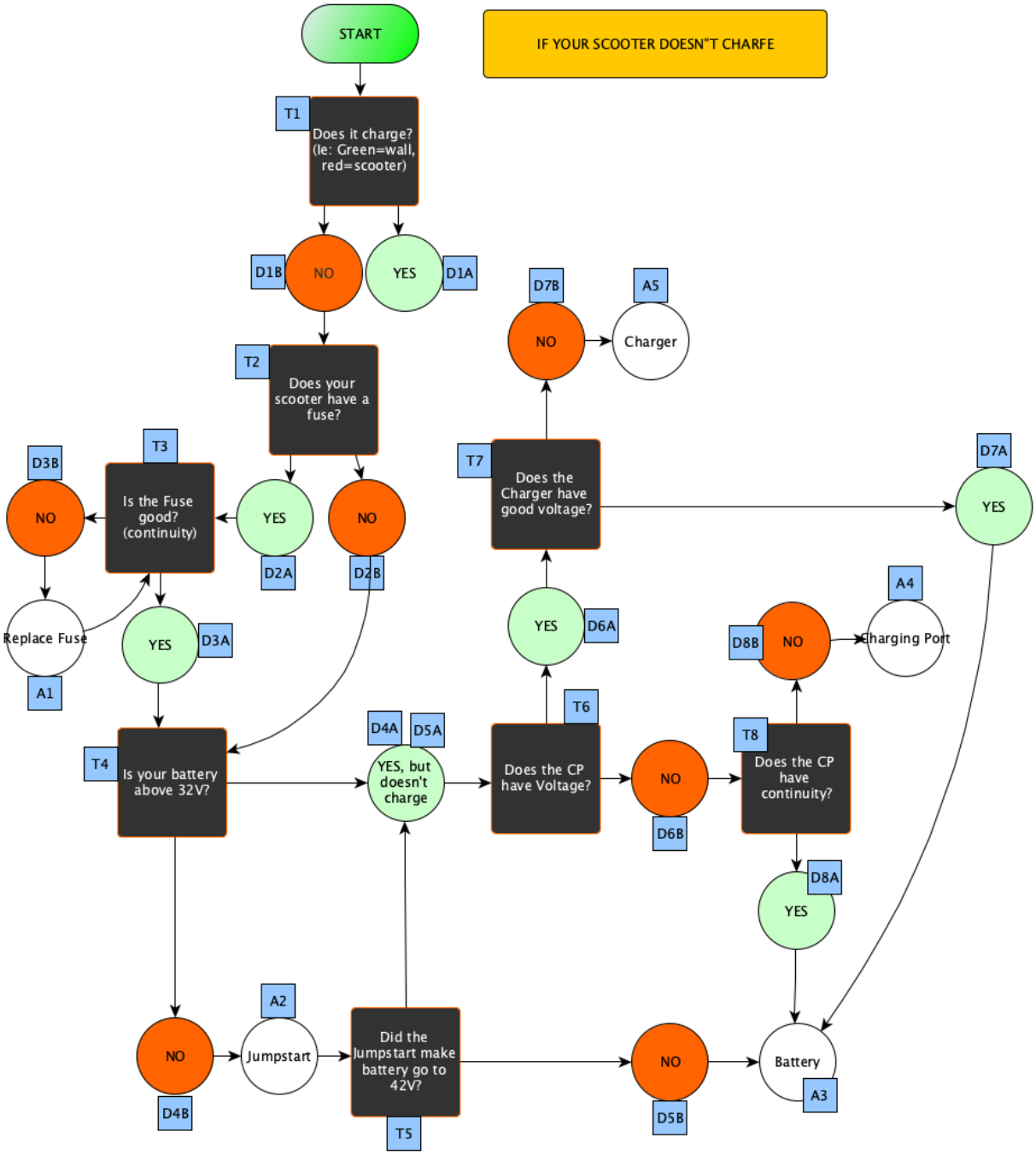
Test 5 - Confirm Through Charge Port Voltage?
[These are the steps to test voltage through a charging port]

If no voltage, circle D5B and continue to A2.

What happens if there is voltage?

6 (mosfets) (Actually, probably A4, but maybe go to T6 in order to "be sure")

[Keep in mind: does the absence of a sharp voltage drop in the hiboy test mean that a jumpstart would not do anything?
Are there any cases where a jumpstart would do anything if there is no voltage drop? In other words: does the result of [this test] mean that you can bypass the Jumpstart?



Intro - No Charge

This troubleshooting guide is to be used when a scooter does not charge. The scooter is (or was) able to be turned on. When the charger is plugged into the wall, the LED is green. When plugged into the scooter, it should change to a different color (usually red) indicating that the scooter is charging. The scooter is not charging if the indicator light does not change/stays green.

Test 1 - Does it Charge?

1. Plug the charger into the wall. Note the color of the LED light on the charger
    a. Charger light color: _____
2. With the charger still plugged into the wall, plug the other end into the scooter. Note the color, as it should have changed.
    a. Charger light color: _____
3. If the charger light does **NOT** change, circle D1B and continue to T2. If

Test 2 - Does Your Scooter Have a Fuse?

Checking your scooter's battery for a fuse is easy.

1. Gain access to the battery
2. Inspect the wires that connect from the battery to the controller. Look for a small plastic "box"that is able to open, in the middle of one of the wires.
3. If there is a box, circle D2A and continue to T3. If there is no box, circle D2B and continue to T4.

Test 3 - Is the Fuse Good?

A fuse is used to allow up to a specified amount of current to flow before the fuse breaks, cutting off any electricity. Essentially it is placed in between parts to protect said part against any surges. Testing a fuse will allow you to determine whether or not it should be replaced. Note: if your scooter does not have a fuse, move to T4.

1. Gain access to the fuse by opening carefully opening the [container/box]. Note: you may have to use an object other than your fingers to open the clip.
2. Remove the fuse. Depending on the type, you may need to use a pair of needle nose pliers to remove the fuse.
3. Once the fuse is removed, take out your multimeter and set it to the Continuity ('Ω') setting.
4. Identify the type of fuse you have see [below] for types of fuses.
5. Place your red probe on one terminal of the fuse and your black probe on the other terminal
    a. Exmaple one (inline fuse)
    b. Example two (cartridge fuse)
6. Is there a "beep" sound? Circle: Yes or No
    a. What was the final measurement? Result:____Ω
7. In step 6:
    a. If you circled "Yes", circle D3A and continue to T4
    b. If you circled "No", circle D3B and continue to A1.

Test 4 - Is your Battery healthy?

A healthy battery is somewhat subjective although can be determined based on a few different factors. The Voltage at which a battery is considered “Unhealthy” is different for each battery voltage. For a 42V battery, the Voltage should be at least 30-42V.

1. Unplug the battery from the controller
2. Turn on your multimeter to the DC Voltage setting
3. Touch the red multimeter probe into the red battery-side connector. Plug the black probe into the black battery-side connector. BE VERY CAREFUL TO NOT LET THE PROBES TOUCH WHEN INSIDE OF THE BATTERY CONNECTOR
    a. Result:____V
4. If over 30V, circle D4A and continue to T6
5. If under 30V, circle D4B and continue to A2

Test 5 - Did the Jumpstart Work?

If the jumpstart did not work, one of two things will happen:

The battery will charge to 42V although the scooter will still not turn on (may or may not draw normal amount of Ah) **or**

The battery will not sustain charge (voltage) within the first few minutes of attempting to Jumpstart.

If the jumpstart **does work**, the battery should sustain a charge throughout the jumpstart process. If this is the case, note the result, circle D5A, and continue to T6.

Result:_____V

If the jumpstart **did not work**, circle D5B and continue to A3.

Test 6 - Does The Charging Port Have Voltage?

1. [This is how you test the charging port for voltage]
2. Also how you test
3. Set your multimeter to the DC Voltage setting.
4. Then____
5. Measure the voltage:
    a. Result:_____V
6. If the voltage in step 5 is [xV, then the port has voltage]. Circle D6A and continue to T7.
7. If the voltage in step 5 is [0V, then the port does not have voltage]. Circle D6B and continue to T8.

Test 7 - Does The Charger Have Voltage?

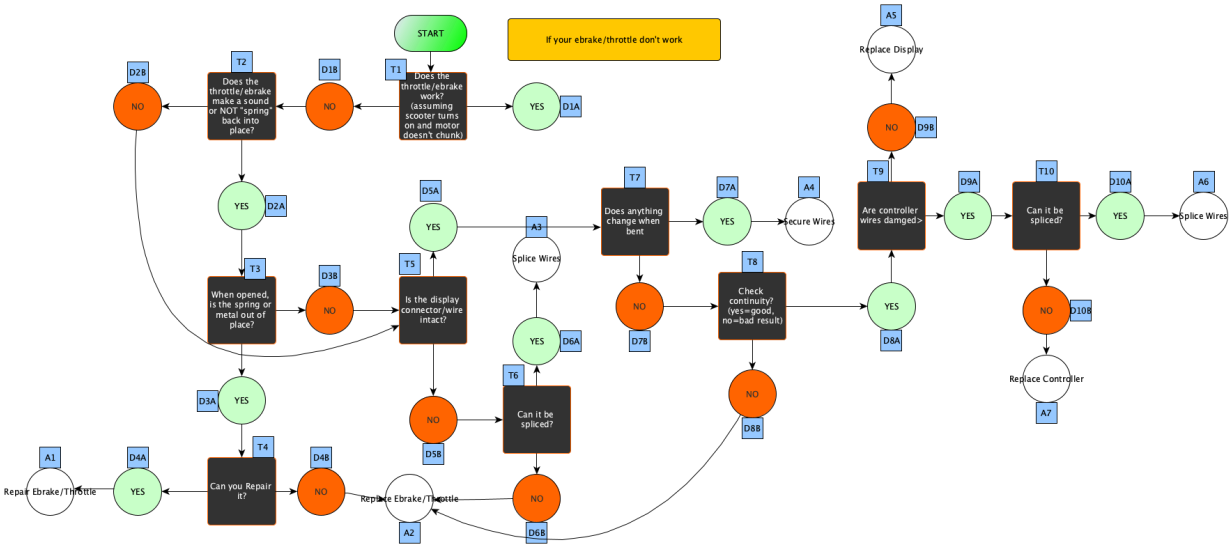
When your scooter won't charge, there is a very small possibility that the charger is the culprit. If this is the case and your scooter will not charge, use this to determine whether or not the charger should be replaced.

1. [this is how you test if the charger has voltage]
2. Measure the Voltage:
    a. Result:_____V
3. Compare the result in step [x] to the charger's advertised voltage. Is the measured voltage at or below the advertised?
    a. Circle one: At or Below
4. If you circled "At", circle D7A and continue to A3. If you circled "Below", circle D7B and continue to A5.

Test 8 - Does the Charging Port Have Continuity?

To determine whether or not a CP has continuity is important.

1. [this is how you test]
2. Set your multimeter to the Continuity ('Ω') setting.
3. Djdfkj
4. Is there a "beep" sound? Circle: Yes or No
    a. What was the final measurement? Result:____Ω
5. In step [4], if you circled "Yes", circle D8A and continue to A3. If you circled "No", circle D8B and continue to A4.



Intro - Throttle No Work

Throttle

https://www.electricscooterparts.com/throttletestingguide.html

Definitions

Tests
Known by T1, T2, T3, really Tx, is the numbering system for each “Test” or “Troubleshooting”. Each test has a Decision (DxA, or DxB) that must be made based on the results of the test. Each decision will lead to an Answer (Ax), or another Test (Tx)

Decisions
Known by D1A, D1B, D2A, really Dxy, is the numbering system for each decision that must be made. A decision must be made after the results of a test are known. The ‘x’ represents the order in which the decisions are made and is represented with ascending numbers. The ‘y’ represents the specific decision being made, either ‘A’ or ‘B’. ‘A’ is a “Yes” decision. ‘B’ is a “No” decision. So, if you see D5B, you know that you are coming from the 5th test, the results of which were “No”. Note: a Yes or No is taken in context of the test and does not necessarily dictate a good or bad.

Answers
Known by A1, A2, A3, and A4, this is a numbering system for the Answers that may result from a Decision. They will always represent a type of repair and/or part.

My name is Kareem and I started this business back in 2019. I was a econ At that point I was just customizing and selling on facebook and craigslist. I even had a paint room in an extra bed

in my apartment where I would paint and disassemble. Then I thought I needed to get into stores and got into one on como ave. People began asking about repairs and I decided to take them on. Fast forward and we currently have 2 partner storefronts and one dedicated workshop where we repair almost everything electric with wheels.

Current Issue

The first issue is the lack of [shared] knowledge within the Electric Scooter Repair community. It is extremely difficult to find detailed information about a specific scooter and can sometimes be even more difficult to diagnose and repair it. Even our trained Technicians struggle with this at times. In addition to Repair, there are many points of friction that currently exist between the customer, a shop, and their scooter. Not to mention the dependencies on communication that exist within a shop.

Purpose

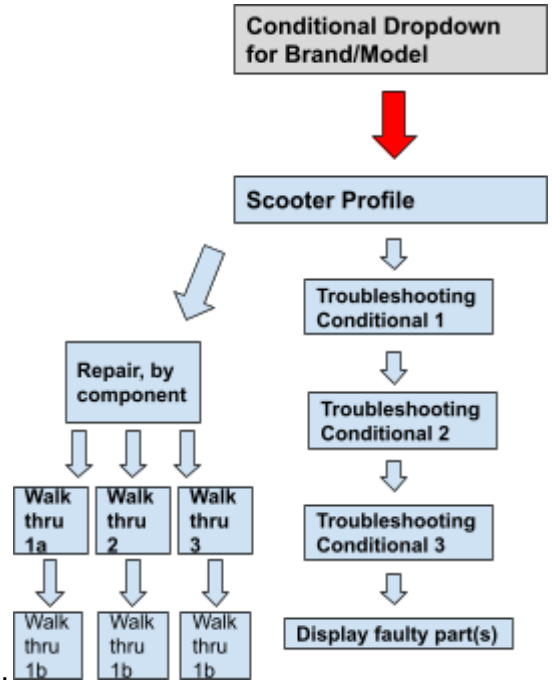
By fostering a process with an efficient and transparent distribution of information, this software will have the ability to catalyze growth within the company. Not only will this software pave the trail for our Technicians during their work, it will allow the process to be documented, converted into data, which will in turn be used to make the process more efficient. Using the data we currently have, and capture in the future, we will provide Riders and Technicians alike with a tool to index a scooter, displaying a custom Rider/Scooter profile, along with a simple and systematic troubleshooting process.

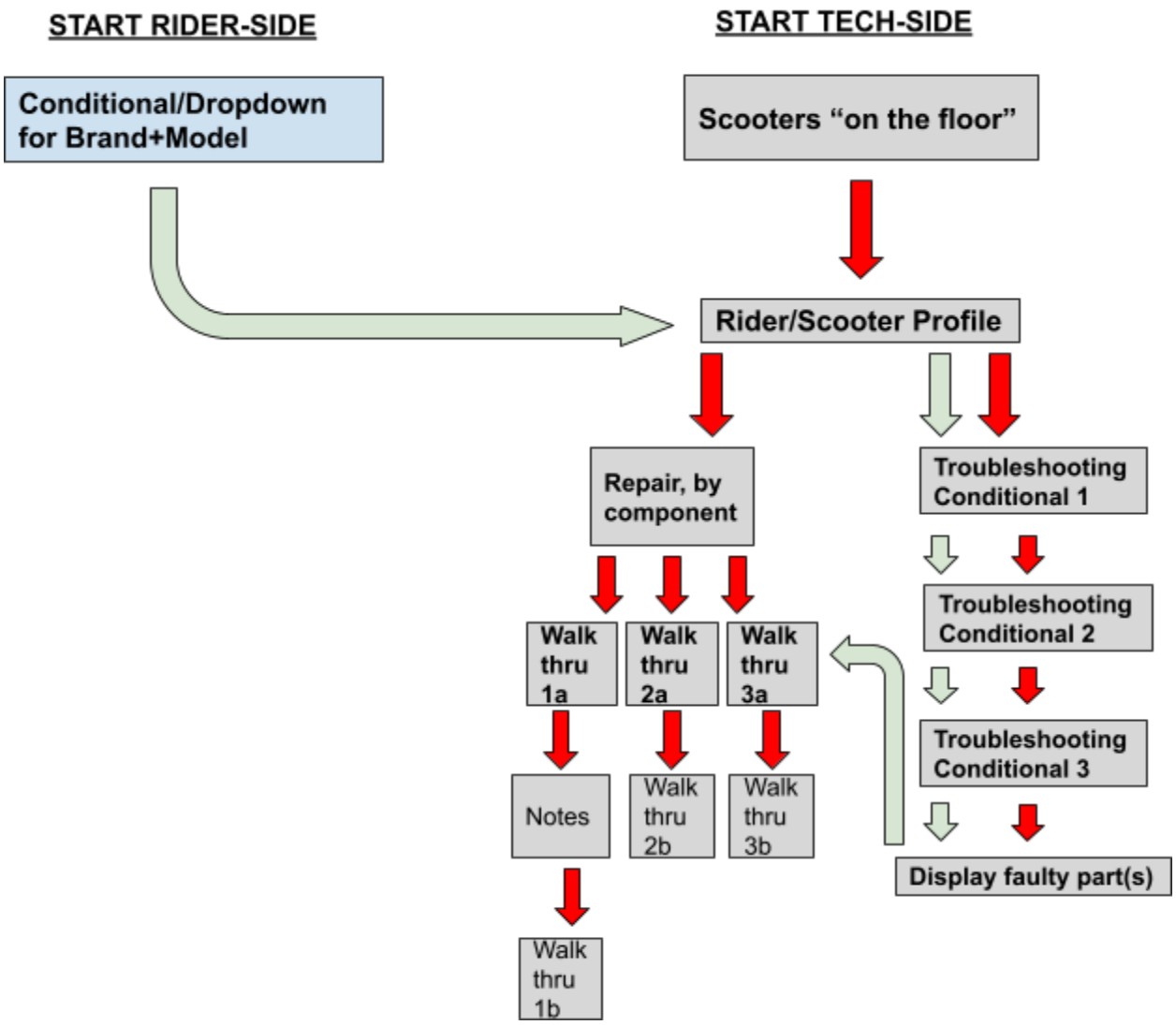
Future

Looking towards the future, this platform will allow for the standardization of parts and practice for manufacturers, shops, and riders alike.

General Needs

- Show repairs that are “on deck”
    - Allow assigning and claiming
    - Description of issue
    - Time repair takes
    - Step-by-step instructions
        - Allow for notes during specific point in process
    - Diagnostics
    - General notes
- Conditional platform for make/model
- Create conditional questions to diagnose a scooter
    - Synthesize, sort, and categorize descriptive data


Conditional Dropdown for Brand/Model
Scooter Profile
Troubleshooting Conditional 1
Troubleshooting Conditional 2
Troubleshooting Conditional 3
Display faulty part(s)
Repair, by component
Walk thru 1a
Walk thru 2
Walk thru 3
Walk thru 1b
Walk thru 1b
Walk thru 1b



Currently the diagram for commercial use of the Diagnostics/Repair platform. (Have not built out client-side profile; What Technician information is updated for viewing by client)

Script

Hello, thank you all for being here with me and owen for organizing this. It's greatly appreciated.

Today I would like to talk about a platform that will be built within the company. As you can see, there are many problems within the scooter community and the shops that repair their scooters.

- Lack of general knowledge and how-to
    - People don't necessarily have the general knowledge to diagnose and often don't understand how to do something
    - Long drawn out process to figure out the issue
- Repair Times, pricing, parts, and subsequent results are subjective and not standard enough for scale or consistent positive experience for the customer or Technician.

Those are some of the problems, now here are some solutions that impact the Rider, client, and technician.

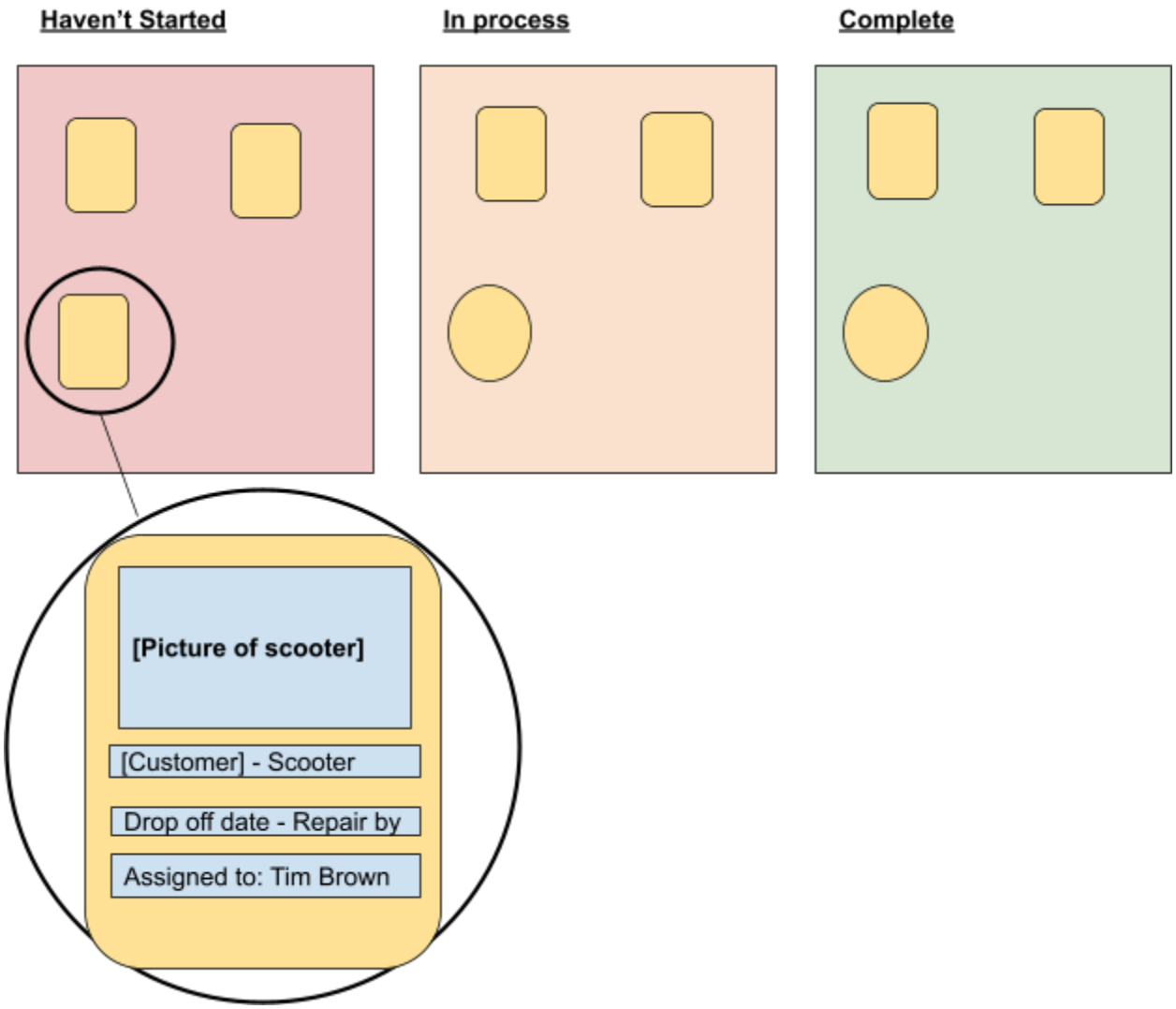
- Create an index of scooters with exact, real-world information. Add-on, process, troubleshooting, and even parts sourcing that can be utilized before purchase or repair
- Enable client and scooter information, pre-repair through post-repair, to be seamlessly communicated to technicians, clients, and managers.
    - Think: Repair meets domino's pizza order tracking
- Most importantly: Create a tool that will Make. Repairs. Easy.

Any questions?

So, with some good solutions.

First, I'd like to show you a video I took at a partner shop of ours, called Dunrite Automotive. They utilize a software called AllData when doing Repairs.
[SHOW ALL DATA VIDEO]

With this in mind we can figure out what they might begin to look like.
Let's begin with the Technician-side interface. [This can come as a table to simplify the process.]



The technicians need to know what to do. This is the first step in connecting information. Clicking on a profile that is “on the floor” will bring you to the Rider’s profile, yet to be fully built out, although the scooter profile may look like this, with information pertaining to the specific customer above.

SEGWAY ES4

General Information

- Specifications
- Parts and Labor
- Diagrams
- Maintenance Schedule
- Company contact

Parts & Components

Head
- Throttle
- Ebrake
- Dashboard
- Flashlight
- Handlebar
  - Grips

Shaft
- Folding Mech.
- Battery
- Controller

Back wheel
- Motor
  - Cable
- Disc Brake
- Suspension

Diagnostic Information

Error Code(s)
- E10
- E14
- E15
- E24

Troubleshoot specific
- Battery
- Controller
- Display
- Motor
- Tires

General Troubleshooting

Now that the technician knows a little bit about the customer and what the issue is, they can use the scooter profile to begin the repair.

Right now, we are unable to get hyper specific parts, steps, and diagrams, although to account for this, we will use conditional troubleshooting.

The data we use to feed the “conditionality” will come from the qualitative symptoms the client describes upon drop off, simplifying and categorizing the data we do have is extremely important.

The goal will be to create a conditional troubleshooting tool. Blending qualitative; using statements like: “if this then that”, with specificity; like using actual electrical measurements.

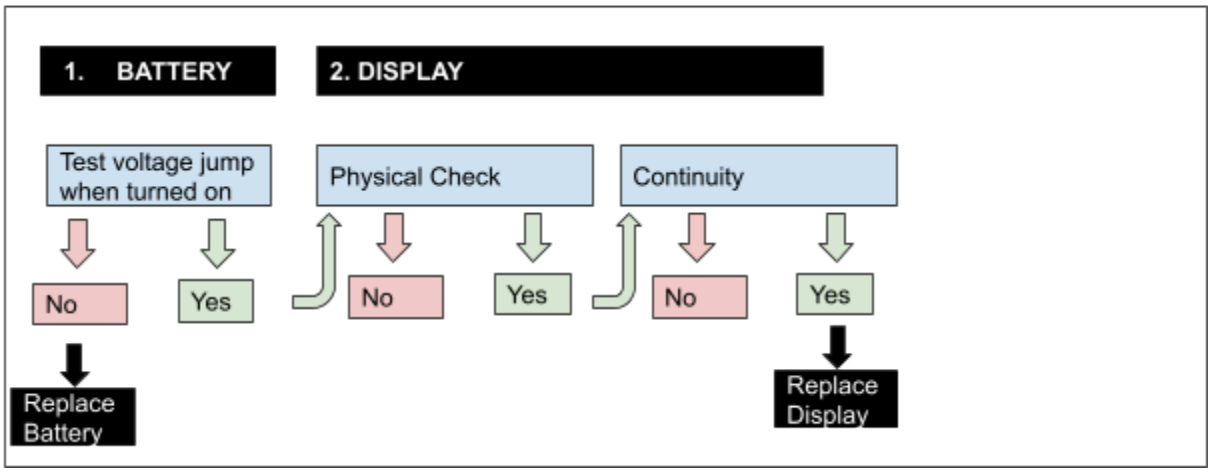
It may look something like this:

Issues

Scooter doesn't turn on
Throttle doesn't work
Motor doesn't work

1. When the **motor** doesn't work, we test: motor, throttle, controller
2. When the **display** doesn't work, we test: battery, display, controller
3. When the **throttle** doesn't work, we test: throttle, controller, motor

When the **display** doesn't work



Essentially I need help building the interface, architecture of the data, displaying and connecting data.