Diagnostic's Manual

Totalflow®

Flow Computer

Diagnostic Procedures

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2017389-001 (AC)

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Section 1

Testing Procedures

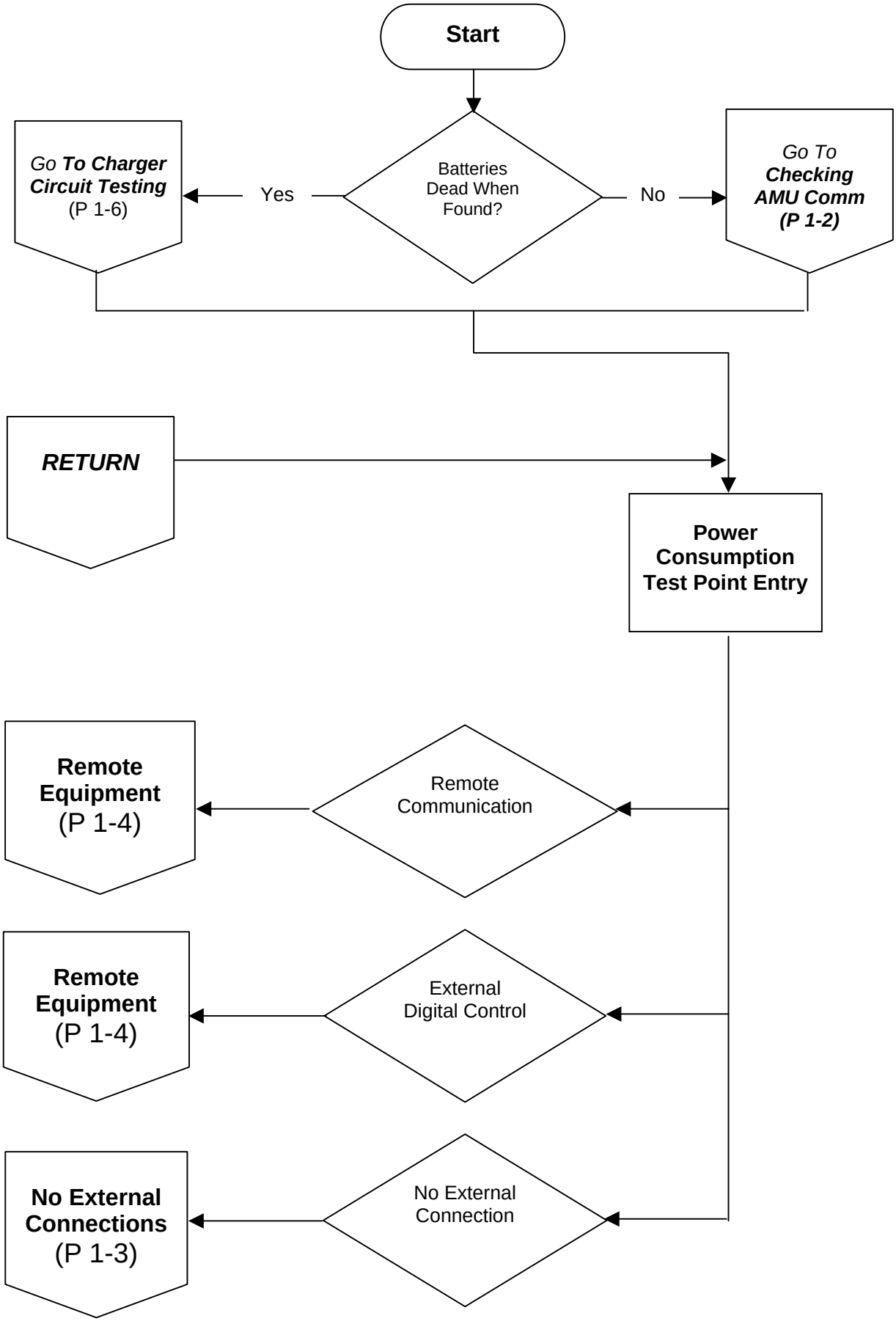
For

Units Going To Sleep

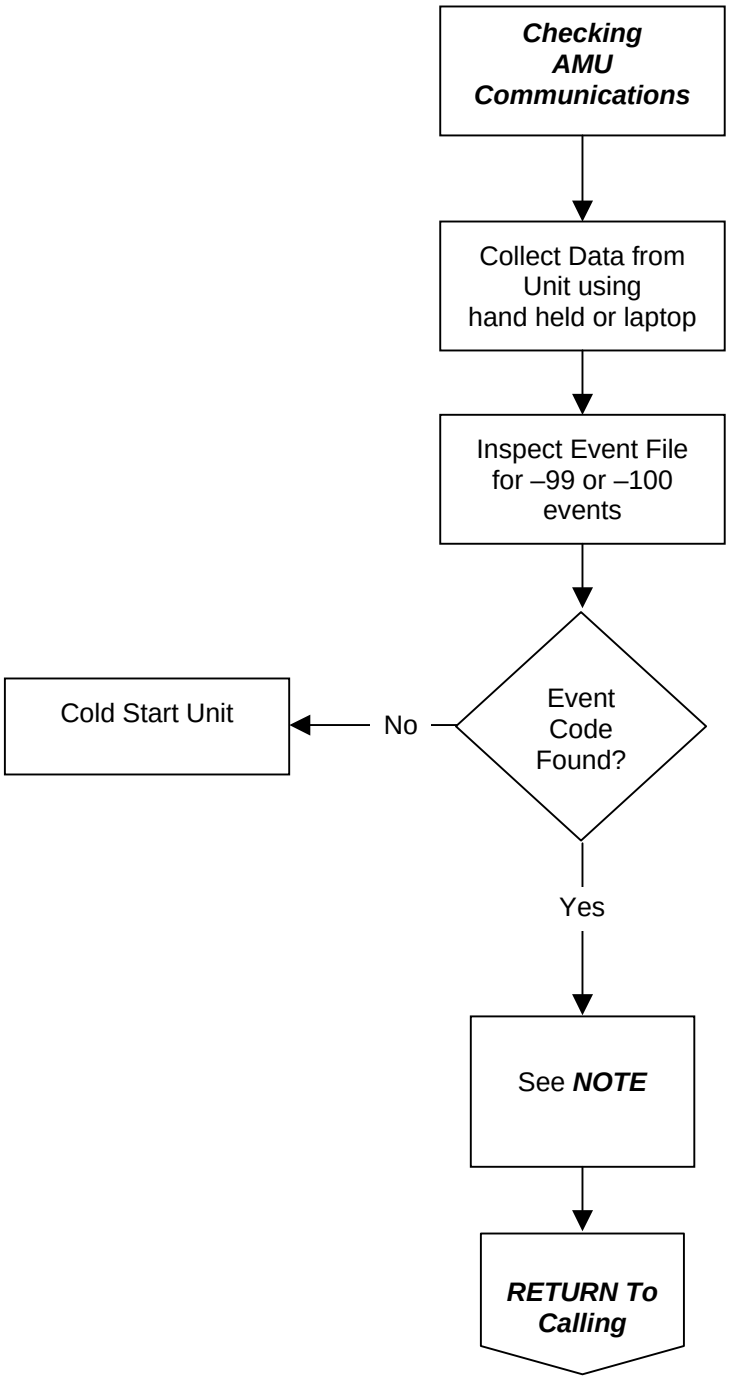
or

Possibly Drawing To Much Current

(This procedure is for use on board numbers: 2015333, 2015382, 2015189, 2100204)

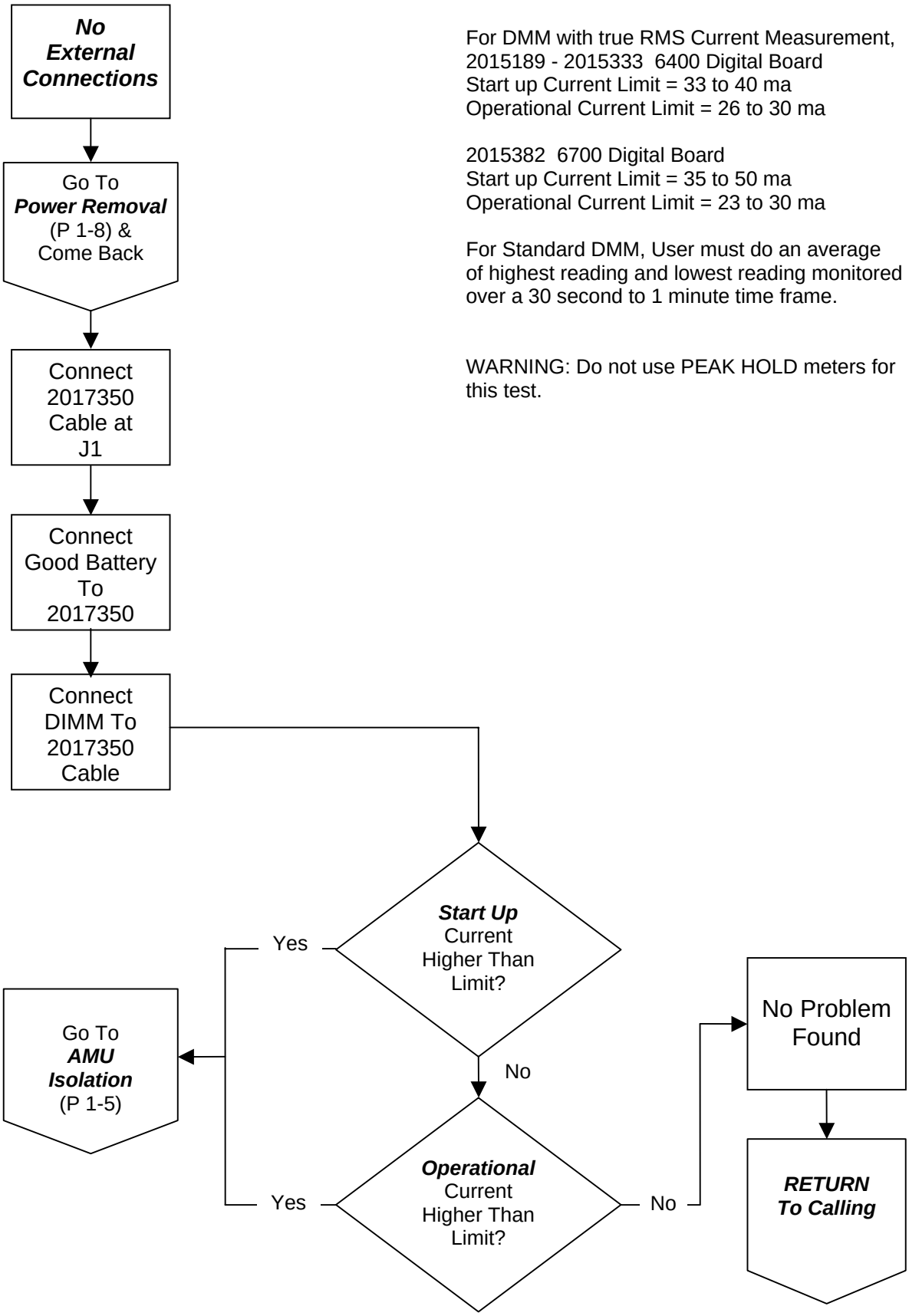

Start
Batteries Dead When Found?
Yes
Go To Charger Circuit Testing (P 1-6)
No
Go To Checking AMU Comm (P 1-2)
RETURN
Power Consumption Test Point Entry
Remote Communication
Remote Equipment (P 1-4)
External Digital Control
Remote Equipment (P 1-4)
No External Connection
No External Connections (P 1-3)

Checking AMU Communications



Note The current procedure is to return the AMU and Digital Board if multiple occurrences are found in the event records. Single occurrences or occurrences in a random pattern spread over weeks or months are acceptable and not an indication of a failure mode.

No External Connections



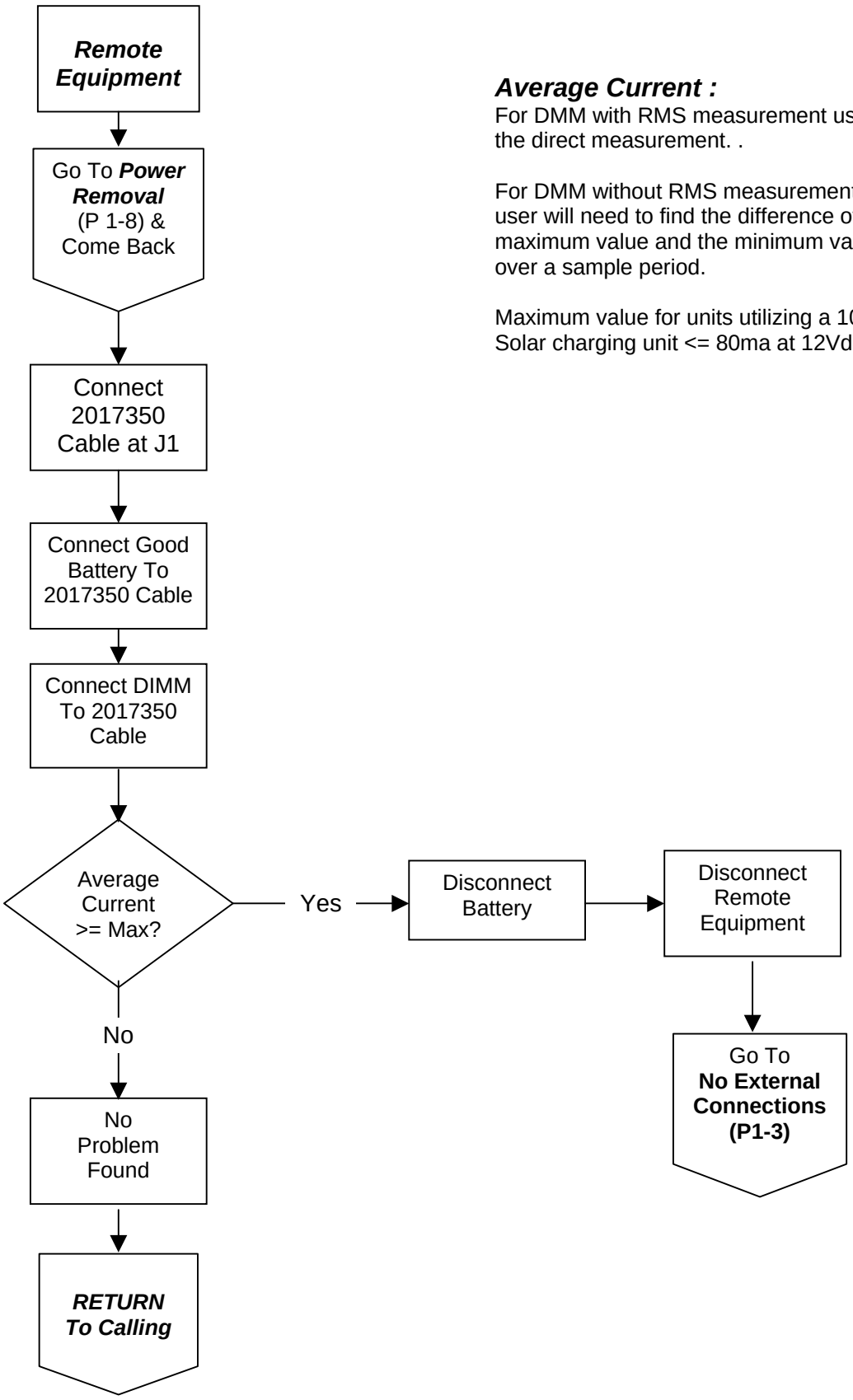
For DMM with true RMS Current Measurement,
2015189 - 2015333 6400 Digital Board
Start up Current Limit = 33 to 40 ma
Operational Current Limit = 26 to 30 ma

2015382 6700 Digital Board
Start up Current Limit = 35 to 50 ma
Operational Current Limit = 23 to 30 ma

For Standard DMM, User must do an average of highest reading and lowest reading monitored over a 30 second to 1 minute time frame.

WARNING: Do not use PEAK HOLD meters for this test.

Remote Equipment



Average Current :

For DMM with RMS measurement use the direct measurement. .

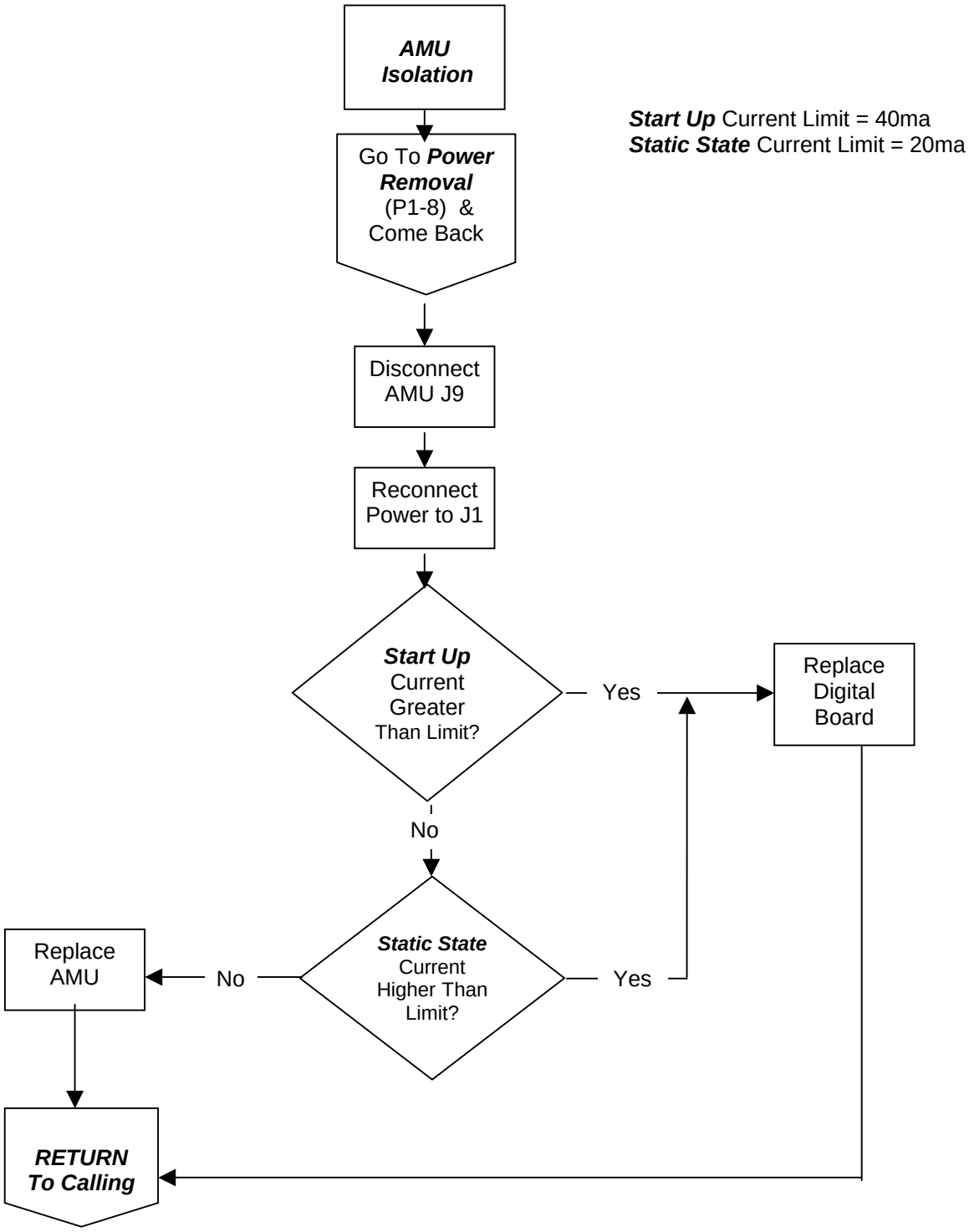
For DMM without RMS measurement the user will need to find the difference of the maximum value and the minimum value over a sample period.

Maximum value for units utilizing a 10 Watt Solar charging unit <= 80ma at 12Vdc.

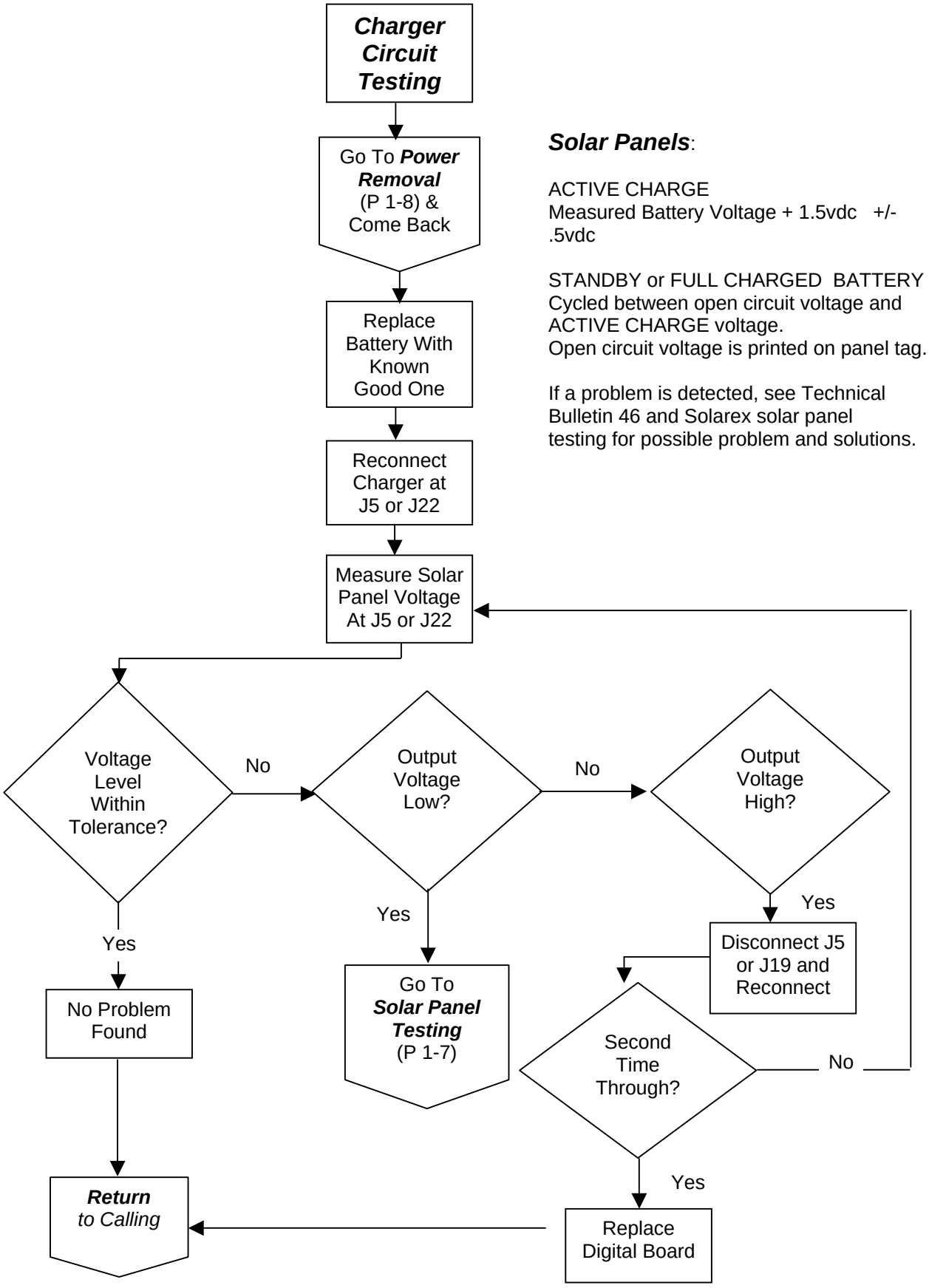
AMU Isolation

Warning

Remove power from unit before disconnection or reconnection of AMU. Failure to disconnect power not only voids the warranty, but can damage components.



Charger Circuit Testing



Solar Panels:

ACTIVE CHARGE
Measured Battery Voltage + 1.5vdc +/- .5vdc

STANDBY or FULL CHARGED BATTERY
Cycled between open circuit voltage and ACTIVE CHARGE voltage.
Open circuit voltage is printed on panel tag.

If a problem is detected, see Technical Bulletin 46 and Solarex solar panel testing for possible problem and solutions.

Solar Panel Testing

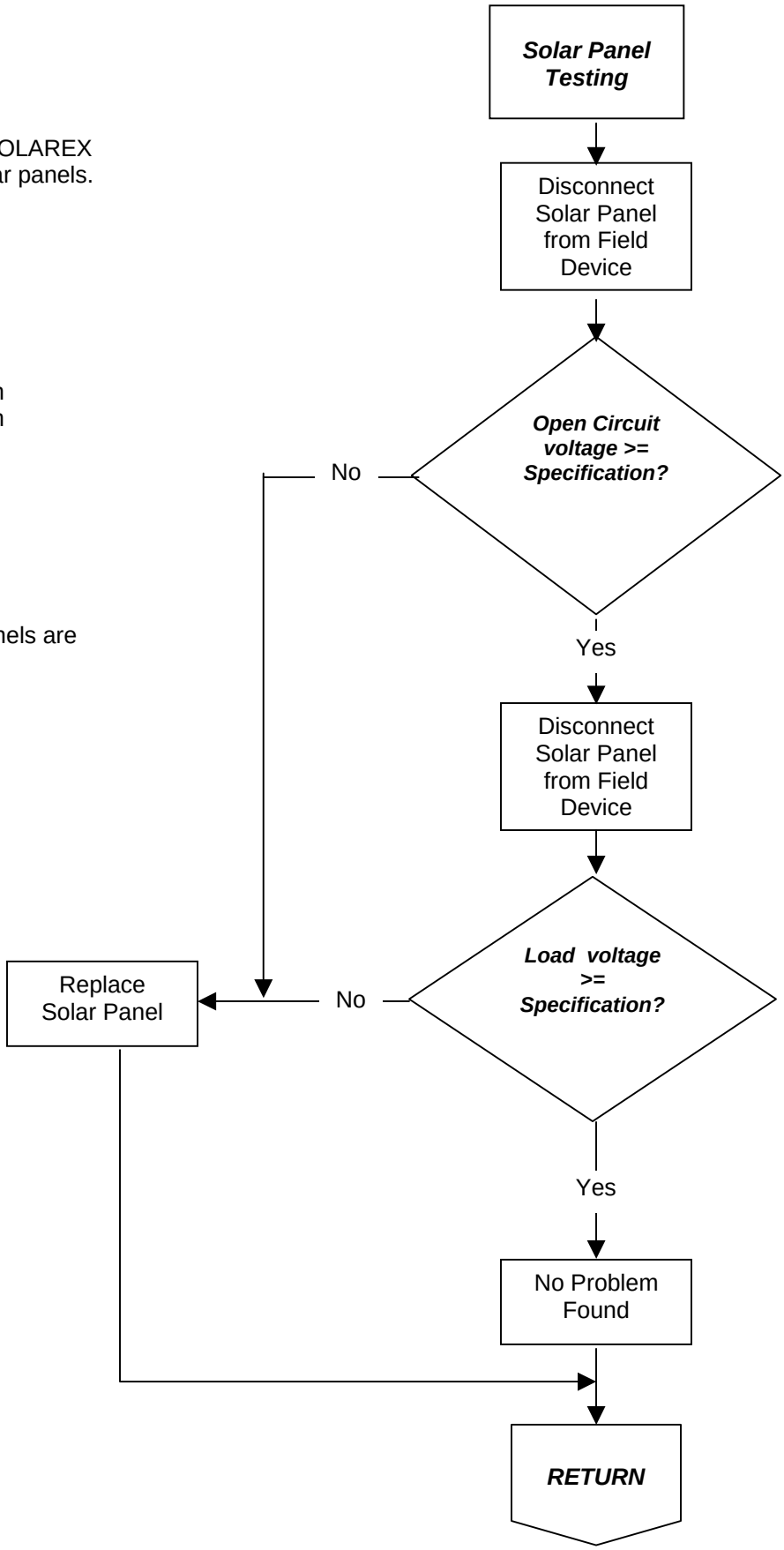
In case of failure, refer to SOLAREX document for testing of solar panels.

Load Values
5 Watt 40 Ohms 10 Watt
10 Watt 30 Ohms 10 Watt

Open Circuit voltage
5 Watt 17 volts Minimum
10 Watt 21 volts Minimum

Load Voltage
5 Watt 12.24 Minimum
10 Watt 15.50 Minimum

Loads for 5 watt and 10 panels are included in diagnostic kit

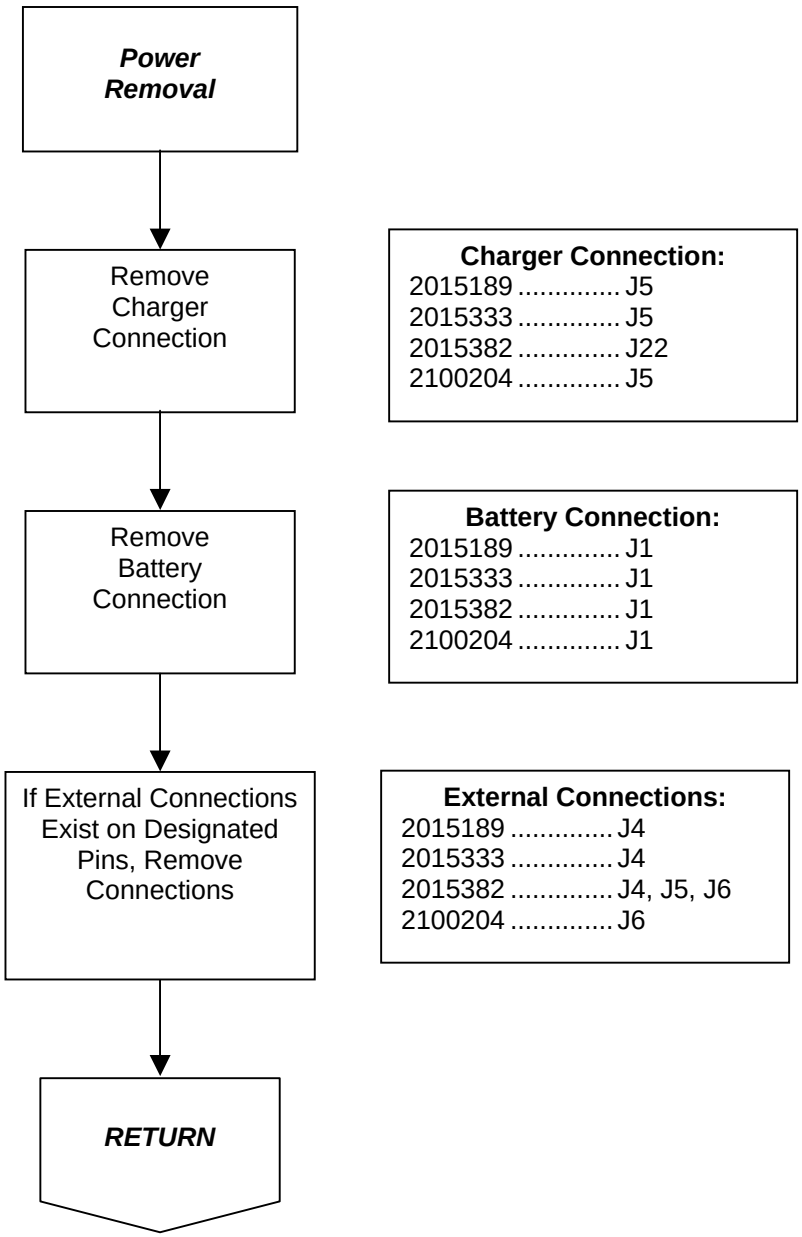


Power Removal

Note This section represents standard operating procedures as noted within all Totalflow FCU manuals. The procedure MUST be followed as shown.

Warning

Failure to disconnect the charger circuit before the battery can result in digital board failure.



Section 2

Field Test Procedure

for

Solarex MSA 10

Solar Modules

Overview

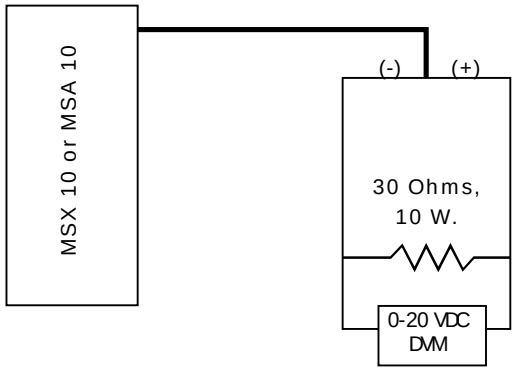
The following test procedure is a reproduction of a test procedure received from Solarex Corporation March of 1997.

Instrument and Tools Needed:

1. Digital multimeter with a 0-20 VDC range.
2. New Solarex MSX 10 polycrystalline module.
3. 10 W, 30 Ohms resistor.
4. #18 AWG test leads.

Typical Test Setup

The following setup applies to the MSX 10 in the solar radiation measurement role and then to the MSA 10 under test. Both solar modules must be in the same plane and facing the sun. The best time to do the test will be on a sunny clear day between the hours of 10 AM and 3 PM. Be sure that nothing is covering or shadowing any part of either solar module when it is tested.



Test

The purpose of using a new MSX 10 is to have a good reference for an accurate comparison. The typical voltage reading with an MSX 10 in full sunshine will be 15 VDC across the 30 Ohms resistor. It is very important that the two measurements (with the MSX 10 then the MSA 10) are made right after each other to ensure the solar insolation is the same during both tests. The reading with the MSA 10 should not be below 80% of the MSX 10 reading under the same conditions. If it is below 80% of the MSX 10 reading, replace the MSA 10 with a new MSX 10.

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Section 3

Testing Procedures

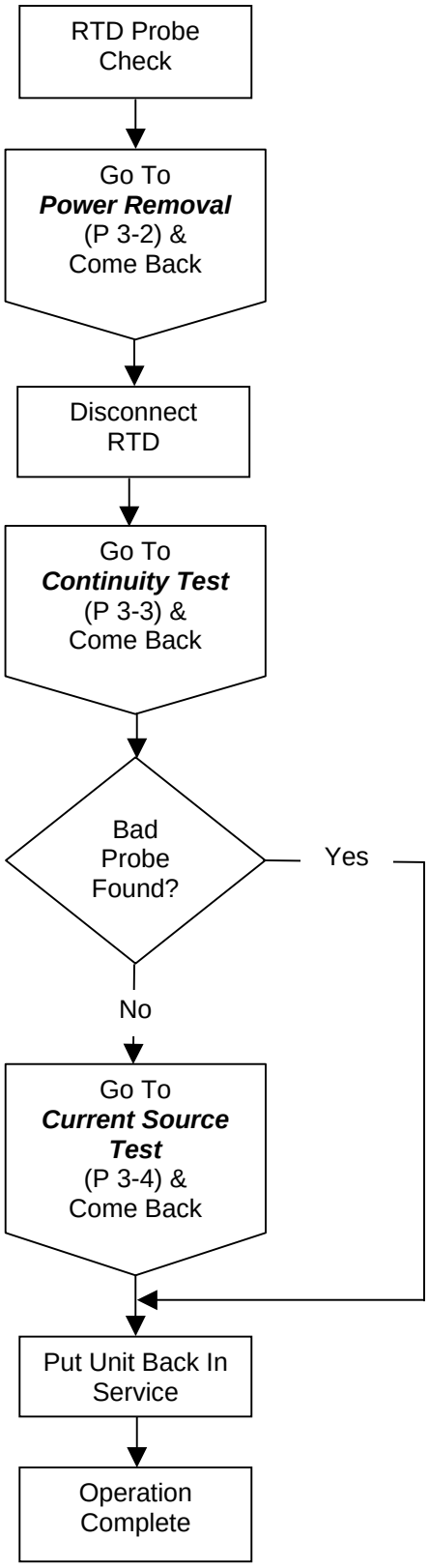
For

RTD Probe

&

Associated Circuitry

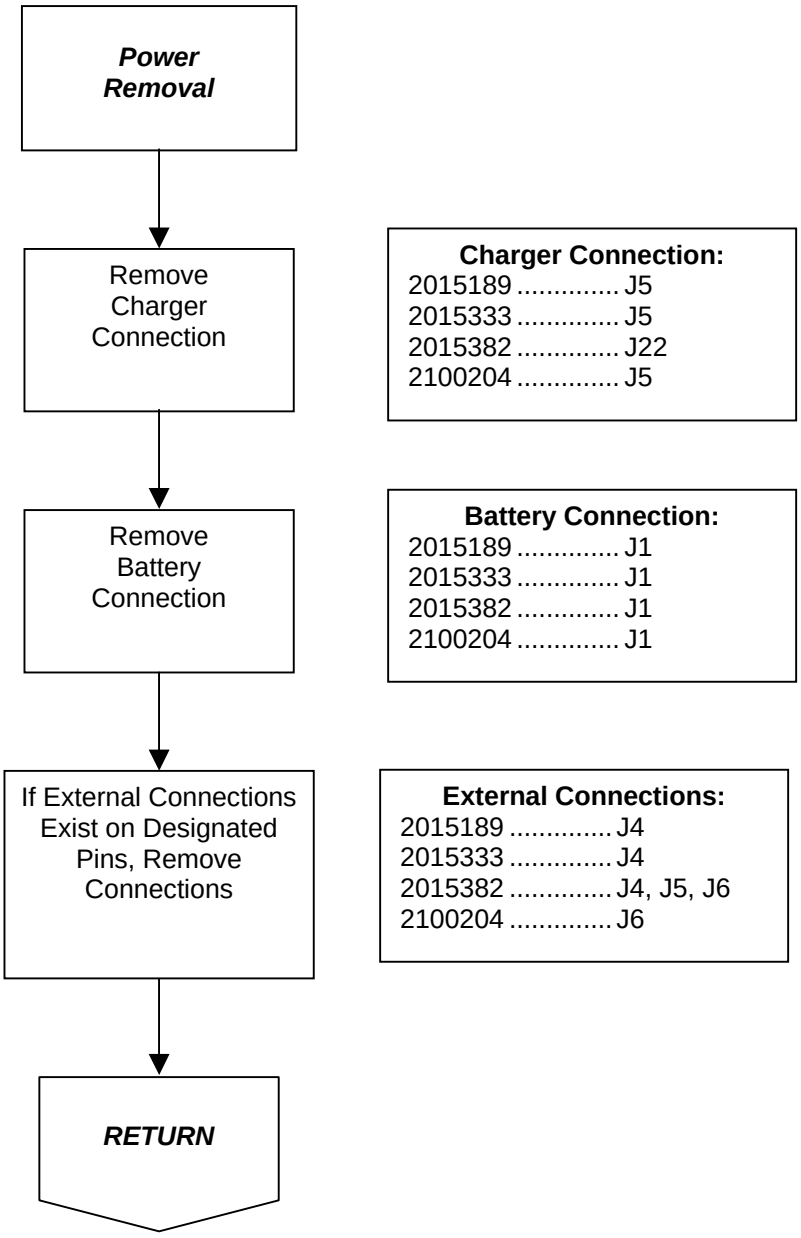
(This procedure is for use on board numbers: 2015333, 2015382, 2015189, 2100204)


RTD Probe Check
Go To ***Power Removal*** (P 3-2) & Come Back
Disconnect RTD
Go To ***Continuity Test*** (P 3-3) & Come Back
Bad Probe Found?
Yes
No
Go To ***Current Source Test*** (P 3-4) & Come Back
Put Unit Back In Service
Operation Complete

Power Removal

Note This section represents standard operating procedures as noted within all Totalflow FCU manuals. The procedure MUST be followed as shown.

Warning **Failure to disconnect the charger circuit before the battery can result in digital board failure.**



Continuity Test for RTD Probe

Equipment Required

2017373-004 Totalflow Diagnostics Kit
(contains Digital Multimeter w/ alligator clip leads)

or

2017373-005 Diagnostics Kit only (no Digital Multimeter)

Step	Action
1.	Set DMM in 200 ohm or Sound Range.
2.	Check continuity of BLACK wire pair.
3.	If there is NO continuity: (if there IS continuity go to step 4) a. Replace RTD Probe. b. Return to calling Page
4.	Check continuity of Black wire pair to probe or shield.
5.	If there IS continuity: (if there is NO continuity go to step 6) a. Replace RTD Probe. b. Return to calling Page
6.	Check continuity of WHITE wire pair.
7.	If there is NO continuity: (if there IS continuity go to step 8) a. Replace RTD Probe. b. Return to calling Page
8.	Check continuity of WHITE wire pair to probe or shield.
9.	If there IS continuity: (if there is NO continuity go to step 10) a. Replace RTD Probe. b. Return to calling Page
10.	Check continuity of BLACK wire pair to WHITE wire pair.
11.	If there IS continuity: (if there is NO continuity go to step 12) a. Replace RTD Probe. b. Return to calling Page
12.	Return to Calling Page

Current Source Test

Equipment Required

2017373-004 Totalflow Diagnostics Kit
(contains Digital Multimeter w/ alligator clip leads)

or

2017373-005 Diagnostics Kit only (no Digital Multimeter)

Step	Action
1.	Make sure RTD is disconnected.
2.	Set DMM in 200m Volts DC Range
3.	Select RTD TEST RESISTANCE VALUE.
4.	Install RTD TEST RESISTANCE by inserting into J7(6400) . J10 (6700)
5.	Clip the positive lead of the DMM to the upper most available location of the RTD TEST RESISTANCE.
6.	Clip the negative lead of the DMM to the lower most available location of the RTD TEST RESISTANCE.
7.	Supply power to the unit.
8.	Once running, the measured value across the RTD TEST RESISTANCE should be: R32 minimum of 100mv to a maximum of 125mv. R141 Minimum of 123mv to a maximum of 155mv
9.	The RTD measurement on the FCU display should measure R32 31.0 to 33.0 R141 140.8 to 142.8
10.	If either of the measured values are outside of range a. **Remove Power** b. Replace AMU. c. Return to Calling Page.