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USE OF THE MEGA BEAST SERVICE CONDUCTOR TESTER (HJA-900-D)

1.0 GENERAL

This work method describes the use of the “Mega Beast” Service Conductor Tester by H.J. Arnett Industries.

The Mega Beast is a conductor tester used to apply up to 80 amps (in 20 amp increments) on 120 volt service to determine if one or both of the conductors are open (or partially open), as well as verifying the condition of the neutral conductor. There are many reasons why a service may not be providing maximum voltage to the customer including a faulted cable, loose connection or some other resistive condition. The Mega Beast is a self-contained, fully portable device which can be used to load transformers and service conductors for diagnostic testing.

2.0 HOW THE MEGA BEAST WORKS (from the Mega Beast Service Conductor Tester manual)



- 2.1 For each position of the “burden switch” (left, center, right) different readings appear on the meters based on the condition of the conductors. The selected meter may drop (usually only a couple of volts for conductors in good condition) due to the load being put on the transformer. The Mega Beast will read as below when connected to “good” service conductors.

<u>Switch Position</u>	<u>Load (Burden)</u>	<u>Left Meter</u>	<u>Right Meter</u>
Centre	OFF	120 volts	120 volts
Left	ON	120 volts	120 volts
Right	ON	120 volts	120 volts

The Mega Beast will read as below when connected to an open neutral.

<u>Switch Position</u>	<u>Load (Burden)</u>	<u>Left Meter</u>	<u>Right Meter</u>
Centre	OFF	120 volts	120 volts
Left	OFF	0 volts	240 volts
Right	OFF	240 volts	0 volts

The Mega Beast will read as below when connected to an open “hot” service conductor.

<u>Switch Position</u>	<u>Load (Burden)</u>	<u>Left Meter</u>	<u>Right Meter</u>
<u>Open Right Conductor</u>			
Centre	OFF	120 volts	0 volts
Left	ON	120 volts	0 volts
Right	OFF	120 volts	0 volts
<u>Open Left Conductor</u>			
Centre	OFF	0 volts	120 volts
Left	OFF	0 volts	120 volts
Right	ON	0 volts	120 volts

3.0 OPERATION (from the Mega Beast Service Conductor Tester manual)

NOTE: Ensure the 100A breaker on the MEGA Beast is in the OFF position and all 4 toggle switches are OFF before connecting any leads.

- 3.1 Remove the KWH meter. Always wear your personal protective equipment (PPE) and follow Standard Work Method SWM 5.10 and 5.11.
 - If the meter base is deteriorated and meter cannot be removed safely, then the first test can be made at the weather head on the meter side of the service connections
- 3.2 Inspect the meter base for loose connections or any other observable problems. With the **Mega Beast 100 amp breaker in the off position (de-energized)**, connect the alligator clips. First connect Green to neutral, then Black on left and Red on right.
- 3.3 Switch the 100 amp breaker on the Mega Beast ON. The voltages between each hot wire and the neutral will be displayed on the meters.
- 3.4 Turn the burden switch to the LEFT position. Start by turning one 20 amp load toggle switch ON (does not matter which one of the four is used). Sequentially turn ON additional 20 amp load toggle switches and record each step in Appendix A.
- 3.5 Turn OFF all toggle switches and repeat with the burden switch in the RIGHT position.

- 3.6 Compare recorded readings (for burden switch in LEFT position) with the table below for analysis of results. Readings will not be exactly as shown.
- 110 V to 125 V – Normal range
 - 106 V to 110 V and 125 V to 127 V – Extreme operating conditions, improvement work should be taken on a planned basis
 - <106 V or >127 V – Outside the extreme range therefore should be escalated to more immediate fix.

<u>Left Meter</u>	<u>Right Meter</u>	<u>Indication</u>
120	120	Left meter reads 120V, so left conductor is good
85	120	Only left meter drops, so left conductor is partially open. If left meter goes blank, left conductor is fully open.
90	150	Left meter drops, right meter increases, so neutral is open. These readings represent a partial open. If left conductor goes blank and the right meter reads 240V, then the neutral is completely open.

- 3.7 Compare recorded readings (for burden switch in RIGHT position) with the table below for analysis of results.

<u>Left Meter</u>	<u>Right Meter</u>	<u>Indication</u>
120	120	Right meter reads 120V, so right conductor is good
120	85	Only right meter drops, so right conductor is partially open. If right meter goes blank, right conductor is fully open.
150	90	Right meter drops, left meter increases, so neutral is open. These readings represent a partial open. If right conductor goes blank and the left meter reads 240V, then the neutral is completely open.

- 3.8 Complete the description of service table at the bottom of Appendix A.

4.0 3-PHASE APPLICATIONS

- 4.1 The Mega Beast can be used effectively on 120/208 volt 3-phase Wye systems as seen below.

1. Connect clips to neutral, line 1 and line 2.
2. Take readings on Line 1 and Line 2.
3. Move one clip lead from either line 1 or line 2 to line 3.
4. Take readings again.

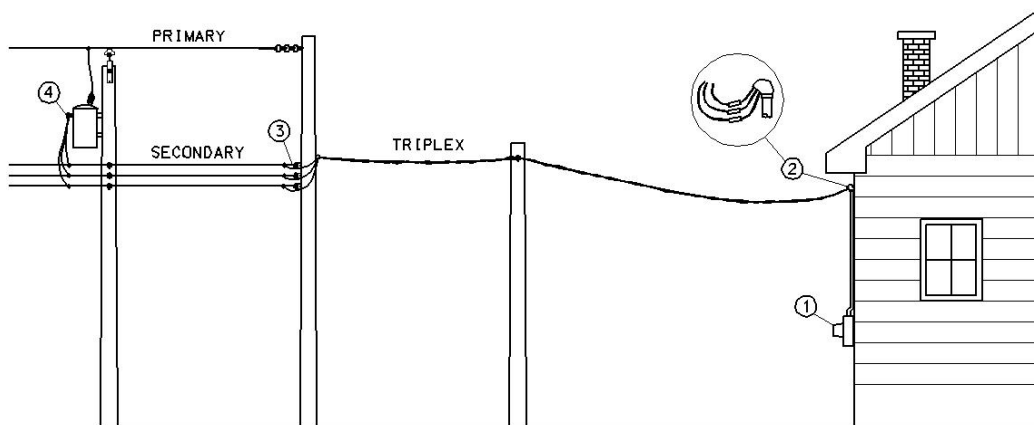
Results can be interpreted the same as for single phase operation.

5.0 CAUTION (from the Mega Beast Service Conductor Tester manual)

- 5.1 This tool is **not** to be used on 120/208 volt 3-phase 4-wire Delta because 208 volts are present between ground and “high phase” of the 3-phase 4-wire Delta system.
- 5.2 This tool is **NOT** to be used on 347/600V systems.

6.0 PIN-POINTING SOURCE OF TROUBLE

- 6.1 Refer to sketch below to indicate locations at which the Mega Beast is typically installed in sequence in order to pin-point source of trouble (high impedance connection).
- 1) Begin at Meter Base if possible (if doubtful that meter can be removed safely, then check at meter base side of service connections at location 2)
 - 2) If test 1) above gives bad readings, then attempt to locate source of high impedance by moving backwards sequentially until Mega Beast no longer sees the ' BAD connection '. This will typically begin at location 2, on the source side of the service connections.
 - 3) If step 2) also shows the problem, then move to the next set of connections, possibly at location 3) to test, again on the source side of these connectors.
 - 4) Proceed accordingly until you are at the transformer leads themselves for testing.
- 6.2 Once the location has been determined, then change out all connections at this one location preferably and return to step 1) above to confirm solution.



APPENDIX A

Mega Beast Meter Readings:

(Table to record your readings, record voltages from digital meters on Mega Beast)

<u>Left Meter</u>	<u>Right Meter</u>	<u>Condition</u>
		Switch in LEFT position
		ONE toggle switch ON (20A)
		TWO toggle switches ON (40A)
		THREE toggle switches ON (60A)
		FOUR toggle switches ON (80A)
		<u>RESET all toggle switches OFF (0A)</u>
		Switch in RIGHT position
		ONE toggle switches ON (20A)
		TWO toggle switches ON (40A)
		THREE toggle switches ON (60A)
		FOUR toggle switches ON (80A)
		<u>RESET all toggle switches OFF (0A)</u>

Description of Service:

(Table to record a brief description of the service being tested)

Transformer KVA rating (KVA)	Transformer Secondary Voltage (V)	Distance from Transformer	Type of Conductor	Number of customers on Transformer